PROPOSED ACCEPTABLE BIOLOGICAL CATCH AND OPTIMUM YIELD SPECIFICATIONS AND MANAGEMENT MEASURES

FOR THE

2004 PACIFIC COAST GROUNDFISH FISHERY

FINAL ENVIRONMENTAL IMPACT STATEMENT, INCLUDING REGULATORY IMPACT REVIEW, AND INITIAL REGULATORY FLEXIBILITY ANALYSIS

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COVER SHEET
2004 Groundfish Specifications and Management Measures
ENVIRONMENTAL IMPACT STATEMENT

Proposed Action:	Specify harvest levels (acceptable biological catch [ABC] and optimum yield [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 year 2004, although they are considered within the context of past management and long-term sustainability of managed fish stocks. Harvest specifications for 2004 include new harvest levels for species with new stock assessments and re-established harvest levels for species with stock assessments completed in prior years. Long-term management programs, such as capacity reduction programs, are not implemented as part of the annual management process, but in separate Council deliberations. Management measures may be modified in 2004, so total fishing mortality is at the OYs identified in the preferred alternative. The environmental impact of any such changes in management measures is expected to fall within the range of impacts evaluated in this environmental impact statement (EIS). Federally-managed Pacific groundfish fisheries occurring off the coasts of Washington, Oregon, and California (WOC) establish the geographic context for the proposed action.
Type of Statement:	Final Environmental Impact Statement

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Abstract:

The *Pacific Coast Groundfish Fishery Management Plan* (FMP) establishes a framework authorizing the range and type of measures that may be used to manage groundfish fisheries, enumerates 18 objectives that management measures must satisfy (organized under three broad goals), and describes more specific criteria for determining the level of harvest that will provide the greatest overall benefit to the Nation, or OY. Fisheries subject to management measures include limited entry trawl fisheries, limited entry fixed gear (pot and longline) fisheries, and a variety of other fisheries catching groundfish, either as target species or incidentally, but not license limited under the management framework established in the groundfish FMP. Allocations to tribal fisheries in Washington State are also identified. To date, nine groundfish species have been declared overfished by the Secretary of Commerce (Secretary), and measures to prevent overfishing

and rebuild these overfished stocks are a central element of this action. The proposed action establishes harvest guidelines for groundfish species, species groups, and geographic subunits. In order to constrain fisheries to these harvest guidelines, management measures for commercial and recreational fisheries are identified. Management measures considered for commercial fisheries include two-month cumulative landing limits for species, species groups, and geographic subunits for limited entry trawl and fixed gear sectors, and fisheries not license limited under the Pacific Coast Groundfish Fishery Management Plan, and gear restrictions to reduce bycatch of overfished species and reduce habitat impacts. Management measures considered for recreational fisheries include bag limits, size limits, and fishing seasons; which vary by state. In addition, area closures based on depth and intended to reduce bycatch of species apply to both commercial and recreational fisheries that are likely to catch these species. These closures vary by geographic area and time of year.

Comments due by: February 17, 2004.

EXECUTIVE SUMMARY

INTRODUCTION

This document provides background information about, and analysis of, harvest specifications and management measures for fisheries covered by the *Pacific Coast Groundfish Fishery Management Plan* (FMP) and developed by the Pacific Fishery Management Council (hereafter, the Council). These measures 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. In addition to addressing MSA mandates, this document is organized so that it contains the analyses required under the National Environmental Policy Act (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 Environmental Impact Statement (EIS), although it addresses the mandates just mentioned and contains required elements of an Initial Regulatory Flexibility Analysis (IRFA) pursuant to the RFA and a Regulatory Impact Review (RIR) pursuant to EO 12866.

This EIS is divided into the following ten chapters:

Chapter 1 describes the ***purpose and need for, and goals and objectives of,*** the proposed action, which also defines the scope of the subsequent analysis, and the scoping process used to identify the range of alternatives and the potentially significant environmental impacts to be analyzed in this document.

Chapter 2 outlines different ***alternatives*** the Council and NMFS considered to address the purpose and need.

Chapter 3 describes the ***affected environment***, or baseline environmental and social conditions as they exist before implementation of the proposed action.

Chapter 4 assesses the predicted potential ***environmental and socioeconomic impacts*** of the alternatives outlined in Chapter 2. This analysis compares and contrasts the alternatives and evaluates how the human environment may potentially be changed by the proposed action in comparison to the baseline conditions described in Chapter 3.

Chapter 5 explains how these management measures are consistent with the groundfish FMP and 10 National Standards set forth in the MSA (§301(a)) and governing plans, plan amendments, and pursuant regulations.

Chapter 6 describes how this EIS addresses relevant laws and EOs, other than the MSA. As appropriate, it also includes additional required elements of and determinations required by these mandates.

Chapters 7 and 8 provide background information on the staff who prepared this document and its distribution to other agencies and interested parties. Chapter 9 is the bibliography.

Chapter 10 reproduces comments received on the draft EIS and the responses to those comments.

Purpose and Need for the Proposed Action

The proposed action falls 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 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.

The Proposed Action

The Council's and NMFS' *proposed action*, evaluated in this document, is to 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 year 2004, although they are considered within the context of past management and long-term sustainability of managed fish stocks. Harvest specifications for 2004 include new harvest levels for species with the new stock assessments and re-established harvest levels for species with stock assessments completed in prior years. Long-term management programs, such as capacity reduction programs, are not developed as part of the annual management process, but in separate Council deliberations. Management measures may be modified in 2004 so that total fishing mortality is at the OYs identified in the preferred alternative. The environmental impact of any such changes in management measures is 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.

Need (Problems for Resolution)

The proposed action is needed to constrain commercial and recreational harvests in 2004 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.

Purpose of the Proposed Action

The purpose of this action is to ensure that Pacific Coast groundfish subject to federal management are harvested at OY during 2004 and in a manner consistent with the aforementioned groundfish FMP and National Standards Guidelines (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 5 of this EIS describes how the proposed action (preferred alternative) is consistent with the FMP and MSA.

Groundfish Management and the Annual Specifications Process

The groundfish FMP allows harvest guidelines and quotas to be re-specified on a periodic basis. Harvest guidelines are specified numerical harvest objectives which are treated as targets but not absolute limitations. Therefore, a fishery does not have to be closed if its harvest guideline is reached, although the Council may choose to do so. All recent numerical harvest specifications, including OY values, have been harvest guidelines. A quota is defined as a specified numerical harvest objective, the attainment (or expected attainment) of which causes closure of the fishery for that species or species group. The main use of harvest guidelines and quotas recently has been to designate allocations and sub-components of a specified OY.

In accordance with the groundfish FMP, since 1990 the Council has annually set Pacific Coast groundfish harvest specifications (acceptable and sustainable harvest amounts) and management measures designed to achieve those harvest specifications. Of the more than 80 groundfish species managed under the FMP, only about 20 are assessed for stock size and status on a regular basis. When the Council recommends a new set of harvest specifications in a given year, normally only specifications for those species with new assessments, or past assessments containing an OY projection for the coming year, are changed from the previous year's value. In addition, nine groundfish species have been declared overfished by the Secretary of Commerce, pursuant to provisions in the MSA.[1/] Based on stock assessments, scientists have conducted rebuilding analyses for these species in order to determine suitable harvest levels consistent with the rebuilding framework established by the MSA and the groundfish FMP. OYs for unassessed stocks are based on more limited data, such as catch history, and are not usually changed year to year.

Proposed 2004 OYs differ from 2003 values for 12 stocks. Five of these are based on data from new stock assessments conducted in 2003, and in the case of overfished species, updated rebuilding analyses using the new assessment information.[2/] Of the remaining seven stocks, new values for all but Pacific whiting are based on projections contained in assessments conducted in earlier years. In the case of Pacific whiting a new assessment will be completed by March 2004, in time for the May 1 start of this fishery. The range of whiting OYs evaluated in this EIS captures the range of potential values expected from that assessment. In summary, the alternatives described in Chapter 2 are structured around different OY values for a limited number of stocks. However, the different management measures needed to achieve these OYs can limit catches of other species, resulting in large differences among the alternatives in terms of actual landings.

In order to rebuild overfished groundfish species while satisfying the groundfish FMP's resource utilization goal, Council policy is to use management measures that discourage or prevent targeting of these species. The Council has also recommended management policies to reduce the incidental catch of overfished species taken in fisheries targeting healthier stocks. When suites of management measures are developed for each alternative, projected bycatch (discarded fish) is estimated for overfished species. (The "bycatch scorecards" presented in Chapter 2 as Tables 2.2.1-1, 2.2.2-1, 2.2.3-1, 2.2.4-1, and 2.2.5-1 summarize these estimates.) From a practical perspective, OYs for overfished species therefore represent a cap on total fishing mortality. In 2003, the Council began using observer data from the West Coast groundfish observer program as a basis for overfished species' total catch (landed catch plus bycatch) projections.[3/] Additional observer data will become available early in 2004 and will likely be used to adjust total catch projections for the year (which could lead to inseason changes in management measures, as occurred in 2003). These efforts to account for total catch mortality serve as a basis for the development of management measures. Cumulative landing limits, which groundfish fishery managers have used in different forms for many years, still feature prominantly in 2004 management. Trip limits are generally set in combinations that allow higher landings of healthy stocks in months and seasons when those healthy stocks co-occur less frequently with overfished stocks. "Rockfish Conservation Areas" first implemented in the second half of 2002, are now a key feature of management measure[4/]. These closed areas vary in configuration by area, season, and fishery, and are intended to exclude commercial vessels from fishing in depths where overfished species are concentrated.

1/ These species are: bocaccio (*Sebastes levis*), cowcod (*S. levis*), canary rockfish (*S. pinninger*), darkblotched rockfish (*S. crameri*), Pacific ocean perch (*S. alutus*), widow rockfish (*S. entomalas*), yelloweye rockfish (*S. ruberimus*), lingcod (*Ophidon elongates*), and Pacific whiting (*Merluccius productus*).

2/ These are: bocaccio, Pacific ocean perch, and widow rockfish, which have been declared overfished; and black rockfish (*Sebastes melanops*) and yellowtail rockfish (*S. flavidus*), which are considered healthy stocks.

3/ The first full year of these data, from August 2001 through August 2002, became available in March 2003.

4/ GCAs include the Rockfish Conservation Area (RCA), Yelloweye Rockfish Conservation Area (YRCA), and Cowcod Conservation Area (CCA).

Finally, gear restrictions, combined with differential landing limits, have been established to discourage bottom trawling in rocky nearshore areas where some overfished groundfish occur.

Determining the Scope of the Analysis

According to the National Environmental Policy Act of 1969 (NEPA) the public and other agencies must be involved in the decision-making process. "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 environmental impact statement (EIS).

On June 5, 2003, NMFS and the Council published a Notice of Intent (NOI) in the *Federal Register* announcing their intent to prepare an EIS in accordance with the NEPA for the 2004 acceptable biological catch and optimum yield specifications and management measures for the Pacific Coast groundfish fishery. 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 public scoping period, ending on July 7, 2003, was announced in the NOI. Two opportunities for the public to comment orally on the scope of the EIS occurred on June 17, 2003, and June 20, 2003, as part of the regular agenda of a Council meeting. In addition, written comments were accepted through the end of the scoping period. The Council process, which is based on stakeholder involvement, also allows for public participation and public comment on fishery management proposals during Council, subcommittee, and advisory body meetings. These processes contributed to the development of alternatives analyzed in this EIS and helped in identifying issues screened for potentially significant impacts.

Alternatives Considered by the Council

The Council, in consultation with its advisory bodies and the public, developed the five alternatives evaluated in the EIS, representing a full range of permissible harvest levels and practicable management measures. These are the *No Action* alternative, the *Low OY* alternative, the *Medium OY* alternative, the *High OY* alternative, and the *Council OY* alternative, which is the preferred alternative recommended by the Council for implementation by NMFS.

Each alternative has two components. One is a specification of an optimum yield (OY) for each species or species complex managed under the groundfish FMP. These OYs represent the total fishing mortality (which includes bycatch mortality) that stocks can safely sustain. The Council evaluated a preliminary range of OYs at their June 2003 meeting and began crafting the set of OYs that became part of the *Council OY* alternative. The Council finalized and approved these OYs, along with the other sets of OYs, at their September 2003 meeting.

Once OYs for each managed species or species complex have been identified, management measures must be crafted which will limit the total catch across all fishery sectors to the OY harvest level. Given the multi-species nature of these fisheries, it is not possible to manage them so that each species' OY is met while none are exceeded. Some species thus become "constraining stocks" because their relatively low OY necessitates management measures which prevent the higher OYs of other species from being completely caught.

The range of available management measures is generally limited to those that can be periodically implemented through the management framework described in the FMP. These measures include gear restrictions, limits on how many fish a vessel can catch in a specified time period (referred to as cumulative landing limits), closed areas, and for recreational fisheries, bag limits and seasons. The allocation of fishing opportunity between fishery sectors and the states (usually expressed as percentage shares of a species' OY) is another important component of each alternative.

At their June meeting, the Council also identified a list of management measures the Groundfish Management Team (GMT) should consider in crafting the alternatives. The GMT identified suites of management measures for each set of OYs based on analyses of total catch mortality. The Team carried out much of this work between the June and September meetings, and working with the Council at their September meeting, finalized the suites of management measures for each alternative. Management measures for the *Council OY* alternative were developed during the September meeting once the Council had finalized the OYs for that alternative.

Chapter 2 details three management issues that were considered when crafting the alternatives presented in that chapter:

<u>Alternative harvest levels (discussed in Section 2.1.1)</u>: Harvest levels for eleven species or species complexes differ from their 2003 values (which represent the OYs in the *No Action* alternative). Of these, nine OYs differ among the other, action alternatives. (This includes separate OYs for the sablefish stocks north and south of Point Conception.) Generally, OYs were ranged in the action alternatives for species below their MSY biomass level for which new assessments and/or rebuilding analyses presented alternative interpretations of stock status or a tradeoff between biological and socioeconomic goals. A new stock assessment for Pacific whiting was not available for Council decision-making. OY alternatives were ranged around a multiple of the 2003 OY. Since this fishery occurs in the summer months, the Council delayed identifying an OY for this species in their preferred alternative until March 2004, when the new information will be available. Black rockfish had not been previously assessed and was managed as part of the remaining rockfish and other rockfish categories. With a new stock assessment it can be managed under its own OY, requiring an adjustment to the "Other Rockfish North" and "Other Rockfish South" categories to compensate for the removal of black rockfish from those categories. (This adjustment is not tallied as a change between the 2003 and 2004 harvest levels.) Table 2.1.1-1 lists all the OYs under each of the five alternatives.

<u>Catch sharing (discussed in Section 2.1.2)</u>: Once an overall harvest level (OY) has been established for a given stock under an alternative, it is often necessary to determine how that harvest opportunity will be allocated among different groups. Some allocations have been previously established and are more or less fixed—the sub-division of OYs among at-sea, shore-based, and tribal participants in the Pacific whiting fishery, for example. In other cases, a variety of allocation schemes are considered, depending on the species. Generally, these schemes involve a complicated mix of allocations between recreational and commercial fisheries, within sectors in the commercial fishery, and among the three West Coast states. Chapter 2 describes allocation schemes for black rockfish, bocaccio, canary rockfish, lingcod, sablefish, widow rockfish, and yelloweye rockfish. Allocations are usually based on the distribution of past catches of a given species by sectoral or geographic groups. Determining an appropriate base period and evaluating any peculiarities that may have influenced catch distribution during the base period complicate these calculations.

<u>Trawl B platoon (discussed in Section 2.1.3)</u>: The limited entry trawl fishery has been managed according to a platoon system. Vessels may elect to join either the A or B platoon; the cumulative landing limit period for the B platoon is staggered by two weeks. This system was established to allow better coordination of landings with processor demand. Fishermen also argue that the platoon system makes it easier for them to avoid bad weather when deciding when to fish, so its elimination could have an effect on weather-related vessel safety. But with the implementation of RCAs this system has complicated enforcement because RCA boundaries can change between cumulative limit periods. As a result, two different sets of boundaries have

to be simultaneously monitored and enforced according to which platoon a vessel is in. Dual platoons also complicate some management functions, such as catch accounting and scheduling fishery observer trips. In structuring and evaluating alternatives the Council considered the costs and benefits of eliminating the platoon system.

Chapter 2 also describes each alternative in terms of management measurers applied to each of the major fishery sectors. The main features of each alternative are briefly summarized below.

The No Action Alternative

The *No Action* alternative (described in Section 2.2.1) represents the harvest specifications and management measures in place as of September 2003. These differ somewhat from what was described in the EIS evaluating 2003 management measures and implemented at the beginning of the year. The Council recommends inseason adjustments to the measures based on information received during the fishing year. Switching to bycatch rates for the trawl fishery based on observer data (versus logbook data as previously used) influenced total catch estimates and required changes to management measures. Preliminary landings estimates also influenced total catch estimates requiring further inseason changes. Where OYs differ between the *No Action* alternative and the other alternatives, they mostly show an increase from 2003 levels (No Action) to 2004 levels, at least for the *Medium OY*, *High OY*, and *Council OY* alternatives. For stocks that have been assessed, but not since the last round of OY setting (for 2003), OYs are calculated by applying the appropriate fishing mortality rate to an estimate of current exploitable biomass projected from the last assessment. Assuming no grave model or estimation errors, actual exploitable biomass for stocks below B_{MSY} will have increased, resulting in higher OYs. The bocaccio and widow rockfish OYs under *No Action* represent perhaps the most significant difference between it and the other alternatives. Because of new assessments, the bocaccio OY is substantially larger under all the action alternatives while the widow rockfish OY is smaller under the action alternatives. Since the management measures under the *No Action* alternative are designed to ensure that none of the OYs are exceeded, there would be a mis-match between the application of these management measures and what could be acceptably harvested in 2004, as reflected in the action alternatives' OYs.

In general, the same types of management measures would be used under the *No Action* alternative as under the action alternatives. For commercial fisheries these include the RCAs and cumulative trip limits, which vary by two-month limit period. RCAs are larger under the *No Action* alternative and extend further offshore for trawl vessels in order to constrain catches of darkblotched rockfish, which has a lower OY under the *No Action* alternative. South of Point Conception, the low bocaccio OY required more extensive RCAs.

Another important gear-related management measure applies to the trawl fishery under *No Action*. Vessels using small footrope trawl gear at any time in a cumulative limit period are subject to lower trip limits for Dover sole, thornyheads, and sablefish (DTS species) for the entirety of that period. Small footropes are more commonly used in areas inshore of RCAs; but if this gear is used, the lower trip limits act as a penalty by limiting the amount of fish that can be caught in deeper water with either small or large footrope trawl gear. (Large footrope gear is preferred when trawling on the soft bottom areas offshore where DTS species are found.) This is meant to encourage vessels to fish exclusively seaward of the RCA, using large footrope gear, thereby avoiding bycatch of overfished groundfish species (particularly canary rockfish) found on the continental shelf. This management measure would also be used under all the action alternatives.

Bycatch of overfished species is a major consideration determining recreational management measures under all alternatives including the *No Action* alternative. Recreational fisheries south of Cape Mendocino are subject to the most restrictive management measures, to limit catches of bocaccio, which has a very low OY under this alternative. (Canary and yelloweye rockfish catches are also a consideration.) In 2003, the fishery in this area was restricted to waters shallower than 20 fathoms (fm) during a six-month, July through December season. North of Cape Mendocino, California recreational management measures are similar to those in Oregon. Along with Washington, these areas would have a year round recreational season along with various bag limits and sub-limits intended to discourage catches of overfished rockfish.

The Low OY Alternative

The *Low OY* alternative (described in Section 2.2.2) represents the most precautionary approach to management with OYs reflecting the most conservative interpretation of stock assessment results. In Table 2.2.2-1 the *Medium OY* alternative ABCs and OYs apply to the blank cells in the *Low OY* and *High OY* alternatives. This highlights the differences between the action alternatives. Keeping this in mind, and comparing the *Low OY* alternative to the *No Action* alternative, it can be seen that they differ in a few crucial respects. Looking only at those OYs which differ between the *Low OY* and *Medium OY* alternatives, and comparing them to the *No Action* alternative, the widow rockfish OY is substantially lower while the bocaccio OY is substantially higher. These differences result from new stock assessment results that differentiate the *No Action* and action alternatives generally. Other overfished species also have lower OYs under this alternative, but the differences are not great and are unlikely to require substantially different management measures under the *Low OY* alternative. Sablefish is an exception; since this is a high-value species, the almost 2,000 mt reduction in the OY would affect revenues generated from fisheries.

RCA boundaries do not vary substantially among the action alternatives. For limited entry trawl fisheries they are almost identical among the action alternatives. (South of the 40º 10' N latitude management area boundary the shoreward RCA boundary is 25 fm deeper in most periods under the *High OY* alternative.) RCA boundaries do vary more among the alternatives for limited entry fixed gear and open access sectors; RCAs are generally wider under the *No Action* alternative in comparison to the other alternatives. Commercial cumulative trip limits do not differ substantially from the *No Action* alternative or, for that matter, among the action alternatives. (Tables 2.2.2-2 through 2.2.2-7 describe trip limits by regulatory sector and area.) In formulating the trip limits, adjustments are made by modeling projected total catch (including bycatch), taking into account the effect of RCAs. This results in modest variations across the alternatives. It should be noted that the *No Action* alternative trip limits show greater variability between periods in part because of inseason changes. The *Council OY* alternative, as implemented as the preferred alternative for 2004 management, will likely undergo similar adjustments inseason. Such adjustments are based on preliminary landings data and either relax or increase constraints on fisheries in order to ensure total catch stays within OYs without necessitating fishery closures before the end of the fishing year.

The Pacific whiting OY under this alternative is half that under the *No Action* alternative (74,100 mt versus 148, 200 mt). Although Pacific whiting are a relatively low value fish, large catches make the directed fisheries an major component of the total revenue generated by groundfish fisheries. This comparatively low OY would reduce these revenues by $13.5 million.

Under the *Low OY* alternative recreational fisheries would be more limited in comparison to the other alternatives. South of Cape Mendocino restrictions would be somewhat relaxed in comparison to the *No Action* alternative, mainly due to the higher OY for bocaccio. However, recreational fisheries along much of the West Coast must be managed to limit canary rockfish catches because of the low OY for this species. Open seasons are increased and vessels are allowed into deeper water during some parts of the year south of Cape Mendocino. (Under the action alternatives, the region south of Cape Mendocino is divided into sub-zones in which different recreational management measures would be implemented.) North of Cape Mendocino, management measures tend to be considerably more restrictive in comparison to the *No Action* alternative. For example, in Northern California recreational fishing is prohibited in waters deeper than 30 fm and limited to a March through December season. A 40 fm maximum depth limit is imposed in Oregon. Canary rockfish retention is also prohibited in Washington and Oregon, along with existing retention limits and prohibitions for overfished groundfish species.

The High OY Alternative

The *High OY* alternative (described in Section 2.2.4) derives OYs (for those differing from the *Low OY* alternative) using the least precautionary interpretation of uncertainties about the true condition of stocks. Except for widow rockfish, OYs are greater than or equal to those under the *No Action* alternative.

RCA boundaries, where they vary from the other action alternatives, result in smaller closed areas, or in the case of limited entry fixed gear and open access sectors, their elimination south of Point Conception. Cumulative trip limits are very similar to the other action alternatives, with some adjustments to account for generally higher OYs. (Tables 2.2.4-2 through 2.2.4-7 describe the trip limits under this alternative by regulatory sector and area). Bycatch of widow rockfish is an important consideration in the Pacific whiting fishery, since these fleets account for the largest share of this bycatch. Although the widow rockfish OY is less than under *No Action*, it is high enough to accommodate the expected widow rockfish bycatch. (In 2003 and bycatch rates were such that total catches of widow rockfish were well below the OY.)

Recreational measures are generally liberalized under this alternative, both in comparison to the *No Action* alternative and the other action alternatives. Depth restrictions are relaxed or eliminated south of Cape Mendocino. However, a 30 fm depth limit would apply in California waters north of there; no depth restriction applies to this area under *No Action*. Seasonal restrictions are more modest too; recreational fishing would be open year round south of Point Conception, for example. Bag limits and retention prohibitions are also relaxed.

The Medium OY and Council OY Alternatives

In developing their preferred alternative (the *Council OY* alternative, described in Section 2.2.5), the Council modified the *Medium OY* alternative (described in Section 2.2.3); this explains the close similarity between the two. For this reason they are treated together in this summary. The OYs under both of these alternatives are generally greater than or equal to the *No Action* alternative OYs and intermediate to the *Low OY* and *High OY* alternatives. As with the other action alternatives, widow rockfish OYs are lower in comparison to *No Action* because of the results of the stock assessment completed in 2003. Pacific whiting, canary rockfish, bocaccio, and darkblotched rockfish differ under *Council OY* in comparison to the *Medium OY* alternative.

Pacific whiting is a special case; the Council recommended deferring choosing a 2004 OY until March 2004. A new stock assessment will be available at that time and since most whiting are caught between in May and August in the directed fishery this delay has little practical effect. Whatever OY is chosen, it is expected to fall within the range of alternative analyzed in this EIS, so potential impacts can be anticipated.

Canary rockfish shows a one metric ton increase in the OY under the *Council OY* alternative in comparison to the *Medium OY* alternative. Canary rockfish OYs vary depending on the proportion of the total catch caught in the recreational versus commercial sectors.[5/] Different allocations between the two sectors account

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5/ Since OYs are measured in terms of weight, a metric ton of smaller size fish represent a greater number (continued...)

for the difference between the *Low OY* alternative canary rockfish OY (44 mt) and the value under the *Medium OY* and *High OY* alternatives (46 mt). The OY under the *Council OY* alternative (47 mt) results from the actual anticipated allocation between the sectors, based on the management measures under this alternative. Once catches in each sector were projected, these values were used to also recalculate the appropriate OY.

The Council applied a precautionary reduction in the bocaccio OY (from 306 mt to 250 mt) in their preferred alternative. Given projected total catch (161 mt under the *Medium OY* alternative and 136 mt under the *Council OY* alternative), this is unlikely to have much practical effect. If the actual total fishing mortality of bocaccio is substantially higher than projected, then this reduction could obligate the Council to modify management measures inseason; however, this is unlikely.

Finally, the Council reduced the darkblotched rockfish OY in their preferred alternative. This reduction results from what might be called an anomaly in the assessment process, which resulted in the OY exceeding the ABC under the *Medium OY* and *High OY* alternatives. The darkblotched rockfish assessment completed in 2003 was an update rather than a full assessment. The ABC is calculated by multiplying the best estimate of exploitable biomass by a proxy fishing mortality rate. The OY is calculated differently as part of the rebuilding analysis. This calculation takes into account stock productivity (in terms of past recruitment or spawner-recruit ratios) to determine a trajectory of OYs for a given rebuilding probability. Because of recent favorable recruitment included in the analysis, resulting OYs exceed the differently-calculated ABC value. Since harvests above the ABC would constitute overfishing under the management framework, the Council made a precautionary reduction to this threshold level. It may be that the proxy fishing mortality rate for darkblotched rockfish, underlying the ABC calculation, is overly conservative. However, stock dynamics will have to be much better understood before any conclusion can be made.

Because of these adjustments to OYs, management measures under the *Council OY* alternative differ from the *Medium OY* alternative in a number of ways. The seaward RCA boundary for limited entry trawl north of Cape Mendocino is extended to 200 fm (in comparison to 150 fm under the *Medium OY* alternative) for all but the May-June cumulative limit period. This primarily addresses the change to the darkblotched rockfish OY. The 200 fm seaward boundary is currently in place in 2003 (representing the *No Action* alternative). The shoreward boundary for this RCA is set at 75 fm under the *Council OY* alternative, as opposed to 50 fm under *No Action* (2003 management). This change reduces effort concentration in nearshore areas. Cumulative trip limit changes, discussed below, encourage trawling seaward of the RCA, which may also reduce nearshore effort concentration. The RCA boundary for limited entry fixed gear and open access fleets south of Cape Mendocino also shows some modest changes: north of Point Conception periods in which the shoreward boundary approximates the 30 fm depth contour, as opposed to the 20 fm contour, are different. This represents a slight relaxation in the depth restriction, mainly due to a tightening of California state regulations applied to nearshore fisheries. South of Point Conception the shoreward boundary is set at 60 fm as opposed to 80 fm in the *Medium OY* alternative. This change supports state management of nearshore rockfish and may also help reduce cowcod bycatch. (Boccacio bycatch also will be likely reduced; but as noted above, even with the precautionary reduction under the *Council OY* alternative, bocaccio should not act as a constraining species in terms of fishing opportunity.)

5/ (...continued)
of fish. However, in considering sustainable production from a fish population it is the number of fish (reaching reproductive age, for example) that matters. Since the recreational fishery catches smaller size fish than commercial fisheries, a larger allocation to that sector requires a reduction in the OY in order to achieve the same stock rebuilding rate.

Limited entry trawl cumulative trip limits mainly differ between the *Medium OY* and *Council OY* alternatives north of Cape Mendocino. These changes mostly relate to the differential trip limits for large versus small footrope trawl gear, discussed above under the *No Action* alternative. If small footrope gear are used in a cumulative limit period, trip limits under the *Council OY* alternative are generally smaller than under the *Medium OY* alternative. Combined with the difference in the RCA boundary, discussed above, these measures are intended to increase trawling in deep water where overfished species bycatch rates are lower. A comparison of trip limits under the *Council OY* and *No Action* alternatives is more difficult because of the inseason changes reflected in the *No Action* trip limit tables. But overall, this same intent—to make fishing on the continental slope more attractive—can be discerned by this comparison. Limited entry fixed gear and open access cumulative trip limits do not differ between the *Medium OY* and *Council OY* alternatives. In comparison to *No Action*, these cumulative trip limits show modest increases for a range of both deepwater and nearshore species.

Differences in recreational management measures between the *Medium OY* and *Council OY* alternatives mainly reflect more cautious management of nearshore species in California waters south of Cape Mendocino. Washington measures do not differ between the alternatives. Other differences between the *Council OY* and *No Action* alternatives are changes in bag limits and sub-limits to address changes in the OY for overfished species, which were discussed above.

The Impacts of the Alternatives on the Human Environment

As noted above, Chapter 3 describes all environmental resources potentially affected by the proposed action and alternatives. It provides details about West Coast geography, bathymetry, ocean currents, and climate; the various stocks of groundfish and where they occur; and essential fish habitat. The chapter also describes the current status of the overfished stocks, as well as other stocks that are affected by actions contemplated for the West Coast groundfish fisheries. There is also a description of the affected socioeconomic environment, including all the affected fisheries and fishing communities. Groundfish fisheries include limited entry trawl, limited entry fixed gear, directed open access, incidental open access, charter, recreational, and tribal fisheries. Potentially affected markets and the structure and values of fishing communities are also described. The affected environment description serves as a baseline for assessing the changes resulting from implementation of any of the alternatives. The baseline represents conditions in 2002, because the most recent time period when complete data are available. Since the *No Action* alternative represents the estimated effect of management measures applied in 2003, the other alternatives are compared to *No Action* as another way to gauge their effects.

Chapters 4 evaluates the impacts of the alternatives. The discussion in this chapter is summarized below according to the main human environment components evaluated in the EIS. For each human environment component evaluation criteria were developed in order to measure impacts. The direct, indirect, and cumulative effects to each environmental component are evaluated based on these criteria. (Direct impacts occur at the same time and in the same place as the proposed action. Indirect impacts, occur at a different time or place. The cumulative effect is the total effect, including other past, present, and reasonably foreseeable future actions.)

Habitat and Ecosystem

The 1996 Sustainable Fisheries Act re-authorizing and amending the Magnuson-Stevens Act obligates the Councils and NMFS to identify and characterize essential fish habitat (EFH), which for West Coast groundfish is defined as the aquatic habitat necessary to allow for groundfish production to support long-term sustainable fisheries for groundfish and for groundfish contributions to a healthy ecosystem. To satisfy this description EFH must be described for all life history stages of managed species. EFH descriptions have been incorporated into the groundfish FMP. West Coast groundfish species managed by the groundfish FMP occur throughout the EEZ and occupy diverse habitats at all stages in their life histories. EFH may be large, because a species' pelagic eggs and larvae are widely dispersed for example, or comparatively small as is the case with the adults of many nearshore rockfishes, which show strong affinities to a particular location or type of substrate. The ecosystem concept is closely related to the habitat concept. Ecosystems embody both the relationships between species, represented by the flow of material and energy through a network of relationships, and the sum total of the species comprising the system within a given physical setting. This overlaps with habitat as the physical and biological attributes to the space occupied by a particular species.

There are limited data available on the distribution, intensity, and duration of fishing effort associated with the groundfish fisheries. Furthermore, the different gear types used in fisheries would have different kinds of impacts to habitat, although bottom trawl gear is likely to have the greatest impact because of its extensive contact with substrate. The effects of fishing gear on different types of habitat is not well understood either. For example, in high energy environments (e.g., strong wave action or currents) the relative effect of fishing gear may be modest compared to more stable, low energy environments. For these reasons, there is insufficient information to fully evaluate the effects of the proposed action on essential fish habitat.

The alternatives are assessed in terms of their effect on EFH and ecosystems as a whole. It is expected the *Low OY* alternative will have the least impact as it will likely result in the least fishing effort. Because trip limits under the *No Action* alternative*, Medium OY* alternative*,* and *Council OY* alternative are similar, these alternatives will likely result in comparable levels of fishing activity and effects. It is expected the *High OY* alternative would have the greatest effect on EFH because it provides for the highest trip limits, which may result in the highest intensity of fishing effort. Because all alternatives include similar area closures on the continental shelf (GCAs), bottom-contacting groundfish gear will not disturb benthic habitat in these areas. Because it is likely that the distribution of fishing effort will shift in response to changes in these shelf closed areas, there may be more impacts to EFH in deep water (depths greater than 150 fm) and nearshore areas (depths less than 75 fm). Cumulative effects cannot be distinguished among the alternatives except in relation to the intensity of direct and indirect impacts. Thus the relative cumulative impacts have the same relative intensity as the direct and indirect impacts discussed above.

Overfished Groundfish Stocks

Overfished groundfish are managed according to a framework for rebuilding these species to a target biomass, which represents the best estimate of B_{MSY}, which is in turn based on guidelines for National Standard 1 in the MSA (detailed at 50 CFR 600.310). (National Standard 1 states "Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield form each fishery for the United States fishing industry.") This framework represents a policy tradeoff between rebuilding stocks more rapidly, which requires a greater reduction in harvests of a given overfished species, and the short-term socioeconomic benefits to fisheries and fishing communities of allowing comparatively higher harvest. Using this framework, the Council manages according to a target rebuilding year (T_{TARGET}) for each overfished stock, which then dictates the allowable harvest in the current year. The analytical method (called a rebuilding analysis) used to determine the current-year harvest level also provides a measure of risk associated with that policy in the form of a "rebuilding probability" (P_{MAX}). Both the target year and this measure of risk can be used to evaluate the overfished species OYs chosen under the alternatives.

This picture is complicated because most of the new stock assessments on which harvest specifications for 2004 were based present a range of results. Stock assessments are an attempt to model complex natural processes—population dynamics—and the nature and intensity of all relationships are not completely known or precisely measured. Recognizing this uncertainty, in most cases, stock assessment authors presented several sets of results, based on different sets of assumptions. In essence, these results represent different interpretations of the actual state of nature. Rebuilding analyses depend, in turn, on which stock assessment results are used as a basis for the analysis. For a given species, the OYs in the different alternatives may vary based on the choice of model results. This choice entails the assumption of some level of risk, given that the range of results reflect uncertainty, although this risk is not specified. Comparison of policy choices about rebuilding (in terms of P_{MAX}, for example) is consequently difficult because the metrics related to rebuilding are based on different state-of-nature assumptions.

Management measures are crafted to keep total fishing mortality for a given stock within the OY identified for that stock in the alternative. As part of the analytical process, total catch mortality for each overfished species under each alternative has been estimated. These estimates are detailed in bycatch scorecards for each alternative (*No Action*: Table 2.2.1-1, *Low OY*: 2.2.2-1, *Medium OY*: 2.2.3-1, *High OY*: 2.2.4-1, *Council OY*: 2.2.5-1). If projected catch exceeds the OY for a species, this would be a significant impact. Because of the inherent error in catch estimates (since all fishing mortality cannot be directly measured) projected catch only slightly below the OY represent a greater impact—in terms of risk—than cases where there is more of a buffer between projected catch and the OY.

The *No Action* alternative uses the OYs in place for the 2003 fishing year. It therefore does not incorporate the results of new stock assessments and rebuilding analyses. Even for overfished species not newly assessed, such as lingcod and canary rockfish, ABCs and OYs may be adjusted based on recent data and productivity estimates from the most recent assessment. *No Action* alternative OYs are generally lower than the intermediate OY choices represented by the *Medium OY* alternative with the exception of the widow rockfish OY, which was lowered substantially based on a new stock assessment completed in mid-2003. The bycatch scorecard for this alternative (Table 2.2.1-1) represents current estimates of total fishing mortality in 2003; except for bocaccio—with its very low OY—none of these 2003 OYs are anticipated to be exceeded. Comparing estimated catch to *Medium OY* alternative OYs (which should represent a more accurate picture of stock status in 2004), projected catches if 2003 management measures were re-applied (representing *No Action*) would not exceed these OYs. (Even the widow rockfish projected catch, at 109 mt, is well below the 284 mt OY under *Medium OY.* However, the *No Action* OY for this species is much higher than what the best estimate based on the new stock assessment would allow as a harvest specification.) Practically speaking, these comparatively low projected harvests would make this alternative more risk averse in terms of rebuilding.

The *Low OY* alternative is the most precautionary of the action alternatives in terms of the OYs. Generally, these OYs represent the most risk-averse interpretation of stock assessment results, and given this choice, a higher likelihood of rebuilding the stock. Projected catches of canary, darkblotched, and widow rockfish would exceed these OYs, based on the management measures proposed for this alternative, however.

As noted above, the *Medium OY* alternative assumes mid-range stock assessment results, and where they vary, an intermediate rebuilding probability, in order to specify OYs. Projected catches of canary and widow rockfish are expected to exceed their respective OYs. For widow rockfish the total catch estimates are based on historic bycatch rates in the whiting fishery, where a large proportion of widow rockfish occurs. However, two factors may reduce bycatch from historic levels. First, the fishing fleet is getting better at avoiding bycatch as total catch mortality accounting acts as a disincentive to incurring bycatch. Second, in 2003 the whiting stock was highly aggregated and distributed in the northern-most portion of the EEZ. Both these factors contribute to lower bycatch rates.

The *High OY* alternative bases OYs on the least precautionary interpretation of stock assessment results, and assumes lower rebuilding probabilities than the other alternatives, in cases where they vary among the alternatives.[6/] Examining the bycatch scorecard for this alternative (Table 2.2.2-4), estimated total catch of canary rockfish, lingcod, and cowcod would exceed their respective OYs.

As discussed above, the *Council OY* alternative represents a modification of the *Low OY* alternative, with precautionary adjustments to three OYs, the deferral of a choice of a whiting OY, and further tailoring of management measures to keep projected catches within OYs.

Other Fish Stocks

The groundfish FMP includes more than 80 fish species in its fishery management unit. A fairly large subset of these are targeted in groundfish fisheries, although a much smaller proportion represent the bulk of commercial and recreational landings. Most of these species have not been fully assessed because they are not target species and/or caught in large amounts. Therefore, they are managed to keep landings at or below historic levels. Some assessed species, including some of the most important target species such as sablefish, Dover sole, and shortspine thornyhead are below the target biomass, B_{MSY}, although not overfished. OYs for these stocks are set according to a precautionary formula that progressively reduces the OY below the ABC as the estimated stock size is lower. This precautionary reduction allows sufficient surplus production to allow the stock to increase to the target biomass over time. As discussed above, OYs only differ from those under *No Action* for assessed stocks. The only OYs that vary among the action alternatives, excluding overfished species, are for sablefish and black rockfish. The range of sablefish OYs is based on different model assumptions in the most recent stock assessment. Under all the alternatives management measures have been tailored to keep total harvest mortality within respective OYs.

Protected Species

Protected species are those subject to the provisions of the Endangered Species Act, the Marine Mammal Protection Act, the Migratory Bird Treaty Act, and EO 13186 (*Responsibilities of Federal Agencies to Protect Migratory Birds*). Various stocks of Pacific salmon are subject to Endangered Species Act protection measures, as are several West Coast marine mammal, sea turtle, and bird species.

Presumably, effects on protected species correlate with changes in the level of fishing effort. Increased fishing effort could lead to an increase in interactions between fishing vessels and protected species while a decrease in fishing effort would have the opposite effect. Thus, changes in fishing effort could be one way to evaluate the relative effects of the alternatives. However, there are limited data available on the distribution, intensity, and duration of fishing effort associated with the groundfish fisheries. Furthermore, different gear types would affect protected species differently, so the relative level of fishing effort by gear type would have to be accounted for. Even if such data were available, this distribution and intensity level of fishing effort would have to be correlated with the distribution of protected species. Finally, the effects of resulting interactions (aside from observed mortality) need to be better understood. Given these limitations, projected groundfish landings and proposed closed areas are used as proxies for fishing effort as criteria to assess the relative effects of the alternatives on protected species.

6/ The framework for rebuilding overfished species does not allow risk-prone management; that is, the choice of a rebuilding probability less than 50%. This applies to all the alternatives.

It is predicted the *Low OY* alternative will have the least impact on protected species as it will likely result in the least fishing effort. Because trip limits under the *No Action* alternative*, Medium OY* alternative, and *Council OY* alternative are similar, these alternatives will likely result in comparable levels of fishing activity and effects on protected species. It is expected the *High OY* alternative would have the greatest effect on protected species, because it provides for the highest trip limits, which may result in the highest intensity of fishing effort. Because all alternatives include similar area closures on the continental shelf (GCAs), protected species would benefit from a decreased likelihood of interactions with groundfish vessels in these areas. Because it is likely that the distribution of fishing effort will shift in response to changes in these shelf closed areas, there may be an increased likelihood of interactions between protected species and groundfish vessels in deep water (depths greater than 150 fm) and nearshore areas (depths less than 75 fm).

The Socioeconomic Environment

Public Sector

The public sector represents the policy, science, and management entities comprising the current management regime. Effects on the public sector correlate with changes in the level of regulatory complexity. Regulatory complexity affects the public costs of implementing a management regime by increasing the burden of monitoring, enforcing, and adjusting fisheries to meet but not exceed intended impact levels. The assessment of risk to the resource is intrinsic to the costs to the public sector. Management alternatives with a high degree of regulatory complexity or a substantial reliance on accurate and timely inseason fishery data not only increase the expense of enforcement and monitoring, they also increase the risk of non-compliance and overfishing. Reducing OYs has several impacts related to these issues. First, monitoring bycatch becomes crucial to effective management. This is generally a difficult proposition because, by definition, bycatch is discarded at sea. Self reporting, if done, is usually not accurate enough and placing fishery observers on vessels (a current key monitoring strategy in the groundfish fishery) is costly and administratively complex. Fishery dependent data—information derived from actual catches—can be an important or primary basis for stock assessments. Constraining fisheries through lower OYs, albeit necessary, may hamper the assessment process. Two issues bear on enforcement-related management complexity. The size and extent of closed areas, which have to be monitored, add to the enforcement burden. Implementation of a vessel monitoring system (VMS), slated for the beginning of 2004 and covering all limited entry vessels, is a separate action that could cumulatively affect enforcement in a positive way. Satellite-based VMS allows real time shore-based monitoring of vessels' positions making it much easier to monitor incursions into RCAs. Elimination of the trawl B platoon, discussed above, would also simplify enforcement because all vessels within a given regulatory class would be subject to the same set of regulations in every two-month cumulative limit period.

Alternatives with a larger buffer between their OYs and projected catches better account for the uncertainties inherent in catch (and especially bycatch) monitoring. All alternatives except for the *Council OY* alternative (the preferred alternative) have projected catches of overfished species over their respective OYs. The *Council OY* includes measures resulting in a larger decrease in projected catches in relation to OYs, although the absolute size of these buffers are small for the most constraining species. The difference among the alternatives in terms of the configuration of RCAs and areas closed to recreational fishing is not great enough to create substantially different impacts on enforcement complexity. Only the *Council OY* alternative eliminates the trawl B platoon, facilitating enforcement. In conclusion, the *Council OY* will likely have the least impact on public sector issues of the alternatives considered here.

Commercial Fisheries

The Pacific Coast groundfish fishery is a multi-species fishery that takes place off the coasts of Washington, Oregon, and California. Maintaining year-round fishing opportunities for groundfish has been one of the primary management objectives for the fishery. Pacific Coast groundfish support or contribute to a wide range of commercial, recreational, and tribal fisheries and the communities dependent on these fisheries. Groundfish is only one component of the West Coast fish harvest that supports commercial seafood vessels, processors, and commercial seafood dependent communities. Commercial fisheries targeting groundfish are, for the most part, regulated under a license limitation program implemented in 1994. Fisheries targeting groundfish that are not under the groundfish license limitation program, and fisheries that catch groundfish incidentally while targeting nongroundfish species, are termed open access. The Council allocates commercial harvest (OYs) between limited entry and open access fisheries. Buyers and processors are an important value-added component of regional fisheries.

Changes in exvessel revenue is used in this EIS as a general indicator of the change in expected net economic benefits derived from harvest by the commercial seafood vessels. This evaluation is made according to major regulatory sectors of the groundfish fleet: limited entry trawl, limited entry fixed gear, and open access. The open access fishery can be further subdivided between those vessels likely targeting groundfish (defined as those deriving more than 5% of their gross income from groundfish) and those for which groundfish catches are incidental to targeting nongroundfish species (defined as those deriving less than 5% of their gross income from groundfish). Evaluating changes in costs is also important if one wishes to specify net benefit. However, data are insufficient to do so in a quantitative manner. This EIS does include a qualitative discussion of factors affecting costs to fishing firms. Other criteria used to evaluate impacts include changes in operational flexibility, safety, and cumulative effects of other current or planned regulatory programs.

The following table summarizes the impacts of the alternatives on commercial fisheries in terms of exvessel revenue. As discussed above, elimination of the B platoon will result in cost savings for fishery enforcement but may represent a cost increase for the vessel owner/operator.

		Alternatives				
	1998	*No Action* (Status Quo, 2003)	*Low OY*	*Medium OY*	*High OY*	*Council OY*
Commercial Groundfish Exvessel Revenue (millions of dollars, no inflation adjustment)						
- Whiting	$11.6	$15.3	$7.6	$15.3	$23.1	$15.3
- Trawl Nonwhiting GF	$34.5	$22.9	$21.2	$23.6	$24.0	$22.8
- Nontrawl	$16.7	$12.1	$8.7	$13.1	$14.2	$13.5
Other Compliance Costs						
-RCA			Generally smaller than 2003	Generally smaller than 2003	Generally smaller than 2003	Generally smaller than 2003
-B Platoon			Same as 2003	Option eliminated (some cost increase, simplified regs)	Same as 2003	Option eliminated (some cost increase, simplified regs)
-Impact on Adjacent Fleets			Possible short-Term increase in pressure	Similar to 2003	Possible short-Term increase in pressure	Similar to 2003
Safety			Negative	Neutral to positive	Positive	Neutral to positive
Cumulative						
VMS		Imposed on the trawl fleet in 2004. Capital and operation costs are associated with the requirement. May be extended to other portions fo the groundfish fleet in coming years.				
Buyback		Referendum has occurred. Industry costs of approximately $36 million. May result in higher trip limits after permits are retired, possibly in mid-2004.				
ITQs		Under consideration in the long-term. May result in consolidation within the fleet and increased efficiency. There will be monitoring and enforcement costs, some of which will likely be born by industry.				

Buyers and Processors

The seafood distribution chain begins with deliveries by the harvesters (exvessel landings) to the shoreside networks of buyers and processors, and includes the linkage between buyers and processors and seafood markets. In addition to shoreside activities, processing of certain species (e.g. Pacific whiting and pollock) also occurs offshore on factory ships. Several thousand entities have permits to buy fish on the West Coast. State fishtickets in the year 2000 (excluding tribal catch) show 1,780 buyers purchased fish which were caught in ocean areas and landed in Washington, Oregon, or California. Of those buyers, 732 of them purchased groundfish. An important and growing share of groundfish harvest is delivered live, primarily to restaurants. Live fish command a much higher exvessel price, fueling growth in this fishery sector. In 2000, nearshore rockfish and perch—but also included thornyheads, sablefish and lingcod roundfish—were the primary groundfish species delivered live. The great majority of live fish landings occur in California, with the remainder in Oregon.

Due to the lack of data on prices, costs, and profitability of buyers and processors, many of the same indicators as used for the harvesting sectors are used for comparing impacts on the buyer/processing sector. Specifically, as a proxy for profits, exvessel revenue is used as an indicator of activity level. From the buyers' perspective, exvessel revenue represents expenditures for a primary production input. In the EIS, projected change in exvessel revenue under the alternatives is stratified by different categories to examine impacts by buyer/processors' relative size and level of involvement in or dependence on groundfish purchases.

Aggregate impacts on buyers and processors under the alternatives are shown in the table below.

Buyer/processor Impacts	Low OY	Medium OY	High OY	Council OY
Total raw material purchases (% change from No Action)	-21.6%	3.9%	18.4%	3.0%
Operating costs	uncertain	uncertain	uncertain	uncertain
Markets and balance of trade	no effect	no effect	no effect	no effect

Recreational Fisheries

Marine recreational fisheries consist of both charter and private vessels. Charter vessels are larger vessels for hire that can typically fish farther offshore than most vessels in the private recreational fleet. Both nearshore and shelf opportunities are important for West Coast recreational groundfish fisheries.

Evaluating impacts to recreational fisheries is less straightforward than commercial fisheries because benefits are not priced. (This excludes revenue and income from commercial activities, such as charter fishing vessel firms, that support recreational fishing.) Changes in the number of recreational trips, which can be projected based on the management measures under each of the alternatives, is one measure used to compare the alternatives. Changes in the quality of these trips, which affects the recreational experience, is another consideration. Reducing bag limits, for example, may affect trip quality. Management regulations governing recreational fishing seasons or permitted fishing areas can also affect safety. Recreational fishers may be more likely to go out in bad weather or fish in areas with dangerous sea conditions in response to limits on opportunity. For example, closing areas outside of a shallow depth zone (such as the 20 fm depth closure applicable under *No Action*) places recreational boaters closer to the shore where marine hazards (rocks, surf, etc.) may be greater. The EIS also considers differential impacts by state, since recreational regulations vary by jurisdiction.

Aggregate impacts on recreational fisheries under the alternatives are shown in the table below.

Recreational Fishery Impacts	Indicator	No Action (est. 2003)	Low OY	Medium OY	High OY	Council OY
Estimated effort						
All Trips	(000 trips)	3,430	4,738	5,183	5,330	4,303
GF Trips	(000 trips)	986	2,294	2,740	2,886	1,860
Quality of trips	(-,0,+)	-	+	+	++	+
Effect on adjacent fisheries	(-,0,+)	-	-	-	-	-
Operational safety						
WA	(-,0,+)	0	0	0	0	0
OR	(-,0,+)	0	0	0	0	0
CA (North of 40-10)	(-,0,+)	0	-	-	-	-
CA (40-10 to 34-27)	(-,0,+)	-	+	+	+	+
CA (South of 34-27)	(-,0,+)	-	+	+	+	+
Demand for charters	(-,0,+)	-	+	+	++	+

Tribal Fisheries

Indian tribes in Washington, primarily the Makah, Quileute, and Quinault, harvest groundfish in the EEZ. There are set tribal allocations for sablefish and Pacific whiting, while the other groundfish species' allocations are determined through the Council process in coordination with the tribes, states, and NMFS. Commercial tribal groundfish fisheries are described in Section 3.5.5, which describes ceremonial and substance harvests. Like non-tribal commercial fisheries, the impacts of the alternatives are evaluated based on changes in projected exvessel revenue. Aggregate impacts on tribal fisheries under the alternatives are shown in the table below. Projected tribal landings and revenues under the *Council OY* alternative are relatively higher than in 1998 and 2002, and roughly the same as expected in 2003.

Tribal Groundfish Harvest	No Action (est. 2003)	Low OY	Medium OY	High OY	Council OY
landings (mt)	26,597	14,286	26,709	31,815	25,000
revenue ($,000) a/	5,661	3,745	6,024	6,775	6,024

a/ Assuming average 2002 exvessel prices.

Fishing Communities

Fishing communities are defined in a broad sense as collections of ports and processing facilities that are grouped based on geographical proximity and similarity of available fishery commercial opportunities and the applicable management regime. Due to data limitations and statistical uncertainty, recreational fisheries are differentiated at a broader, regional level: the state level for Washington and Oregon, and Northern (north of Point Conception) and Southern components for California recreational fisheries.

Projected commercial landings and recreational fishing effort under the different alternatives are compared against comparable recent historical data to estimate change in landings by port area. The resulting change in personal income due to these changes is then modeled for each port area. Personal income changes are used to estimate changes in employment. These changes in personal income and employment serve as a proxy for a range of potential effects on communities.

Aggregate income and employment impacts on coastal communities under the alternatives resulting from commercial fishing and recreational fishing activities are shown in the table below.

Community Impacts	No Action (est. 2003)	Low OY	Medium OY	High OY	Council OY
Commercial fishing community impacts:					
income impact ($,000)	524,663	507,285	526,623	537,794	526,191
employment impact (jobs)	18,365	17,742	18,484	18,919	18,460
Recreational fishing community impacts:					
income impact ($,000)	214,926	309,808	327,643	337,154	270,272
employment impact (jobs)	8,321	11,656	12,281	12,612	10,289

The effect of the alternatives on non-consumptive values is also considered in the impact analysis. Examples of non-consumptive uses include wildlife viewing and the derivation of secondary benefits from ecosystem services. One or more of the following non-use benefits may result from preservation of fish stocks at higher levels of abundance (1) existence value derived from knowing a fish population or ecosystem is protected without intent to harvest, observe, or otherwise derive direct benefits from the resource; (2) option value placed on knowing a fish population, habitat, or ecosystem has been protected and is available for use, regardless of whether the resources are actually used; and (3) bequethal value placed on knowing a fish population, habitat, or ecosystem is protected for the benefit of future generations. It is difficult to measure and aggregate individuals' non-use values for a given resource. For this discussion, the primary criterion used as a proxy for non-use values is unharvested biomass in the ocean. This is assumed to be inversely proportional to harvest levels under the alternatives. Action alternatives ranked from highest to lowest unharvested total biomass are: *Low OY*, *Council OY*, *Medium OY*, *High OY*.

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ACRONYMS AND GLOSSARY

ABC	acceptable biological catch. The ABC is a scientific calculation of the sustainable harvest level of a fishery, and is used to set the upper limit of the annual total allowable catch. It is calculated by applying the estimated (or proxy) harvest rate that produces maximum sustainable yield to the estimated exploitable stock biomass (the portion of the fish population that can be harvested).
B_{MSY}	The biomass that allows maximum sustainable yield to be taken.
B_o	Unfished biomass; the estimated size of a fish stock in the absence of fishing.
BO	Biological Opinion
BRD	bycatch reduction device
CalCOFI	California Cooperative Oceanographic Fisheries Investigation
CCA	Cowcod Conservation Area
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations. A codification of the regulations published in the *Federal Register* by the executive departments and agencies of the federal government. The CFR is divided into 50 titles that represent broad areas subject to federal regulation Title 50 contains wildlife and fisheries regulations.
CMC	Center for Marine Conservation
Council	Pacific Fishery Management Council
CPF	commercial passenger fishing vessel
CPS	coastal pelagic species. Coastal pelagic species are schooling fish, not associated with the ocean bottom, that migrate in coastal waters. They usually eat plankton and are the main food source for higher level predators such as tuna, salmon, most groundfish, and humans. Examples are herring, squid, anchovy, sardine, and mackerel.
CPUE	catch per unit effort
CZMA	Coastal Zone Management Act
DAP	domestic annual processing
DTS	Dover sole, thornyhead(s), and trawl-caught sablefish complex

EA	environmental assessment. As part of the National Environmental Policy Act (NEPA) process, an EA is a concise public document that provides evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact.
EC	Enforcement Consultants
EEZ	Exclusive Economic Zone. A zone under national jurisdiction (up to 200 nautical miles wide) declared in line with the provisions of the 1982 United Nations Convention of the Law of the Sea, within which the coastal state has the right to explore and exploit, and the responsibility to conserve and manage, the living and non-living resources.
EFH	essential fish habitat. Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.
EFP	exempted fishing permit
EIS	environmental impact statement. As part of the National Environmental Policy Act (NEPA) process, an EIS is an analysis of the expected impacts resulting from the implementation of a fisheries management or development plan (or some other proposed action) on the environment. EISs are required for all fishery management plans as well as significant amendments to existing plans.
EO	Executive Order
ENSO	El Niño southern oscilation
EPIRB	emergency position indicating radio beacons
ESA	Endangered Species Act. An act of federal law that provides for the conservation of endangered and threatened species of fish, wildlife, and plants. When preparing fishery management plans, councils are required to consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service to determine whether the fishing under a fishery management plan is likely to jeopardize the continued existence of an ESA-listed species, or to result in harm to its critical habitat.
F	The instantaneous rate of fishing mortality. The term "fishing mortality rate" is a technical fishery science term that is often misunderstood. It refers to the rate at which animals are removed from the stock by fishing. The fishing mortality rate can be confusing because it is an "instantaneous" rate that is useful in mathematical calculations, but is not easily translated into the more easily understood concept of "percent annual removal."
FEAM	Fishery Economic Assessment Model

fecundity	The potential to produce offspring.
fm	fathoms
FMP	Fishery management plan. A plan, and its amendments, that contains measures for conserving and managing specific fisheries and fish stocks.
FONSI	Finding of No Significant Impact. As part of the National Environmental Policy Act (NEPA) process, a finding of no significant impact (FONSI) is a document that explains why an action that is not otherwise excluded from the NEPA process, and for which an environmental impact statement (EIS) will not be prepared, will not have a significant effect on the human environment.
FRFA	Final Regulatory Flexibility Analysis. the FRFA includes all the information from the initial regulatory flexibility analysis. Additionally, it provides a summary of significant issues raised by the public, a statement of any changes made in the proposed rule as a result of such comments, and a description of steps taken to minimize the significant adverse economic impact on small entities consistent with stated objectives.
FVCTF	The U.S. Coast Guard's Fishing Vessel Casualty Task Force
GAP	Groundfish Advisory Subpanel. The Council established the GAP to obtain the input of the people most affected by, or interested in, the management of the groundfish fishery. This advisory body is made up of representatives with recreational, trawl, fixed gear, open access, tribal, environmental, and processor interests. Their advice is solicited when preparing fishery management plans, reviewing plans before sending them to the Secretary, reviewing the effectiveness of plans once they are in operation, and developing annual and inseason management.
GCA	Groundfish Conservation Area
GMT	Groundfish Management Team. Groundfish management plans and annual and inseason management recommendations are prepared by the Council's GMT, which consists of scientists and managers with specific technical knowledge of the groundfish fishery.
HAPC	habitat areas of particular concern
HMS	highly migratory species
INPFC	International North Pacific Fishery Commission
IPHC	International Pacific Halibut Commission. A commission responsible for studying Pacific halibut stocks and the halibut fishery. The IPHC makes proposals to the U.S. and Canada concerning the regulation of the halibut fishery.

IRFA	Initial Regulatory Flexibility Analysis. Anytime an agency publishes a notice of proposed rule making and the rule may have a significant impact on a substantial number of small entities, an IRFA is required. It describes the impact of the proposed rule on small entities and includes a description of the action, why it is necessary, the objectives and legal basis for the action, the small entities that will be impacted by the action, and the projected reporting, record-keeping, and other compliance requirements of the proposed rule. Rules that duplicate, overlap, or conflict with the proposed rule are also identified.
ITQ	individual transferrable quota
JVP	joint venture processing
kg	kilogram
m	meter
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act. The MSA, sometimes known as the "Magnuson-Stevens Act," established the 200-mile fishery conservation zone, the regional fishery management council system, and other provisions of U.S. marine fishery law.
MBTA	Migratory Bird Treaty Act
mean generation time	A measure of the time required for a female to produce a reproductively-active female offspring.
MFMT	maximum fishing mortality threshold. A limit identified in the National Standard Guidelines. A fishing mortality rate above this threshold constitutes overfishing.
MHHW	mean higher high water (level, high tide line)
mixed stock exception	In "mixed-stock complexes," many species of fish swim together and are caught together. This becomes a problem when some of these stocks are healthy and some are overfished, because even a sustainable harvest of the healthy stocks can harm the depleted stock. In order to avoid having to shut down all fisheries to protect one particular overfished stock, the national standard guidelines allow a "mixed-stock" exception to the "overfished" definition. This would allow higher catches of some overfished species than ordinarily allowed in order to avoid severe hardship to fishing communities.
MMPA	Marine Mammal Protection Act. The MMPA prohibits the harvest or harassment of marine mammals, although permits for incidental take of marine mammals while commercial fishing may be issued subject to regulation. (See "incidental take" for a definition of "take".)

MPA	marine protected area
MRFSS	Marine Recreational Fisheries Statistics Survey
MSA	Magnuson-Stevens Fishery Conservation and Management Act (see Magnuson-Stevens Act, above).
MSST	minimum stock size threshold. A threshold biomass used to determine if a stock is overfished. The Council proxy for MSST is $B_{25\%}$.
MSY	maximum sustainable yield. An estimate of the largest average annual catch or yield that can be continuously taken over a long period from a stock under prevailing ecological and environmental conditions. 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.
mt	metric ton. 1,000 kilos or 2,204.62 pounds.
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NGO	non-governmental organization
NMFS	National Marine Fisheries Service. A division of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). NMFS is responsible for conservation and management of offshore fisheries (and inland salmon). The NMFS Regional Director is a voting member of the Council.
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPOA	National Plan of Action
NSG	National Standards Guidelines
NRDC	Natural Resources Defense Council
NWR	Northwest Region
ODFW	Oregon Department of Fish and Wildlife
overfished	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	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 (B_{MSY}) or its proxy.
OY	optimum yield. The amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems. The OY is developed on the basis of the MSY from the fishery, taking into account relevant economic, social, and ecological factors. In the case of overfished fisheries, the OY provides for rebuilding to a level that is consistent with producing the MSY for the fishery.
PacFIN	Pacific Coast Fisheries Information Network
PDO	Pacific decadal oscillation
PEIS	programmatic environmental impact statement
P_{MAX}	The estimated probability of reaching T_{MAX}. May not be less than 50%.
PMCC	Pacific Marine Conservation Council
POP	Pacific ocean perch
RCA	Rockfish Conservation Area
Rebuilding	Implementing management measures that increase a fish stock to its target size.
RecFIN	Recreational Fishery Information Network
RFA	Regulatory Flexibility Act (see IRFA and FRFA above). The Regulatory Flexibility Act (5 U.S.C. 601-612) requires federal agencies to consider the effects of their regulatory actions on small businesses and other small entities and to minimize any undue disproportionate burden.
RGC	rockfish, greenling, cabezon
RIR	Regulatory Impact Review. RIRs are prepared to determine whether a proposed regulatory action is "major." The RIR examines alternative management measures and their economic impacts.

SAFE	Stock Assessment and Fishery Evaluation. A 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, including the fish processing sector. It summarizes, on a periodic basis, the best available information concerning the past, present, and possible future condition of the stocks and fisheries managed in the FMP.
Secretary	U.S. Secretary of Commerce
SFA	Sustainable Fisheries Act (see Magnuson-Stevens Act, above).
SSC	Scientific and Statistical Committee. An advisory committee of the Council made up of scientists and economists. The Magnuson-Stevens Act requires that each council maintain an SSC to assist in gathering and analyzing statistical, biological, ecological, economic, social, and other scientific information that is relevant to the management of Council fisheries.
STAR	Stock Assessment Review Panel. A panel set up to review stock assessments for particular fisheries. In the past there have been STAR panels for sablefish, rockfish, squid, and other species.
STAT	Stock Assessment Team. Stock assessment authors from the National Marine Fisheries Service fisheries science centers.
SWFSC	NMFS Southwest Fishery Science Center
TAC	total allowable catch
TALFF	total allowable level of foreign fishing
T_{MAX}	The maximum time period to rebuild an overfished stock, according to National Standard Guidelines. Depends on biological, environmental, and legal/policy factors.
T_{TARGET}	The target year, set by policy, for a fish stock to be completely rebuilt.
T_{MIN}	The minimum time period to rebuild an overfished stock, according to National Standard Guidelines. Technically, this is the minimum amount of time in which a fish stock will have a 50% chance of rebuilding if no fishing occurs (depends on biological and environmental factors).
U and A	usual and accustomed
USFWS	U.S. Fish and Wildlife Service
VMS	vessel monitoring system
VMSC	Ad Hoc Vessel Monitoring System Committee

ABBREVIATIONS AND ACRONYMS, GLOSSARY (continued)

WDFW	Washington Department of Fish and Wildlife
WOC	Washington/Oregon/California
YRCA	Yelloweye Rockfish Conservation Area

1.0 INTRODUCTION

1.1 How This Document is Organized

This document provides background information about, and analysis of, harvest specifications and management measures for fisheries covered by the *Pacific Coast Groundfish Fishery Management Plan* (FMP) and developed by the Pacific Fishery Management Council (hereafter, the Council). These measures 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. In addition to addressing MSA mandates, this document is organized so that it contains the analyses required under the National Environmental Policy Act (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 Environmental Impact Statement (EIS), although it addresses the mandates just mentioned and contains required elements of an Initial Regulatory Flexibility Analysis (IRFA) pursuant to the RFA and a Regulatory Impact Review (RIR) pursuant to EO 12866.

This EIS is divided into the following ten chapters:

The rest of this chapter discusses why the Council and NMFS must establish management measures for fisheries anticipated to catch groundfish in 2004 and the process that has been used to develop these measures. This description of ***purpose and need*** defines the need for, and goals and objectives of, the proposed action, which also defines the scope of the subsequent analysis. Chapter 1 also describes the scoping process by which Council and NMFS staff identified the range of alternatives and the potentially significant environmental impacts to be analyzed in this document.

Chapter 2 outlines different ***alternatives*** the Council and NMFS considered to address the purpose and need. One of these alternatives is chosen by the Council and NMFS as its preferred alternative, representing the harvest specifications and management measures that could be applied in 2004. Each alternative has two components. One is a specification of an optimum yield (OY) for each species or species complex managed under the groundfish FMP. These OYs represent the total fishing mortality (which includes bycatch mortality) that stocks can safely sustain. Each alternative also contains a suite of management measures that can be periodically implemented through the management framework described in the FMP. These measures include gear restrictions, limits on how many fish a vessel can catch in a specified time period (referred to as trip limits), closed areas, and for recreational fisheries, bag limits, and seasons. The allocation of fishing opportunity between fishery sectors and the states (usually expressed as percentage shares of a species' OY) is another important component of each alternative. The suite of management measures in each alternative is crafted so as to constrain total fishing mortality, across all fishery sectors, to a level at or below the OY for each identified species or species complex.

Chapter 3 describes the ***affected environment***, or baseline environmental and social conditions as they exist before implementation of the proposed action.

Chapter 4 assesses the predicted ***environmental and socioeconomic impacts*** of the alternatives outlined in Chapter 2. This analysis compares and contrasts the alternatives and evaluates how the human environment may potentially be changed by the proposed action in comparison to the baseline conditions described in Chapter 3.

Chapter 5 explains how these management measures are consistent with the groundfish FMP and 10 National Standards set forth in the MSA (§301(a)) and governing plans, plan amendments, and pursuant regulations.

Chapter 6 describes how this EIS addresses relevant laws and EOs, other than the MSA. As appropriate, it also includes additional elements and determinations required by these mandates.

Chapters 7 and 8 provide background information on the staff who prepared this document and its distribution to other agencies and interested parties. Chapter 9 is the bibliography.

Chapter 10 reproduces comments received on the draft EIS and the responses to those comments.

1.2 Purpose and Need for the Proposed Action

The proposed action falls 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), and authorizes the range and type of measures that may be used to achieve optimum yield. 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 Action

The Council's/NMFS' *proposed action*, evaluated in this document, is to 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 year 2004, although they are considered within the context of past management and long-term sustainability of managed fish stocks. Harvest specifications for 2004 include new harvest levels for species with the new stock assessments and re-established harvest levels for species with stock assessments completed in prior years. Long-term management programs, such as capacity reduction programs, are not developed as part of the annual management process, but in separate Council deliberations which are outside the scope of this EIS. Management measures may be modified in 2004, so total fishing mortality is at the OYs identified in the preferred alternative. The environmental impact of any such changes in management measures is 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 action is needed to constrain commercial and recreational harvests in 2004 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 Purpose of the Proposed Action

The purpose of this action is to ensure Pacific Coast groundfish subject to federal management are harvested at OY during 2004 and in a manner consistent with the aforementioned groundfish FMP and National Standards Guidelines (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 5 of this EIS describes how the proposed action (preferred alternative) is consistent with the FMP and MSA.

1.3 Background

1.3.1 Background to Purpose and Need

Marine fish are "common pool" resources with access and use stemming from the public trust doctrine. It is difficult to exclude people from using a common pool resource, because of the physical characteristics of these resources (Ostrom 1990). (Fish are a relatively mobile, "fugitive" resource, making it impossible for any one individual to precisely know their location or control their distribution.) A fish stock is also "subtractable," meaning that exploitation by any one person diminishes the total amount available to others. Under the common law public trust doctrine, resources in ocean areas under U.S. jurisdiction are believed to be held in trust by government to satisfy a broadly-defined public interest (Committee to Review Individual Fishing Quotas 1999). This doctrine also makes a legally defensible exclusive property right to fishery resources difficult or impossible (at least before fish are harvested). The MSA, originally enacted in 1976 as part of the extension of jurisdiction to the 200-mile EEZ (and most recently amended in 1996), establishes the goals, standards, responsibilities, and processes needed to address the characteristics of the fishery resource. A paramount purpose is to "conserve and manage the fishery resources found off the coasts of the United States" (§2(b)(1)). This Act delegates management responsibility to the U.S. Secretary of Commerce (Secretary) who, with the aid of eight regional fishery management councils and through the National Marine Fisheries Service (NMFS), implements measures to ensure the conservation and management goals of the MSA and fulfills the trust responsibility. Councils develop FMPs describing how particular species and fisheries will be managed. The Pacific Fishery Management Council was assigned stewardship responsibilities for the fish resources in the EEZ off the Pacific Coast (see Figure 1.3.1-1) and first approved the groundfish FMP in 1982.[7/]

Chapter 6 in the groundfish FMP describes the management measures the Council may recommend NMFS use and the process of establishing and adjusting such measures. Various biological reference points and information on fishery performance are used to determine, on an annual basis, the OY for particular species or species groups (see Section 3.2. for a description of these reference points). The groundfish FMP also describes "points of concern" and socioeconomic frameworks, which help managers determine whether and what types of management measures are needed. Section 6.2 of the groundfish FMP describes the deliberative process the Council must follow and the parallel process NMFS uses to translate Council recommendations into regulations. NEPA-mandated environmental impact assessment is a central component of this process. (Due to recent litigation, *Natural Resources Defense Council* v. *Evans* discussed in Section 1.3.3, the current process differs somewhat from what is described in the groundfish FMP. The NEPA analysis has gained greater prominence, and there is more opportunity for public notice and comment during rulemaking.)

7/ The groundfish FMP has been amended 15 times to date.

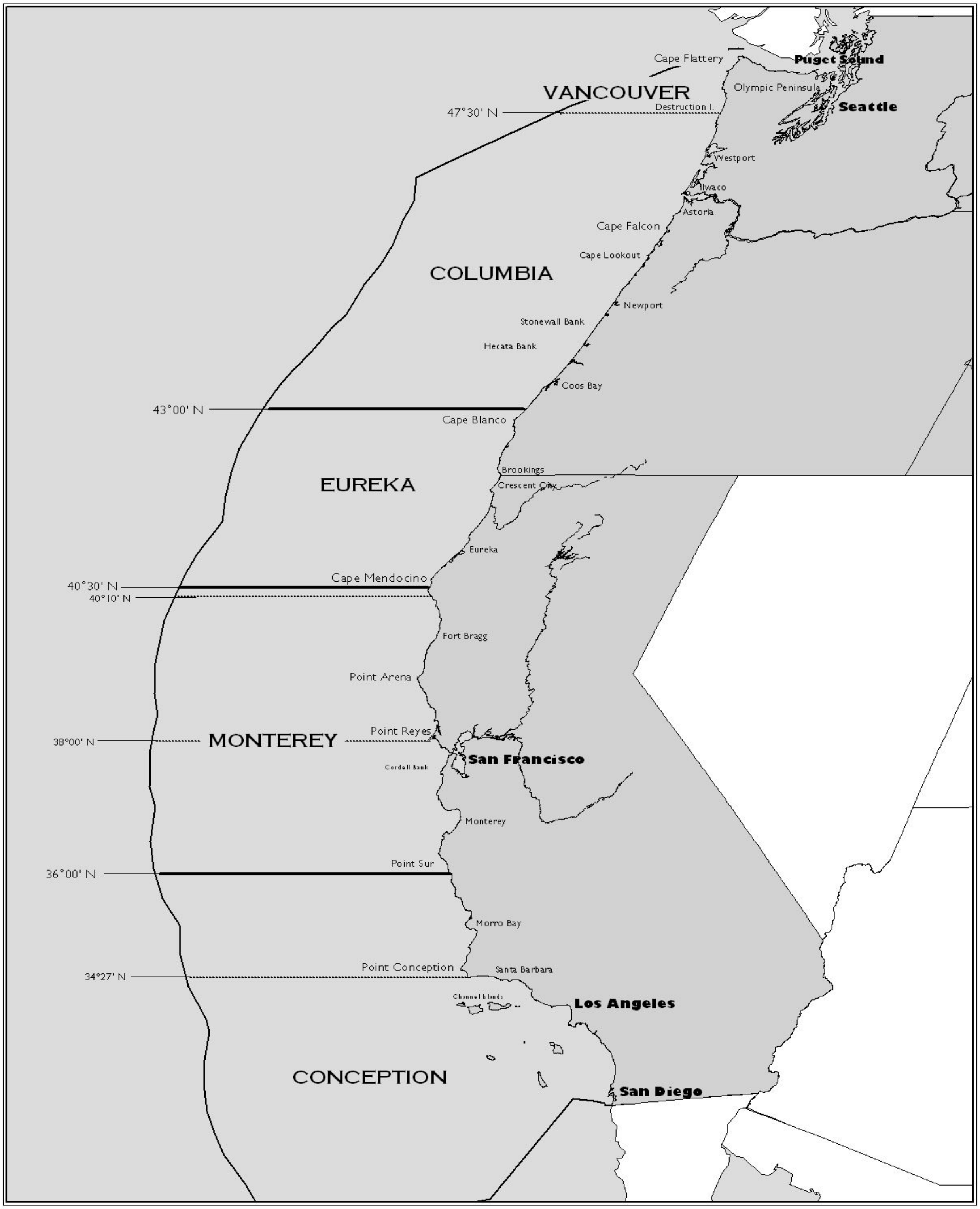

FIGURE 1.3.1-1. Management lines and zones and West Coast ports.

1.3.2 Background to Groundfish Management and the Annual Specifications Process

The groundfish FMP lists three overall goals to guide the management process:

1. Conservation - prevent overfishing by managing for appropriate harvest levels and prevent any net loss of habitat of living marine resources.
2. Economics - maximize the value of the groundfish resource as a whole.
3. Utilization - achieve the maximum biological yield of the overall groundfish fishery, promote year-round availability of quality seafood to the consumer, and promote recreational fishing opportunities.

A variety of management measures have been employed to achieve these goals, including gear restrictions, a license limitation program, time/area closures, the specification of OYs or other harvest limitations for some species, seasons, and trip/cumulative landing limits, which are limitations on the amount of certain species that may be caught, retained, and landed by any vessel. The groundfish FMP allows harvest guidelines and quotas to be re-specified on a periodic basis. Harvest guidelines are specified numerical harvest objectives which are treated as targets but not absolute limitations. Therefore, a fishery does not have to be closed if its harvest guideline is reached, although the Council and NMFS may choose to do so. All recent numerical harvest specifications, including OY values, have been harvest guidelines. A quota is defined as a specified numerical harvest objective, the attainment (or expected attainment) of which causes closure of the fishery for that species or species group. The main use of harvest guidelines and quotas recently has been to designate allocations and sub-components of a specified OY.

In accordance with the groundfish FMP, since 1990 the Council has annually set Pacific Coast groundfish harvest specifications (acceptable and sustainable harvest amounts) and management measures designed to achieve those harvest specifications. Of the more than 80 groundfish species managed under the FMP, only about 20 are assessed for stock size and status on a regular basis.[8/] As a general principal, assessments are scheduled for stocks on a three-year rotating basis, although the actual schedule can vary due to the availability of scientists to conduct the assessments and the role a stock plays in structuring management measures. Thus, when the Council recommends a new set of harvest specifications in a given year, normally only specifications for those species with new assessments, or past assessments containing an OY projection for the coming year, are changed from the previous year's value. In addition, nine groundfish species have been declared overfished by the Secretary, pursuant to provisions in the MSA.[9/] Based on stock assessments, scientists have conducted rebuilding analyses for these species in order to determine suitable harvest levels consistent with the rebuilding framework established by the MSA and the groundfish FMP.[10/] For these species, the rebuilding analysis represents an additional analytical step used to determine an OY. OYs for

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8/ Target species, and in recent years overfished species, are given the highest priority for full stock assessment. Incidentally-caught species, species only identifiable as part of a stock complex, and species caught in small numbers, typically fall in assessment Category 2 or 3, as defined in the groundfish FMP. These species are managed based on historical landings.

9/ Tables 3.2.1-1 and 3.2.1-2 list the overfished species and associated rebuilding parameters. The species are: bocaccio (*Sebastes levis*), cowcod (*S. levis*), canary rockfish (*S. pinninger*), darkblotched rockfish (*S. crameri*), Pacific ocean perch (*S. alutus*), widow rockfish (*S. entomalas*), yelloweye rockfish (*S. ruberimus*), lingcod (*Ophidon elongates*), and Pacific whiting (*Merluccius productus*).

10/ Amendment 16-1 to the groundfish FMP, establishes the framework for rebuilding overfished stocks. It was approved by NMFS in November 2003.

unassessed stocks are based on more limited data, such as catch history, and for this reason are not usually changed year to year.

Proposed 2004 OYs differ from 2003 values for 11 stocks (see Table 2.1.1-1). Six of these are based on data from new stock assessments conducted in 2003, and in the case of overfished species, updated rebuilding analyses using the new assessment information.[11/] Of the remaining seven stocks, new values for all but Pacific whiting are based on projections contained in assessments conducted in earlier years. In the case of Pacific whiting a new assessment will be completed by March 2004, in time for the May 1 start of this fishery. The range of whiting OYs evaluated in this EIS captures the range of potential values expected from that assessment. In summary, the alternatives described in Chapter 2 are structured around different OY values for a limited number of stocks. However, the different management measures needed to achieve these OYs can limit catches of other species, resulting in large differences among the alternatives in terms of actual landings.

In order to rebuild overfished groundfish species while satisfying the groundfish FMP's resource utilization goal, Council policy is to use management measures that discourage or prevent targeting of these species. The Council has also recommended management policies to reduce the incidental catch of overfished species taken in fisheries targeting healthier stocks. In 2002 the Council began using an analysis of the incidental catch rates of particular overfished species taken in trawl fisheries targeting healthy stocks.[12/] Then, in setting management measures for the year, the Council recommended trip limit combinations that allowed higher landings of healthy stocks in months and seasons when those healthy stocks co-occur less frequently with overfished stocks. Since that time a "trawl bycatch model" has been developed by NMFS (Hastie 2001; Hastie [2003]), which is used to project total fishing mortality in the limited entry groundfish trawl fishery for key species, based on a given set of management measures.[13/] In late 2002 the Council also implemented large closed areas for commercial groundfish fisheries, which are intended to prohibit fishing in depth ranges where certain overfished species are most abundant. These "Rockfish Conservation Areas" (RCAs) were a key feature of 2003 management. Observer data from the first year of the West Coast groundfish observer program (August 2001 through August 2002) also became available in early 2003. Although still relatively limited, the Council directed that these data should be used to estimate total fishing mortality beginning in mid-2003. The trawl bycatch model has been continually updated, both to evaluate the effect of different closed area configurations on total fishing mortality and to incorporate new bycatch rates based on observer data (Hastie 2003).

The main issues considered in 2003 play a role in the development of management measures for 2004. In particular, key overfished species will continue to constrain harvest opportunities for healthier stocks. In response, various combinations of sector-specific trip limits and closed area configurations will be a central

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11/ These are: bocaccio, darkblotched rockfish, Pacific ocean perch, and widow rockfish, which have been declared overfished; and black rockfish (*Sebastes melanops*) and yellowtail rockfish (*S. flavidus*), which are considered healthy stocks.

12/ Incidental catch includes retained catch of non-target species and discards. The MSA defines bycatch as "fish which are harvested in a fishery, but which are not sold or kept for personal use . . ." Bycatch, under the MSA definition, accords with discards, as the term is used here.

13/ The number of trawl vessels targeting Pacific Coast groundfish is limited by a licensing program established in the groundfish FMP. Although only one of several fishery sectors catching groundfish, a large proportion of total groundfish landings is attributable to this sector. Accurately predicting total catch mortality in this sector is, therefore, crucial in determining how well a given set of management measures will constrain fishing to OYs.

management feature. Finally, the availability of a second year's worth of observer data (September 2002 through August 2003), available in early 2004, could lead to adjustments in the bycatch rates used in modeling projected total fishing mortality. This could require inseason changes in management measures, as occurred in 2003, but is unlikely to incur impacts outside the range described in this EIS. In addition, sufficient data may be available to extend model-based bycatch projections to other fishery sectors in addition to limited entry trawl.

In summary, in addition to a general need to manage fisheries for sustainable harvests, the proposed action satisfies several objectives. Management is based on "the best available science," the second National Standard enumerated in the MSA. Regular stock assessments for target species in groundfish fisheries, whenever possible, are an example of the application of this requirement. Managers are improving the quality of data and analysis; this supports assessment and catch accounting. Because of the decline in several groundfish stocks revealed by these assessments, preventing overfishing and rebuilding overfished stocks is a paramount concern. However, the ability of fishers to access healthy stocks is also considered, because a competing goal in the groundfish FMP is to maximize the value of the groundfish resource. Striking this balance between conservation of and direct social benefit from groundfish is another way to understand the purpose of this action.

1.3.3 Changes to the FMP Affecting Annual Management

Although the groundfish FMP was first implemented 20 years ago, changes in the fishery and the MSA have resulted in substantial modification through plan amendments. Three recent amendments (numbered 11 through 13), which in part respond to new requirements imposed by the 1996 Sustainable Fisheries Act (SFA) reauthorizing and amending the MSA, have affected the framework for specifying harvest levels and management measures. Amendments 11 and 12 were adopted in order to make the groundfish FMP consistent with MSA National Standard 1: *Conservation and management measures shall prevent overfishing while achieving on a continuing basis, the optimum yield from each fishery for the United States fishing industry*.

Approved in 1999, Amendment 11 establishes a default OY policy that reduces the numerical OY of any stock believed to be below its precautionary threshold, which is defined as smaller than 40% of its pristine (unfished) abundance (denoted B_0) unless better information is available.[14/] A groundfish stock is defined as overfished if its abundance is less than 25% of its unfished abundance ($B_{25\%}$). The procedures and criteria for determining OYs for Pacific groundfish are detailed in Section 3.2.

Amendment 12, although subsequently remanded in part, by court order, establishes procedures to rebuild overfished stocks. In response to the remand, the Council is developing Amendment 16, which is being adopted in several different parts. Amendment 16-1, approved in November 2003, establishes a framework for adopting and reviewing rebuilding plans for overfished species. Under this framework key targets that will guide the rebuilding process will be specified in the FMP and federal regulations. If these target values need to be changed, new values would be published in regulations. Amendment 16-2 adopts rebuilding plans for four species: darkblotched rockfish, Pacific ocean perch, canary rockfish, and lingcod. Amendment 16-3 will adopt rebuilding plans for bocaccio, cowcod, widow rockfish, and yelloweye rockfish; Amendment 16-4 will adopt a rebuilding plan for Pacific whiting. Amendment 16-2 has been submitted for Secretarial review;

14/ Sometimes spawning stock biomass is used instead of total stock biomass, and sometimes spawning potential is used. Where there is insufficient information to develop a numerical OY, the groundfish FMP still allows establishment of a non-numerical OY.

decisions on this amendment (approval, partial approval, or disapproval) will be rendered in early 2004. Amendments 16-3 and 16-4 are expected to be completed in 2004. Adoption of rebuilding plans will have a modest effect on the harvest specifications and management process because OYs must be consistent with rebuilding targets, unless the values published in federal regulations are changed. The Council has managed overfished stocks under interim rebuilding plans and chose the targets from these plans for the four species covered by Amendment 16-2. Adoption and approval of the amendment obligates the Council to manage to these targets.

Amendment 13 was developed in response to SFA requirements to address bycatch and bycatch accounting. (It also added to the list of routine management measures that are part of the groundfish FMP framework. This allows more effective management of overfished species and bycatch.) This amendment addresses MSA National Standard 9: *Conservation and management measures shall, to the extent practicable (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize mortality of such bycatch*. Bycatch (fish discarded at sea for regulatory or economic reasons) has emerged as a difficult problem in groundfish management. In order to manage for overfished stocks, it is necessary to estimate total catch, rather than only the catch landed at the dock. At the same time, reductions in cumulative landing limits can increase the amount of fish discarded, since these limits are based on landed catch rather than total catch. (Until the recent development of an observer program, it has been difficult to effectively monitor discards, confounding the ability to accurately estimate total catch.) NMFS has been developing a programmatic EIS (PEIS) for the groundfish FMP, which would evaluate strategic goals and the overall management framework. In May 2003 NMFS announced they could re-scope this EIS in order to focus exclusively on bycatch-related issues. A draft EIS will be published in early 2004.

Although the groundfish FMP states that all specifications will remain in effect until changed, they are announced annually on or about January 1. These management specifications are developed by the Council, based on a review of available stock status information, over the course of several meetings. Until 2002, this occurred at the September meeting, when the Council would adopt a range of alternatives representing preliminary harvest specifications (the ABC and OY for species or species groups) and management measures intended to limit catches to those targets. At its November meeting, the Council would then choose a preferred alternative, representing final harvest specifications and management measures. However, the court ruling in *Natural Resources Defense Council* v. *Evans*, 2001 168 F. Supp. 2d 1149 (N.D. Cal. 2001) found that NMFS was not allowing sufficient time for public notice and comment on the regulations before they were implemented at the beginning of the new year. Now, in order to allow enough time for the required comment period and still implement management measures early in the year, the Council must make its final decision at its September meeting, with the development of alternatives pushed back to the June meeting.[15/]

Amendment 17 implements a biennial management cycle. With this change, 2004 will be the last year managed under an annual cycle, with biennial management beginning in 2005–2006. Under the biennial management cycle harvest specifications and management measures will be established for the two-year period in advance of the period (as is the case with annual management). Council decision making will occur

15/ Even with the earlier decision-making framework, regulations cannot be promulgated by January 1. Therefore, NMFS must promulgate emergency regulations, which are exempt from regular rulemaking procedures, for January and February, with the full rulemaking procedure applying to regulations implemented March 1. (This EIS covers the March 1 regulations, although the impact analysis, herein, considers OY and management measures for all of 2004. An environmental assessment is prepared for the regulations covering January and February.)

over three meetings, culminating in June of the year preceding the biennium. In addition to allowing more careful consideration of management proposals, promulgation of an emergency rule to cover management at the beginning of the cycle (as described in footnote #15 for annual management) will no longer be necessary.

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. "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 June 5, 2003, 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 2004 ABC and OY specifications and management measures for the Pacific Coast groundfish fishery. 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 public scoping period, ending on July 7, 2003, was announced in the NOI. Two opportunities for the public to comment orally on the scope of the EIS occurred on June 17, 2003 and June 20, 2003 as part of the regular agenda of a Council meeting. In addition, written comments were accepted through the end of the scoping period.

In addition to the formally-announced public scoping period, 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. 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 and recreational fishery, processing, and conservation sectors. The Ad Hoc Allocation Committee, a subpanel of the whole Council, provides advice on allocating harvest opportunity among the various fishery sectors. These opportunities all constitute the broadly-defined Council scoping process, not all of which focuses on the scope and content of NEPA analysis.

The Council and its advisory bodies considered 2004 specifications and management measures at several meetings. The Ad Hoc Allocation Committee of the Council met on June 10 and 11 and reviewed new stock assessments and rebuilding analyses, which apply to overfished groundfish species; and considered the types of management measures that might be used in 2004. During its June 2003 meeting the Council identified three sets of harvest specifications for managed groundfish species or species groups, representing limits on total fishing mortality. These form the basis of alternatives that will be analyzed in the EIS: a *Low OY* alternative, *Medium OY* alternative, and *High OY* alternative. They also identified a preliminary range of management measures that could be used to constrain fishing mortality to these different OY levels. The GMT met July 14-18, 2003, to further develop the range of management measures incorporated into the alternatives. The Council and their advisory bodies met in September 2003 to finalize the management measures included in the alternatives. The Council also chose a preferred alternative, which is identified as the *Council OY* alternative.

In addition, although not part of the formal scoping process, both the Oregon and California state fish and game departments held public hearings to solicit input on the formulation of management measures. Comments made at these hearings were summarized and made available to the Council in advance of their September 2003 meeting.

1.4.3 Summary of Comments Received

The Council received emails, letters, and oral comments from 20 people. (Some people provided both written and oral comments and are not tallied twice.) Based on their affiliation these commenters can be categorized as follows:

Affiliation	Number of Commenters
Commercial fishing	9
Conservation organization	5
Recreational fishing	5
No affiliation	1

As discussed below, not all comments bear directly on the EIS analysis, and some recommendations were outside the scope of the proposed action (actions requiring an FMP amendment, for example). The comments are summarized in Table 1.4.3-1. This table represents a matrix. The columns refer to the major components of the EIS analysis. Each row represents a specific comment extracted from the source; they are organized into blocks of rows based on the type of issue being raised. Comments were reworded for clarity. Many commenters raised several issues, and each was entered into the table. However, comments were recorded only once, even if they were applicable to different categories; and when individuals made several comments saying the same thing (for example, in two different public comment periods) their duplicate comments were only counted once. The number of times an issue is raised during the scoping process provides an indication of the issues that commenters are most concerned about. Scoping also helps agencies eliminate from detailed study issues that are not significant (40 CFR 1501.4(g)).

The comments are briefly described below, based on the EIS component they address (or column in Table 1.4.3-1 by which they were categorized). The way in which these comments are addressed in the EIS is also discussed.

1.4.3.1 The Range of Alternatives: Harvest Specifications (OYs)

The alternatives in the EIS identify harvest specifications for managing each managed species or species complex. (The specifications consist of an ABC value—representing the upper limit of fishing mortality a stock can sustain—and an OY, which usually represents a precautionary reduction from the ABC value.) Fisheries are managed to keep catches, or total fishing mortality, at or below the OY. Most of the comments and recommendations for setting harvest specifications focus on the need to rebuild overfished species. Commenters also made specific recommendations for establishing overfished stock rebuilding strategies.

For overfished species, the choice of target rebuilding time period helps determine annual OYs. Although the 2003 groundfish harvest specifications EIS evaluated a range of OYs based on different rebuilding periods (expressed in terms of the related rebuilding probability), in this EIS these rebuilding targets are less of an issue for several reasons. Foremost, the Council recently adopted formal rebuilding plans for four of the overfished groundfish species, and these rebuilding periods are used in determining OYs in the alternatives. (Other sources of uncertainty in the stock assessment modeling process are the basis for the range of possible OYs that could be adopted for these species.) For the remaining overfished species, interim targets were used, if available, although in some cases, an evaluation of different rebuilding targets may be one among several factors used in formulating a range of OYs. Chapter 2 in the EIS provides a detailed rationale for the range of OYs used in the alternatives.

1.4.3.2 The Range of Alternatives: Management Measures

As described above, each alternative contains a set of harvest specifications, or OYs. Management measures must then be developed to ensure total catch doesn't exceed the OY. These measures do not directly limit fishing, by means of a quota for example, which once reached would trigger a fishery to close. Instead, a range of indirect measures are used. Two of the most important commercial fishery management measures constrain fishing effort by limiting landings during a given period (called cumulative trip limits) or by closing areas to fishing during different seasons. Bycatch, discarding of unwanted fish at sea, has become a major management concern. Most of this bycatch results from low cumulative trip limits (or bag limits in the recreational fishery) set for overfished species. (In some cases the limit is set to zero: retention is not allowed.) Having reached their limit for one of these species, fishermen will discard fish of these species in order to keep fishing for other species with higher limits. Several commenters recommended modifications to the trip limit system. Many comments focused on the need to reduce bycatch. Establishing caps on the amount of bycatch a vessel, a fishing sector, or a fishery is permitted to discard was recommended. (This concept is commonly referred to as a “hard bycatch cap.”) A related approach, mentioned in one comment, would be to require vessels to land all the fish they catch, referred to as full retention. This eliminates at-sea discards, of course, so total fishing mortality could be more accurately monitored.

Other commenters recommended new or different approaches to closed areas, which have become an important management tool for limiting bycatch. (These are referred to as RCAs, groundfish conservation areas, or the California conservation area in waters off that state.) Permanent marine protected areas (MPAs), including “no-take” marine reserves (where all fishing is prohibited) were recommended, for example. MPAs could also be a tool to protect important or sensitive marine habitats. Habitat protection was raised as a management goal.

Several commenters made recommendations related to fishing seasons. One commenter recommended alternatives to managing for a year-round season, since a shorter season could allow trip limits to increase, reducing bycatch. One of the goals of the FMP is to allow commercial fishing year round in order to provide a consistent supply of fish to markets. Therefore, shortening the fishing season was eliminated from further detailed consideration.

One commenter mentioned the need to reduce fishing capacity, especially in many groundfish trawl fisheries. Put simply, with fewer boats in the fishery, cumulative trip limits could be set higher, possibly reducing bycatch. Although not affecting total fishing mortality, landed fish are generally more accurately tabulated (although NMFS now has an at-sea fishery observer program, which is improving estimates of bycatch). Capacity reduction also has socioeconomic benefits because of potentially higher landings by boats still in the fishery.

Gear modifications were also raised in the comments. One of the main purposes of experimenting with or requiring certain types of fishing gear is to reduce bycatch of unwanted or prohibited species. If gear can exclude overfished species, for example, the bycatch problems mentioned above might be reduced.

One commenter recommended implementing individual transferrable fishing quotas (ITQs) as soon as possible.

More generally, commenters recommended implementing management measures that would rebuild overfished stocks.

Many of the recommendations summarized above are incorporated into the alternatives analyzed in the EIS. Those that are not are either outside the scope of the proposed action or eliminated from further detailed study as part of the process of screening alternatives. Implementation of permanent marine protected areas (including no-take marine reserves), implementing a capacity reduction program (reducing the number of vessels participating in the fishery), allowing trawl vessels with limited entry permits to use fixed gear, and establishing an ITQ program cannot be implemented through the harvest specification process because they would require an FMP amendment and are, thus, outside the scope of the proposed action. However, it should be noted that NMFS has implemented a capacity reduction program, and the Council is considering separate initiatives addressing these other recommendations. Implementing a “hard bycatch cap” pilot program was considered, but eliminated from further detailed study for reasons of feasibility. Chapter 2 discusses the reasons for its elimination. However, OYs do represent a total mortality cap in that both projected landings and bycatch are estimated when formulating management measures and evaluating their impacts. In addition, NMFS is preparing a separate EIS evaluating bycatch reduction measures; it includes the use of bycatch caps in the range of alternatives.

1.4.3.3 The Range of Alternatives: Allocation of Harvest Opportunity

The allocation of harvest opportunity is an important, and sometimes contentious, part of the groundfish management process. Allocation decisions revolve around two ways of stratifying fisheries. First, there are broad regulatory categories: recreational and commercial fishing, and within the commercial sector, holders of limited entry trawl permits, limited entry fixed gear permits, and the so-called open access sector. Limited entry permits are fixed in number, as implied by their name, and tied to a particular gear type. The open access sector refers to all remaining fisheries, which are quite diverse, catching some amount of groundfish. These range from mostly small-scale fisheries targeting groundfish to fisheries targeting other species and catching small amounts of groundfish—the California halibut exempted trawl fishery, for example—mainly because they cannot avoid them with their gear. Secondly, the three West Coast states must allocate those stocks that occur in the waters off of more than one state. The Council must make allocation decisions according to rules in the groundfish FMP. Generally, allocations are not made directly. Instead, management measures result in allocations. For example, different trip limits are set for each of the regulatory sectors just mentioned and also differ geographically for waters north and south of Cape Mendocino. Comments on this topic were related to specific allocations or the process and methods used to make allocation decisions. These recommendations have been incorporated into the alternatives.

1.4.3.4 Description of the Baseline Affected Environment

An EIS must describe the area affected by the alternatives. In the analysis this serves as the baseline, or the condition of resources and communities before the proposed action occurs. The EIS analysis evaluates how the affected environment will be changed if any of the alternatives were implemented. Several commenters asked for description or discussion of issues that would fit best into this part of the EIS. This included discussion of bycatch reduction, enforcement of harvest limits, and the effectiveness of past management measures, managed species, market infrastructure, fishing patterns, and uncertainties in the catch data. These issues are discussed in Chapter 3 of the EIS, describing the affected environment.

1.4.3.5 Evaluation of Impacts

As its name suggests, the heart of an EIS is the evaluation of the impacts to the human environment that would occur if any one of the alternatives were implemented. The human environment includes the natural and physical environment and the relationship of people to that environment. That means that socioeconomic impacts of an action need to be evaluated, although these impacts should be interrelated with the natural environment. Environmental impact analysis should consider three types of impact: direct, indirect, and cumulative. Direct impacts occur at the time and in the same place as the proposed action. Indirect impacts occur in a different place or time than the proposed action. Cumulative impacts result from the effect of past, present, and reasonably foreseeable future actions, which when combined with proposed action have some large impact on affected components of the human environment. Commenters asked that the EIS evaluate a range of potential impacts. These range from requests to evaluate specific effects of management measures to general observations about the socioeconomic impacts of more restrictive management. These impacts are evaluated in Chapter 4 of the EIS, organized by human environment components. The EIS identifies the type and intensity of impacts to each of these environmental components. This approach is discussed further below.

1.4.3.6 Monitoring and Evaluation of the Management Program, Adequacy of Data, Enforcement of Management Measures

Monitoring and evaluating the effectiveness of the management program, and enforcing management regulations, are important components of environmental management. Although NEPA regulations only mention monitoring and enforcement in relation to mitigation programs (40 CFR 1505.2(c)), the proposed action could be seen as generally mitigative. Mitigation reduces the effects of an action or event; harvest regulations are partly intended to reduce the potential adverse impacts of fishing, such as overfishing. Looking at the management regime, monitoring and enforcement programs are separate, connected actions. Therefore, these activities should be evaluated in the EIS even if monitoring and enforcement is outside the measures implemented by the harvest regulations. Monitoring of catches during the fishing season leads to the evaluation of the management measures in place and possible inseason actions by the Council to adjust those measures. As discussed above, several comments reflected concerns about how accurately bycatch is being monitored. Most fisheries monitoring is done at dockside by tallying landed fish. But with low limits and several overfished species, accurately estimating bycatch is crucial to effective management. The ability to enforce management measures—such as the closed areas being used as part of a bycatch reduction strategy—was also a theme in comments. Several comments recommended specific monitoring techniques, such as the use of a vessel monitoring system, full retention of rockfish, and the use of observers. One commenter asked whether catch-by-depth data is accurate enough to evaluate how well different closed area boundaries will work. Monitoring and enforcement issues enter into the EIS analysis in several places. First, the description of the management measures that are a part of each alternative (found in Chapter 2) may include a description of monitoring, as appropriate. Second, the impact of the alternatives on particular environmental components may include an assessment of monitoring needs. Third, the capacity for government institutions to conduct needed monitoring programs is evaluated.

1.4.3.7 Other Issues

Several comments were general observations about the management process. Since these comments do not address potential alternatives or potential impacts, they are outside the scope of the EIS analysis.

TABLE 1.4.3-1. Summary of scoping comments received on 2004 Annual Specifications. (Page 1 of 10)

Subject/Comments	No. of comments	Alternative OY specifications (Chapter 2)	Alternative management measures (Chapter 2)	Alternative allocations (Chapter 2)	Baseline description (Chapter 3)	Impacts (Chapter 4)	Monitoring and enforcement (Chapters 2 and 4)	Other comments and observations
Allocation								
Consider allocating black rockfish between California and Oregon based on the total amount of nearshore habitat along each state's shoreline.	1			X				
Regarding limited entry/open access allocation of bocaccio, prohibit new fishing effort on the shelf by establishing shelf trip limits for open access that allow for incidental landings, but serve to defer new involvement.	1			X				
Return bocaccio OY allocation to 56/44 recreational/commercial split that was in place in 2002.	1			X				
The allocation of overfished species among states and fishery sectors should be based on catch histories in the period shortly before they were declared overfished. The FMP establishes a process for changing allocations, and this process should be followed if they are to be changed.	2			X				
The burden of a fishing moratorium should fall on both sport and commercial fishers, but more on commercial fishermen since they take more fish.	1			X				
Area closures/marine reserves								
Analyze the effect of closed-area-related fishing effort shifts on essential fish habitat.	1					X		
Consider a range of area closure alternatives.	1		X					
Consider Marine Protected Areas (MPAs) and area closures by gear type to reduce impacts on marine habitats.	1		X					
Consider no-take marine protected areas to reduce bycatch and meet management goals.	1		X					
Consider time and area closures.	1		X					
Create refuges.	1		X					
Discuss the value of area closures for protecting groundfish and habitat.	1					X		
Do not make changes to the Cowcod Conservation Area (CCA) boundaries; would harm spot prawn trawlers and provide no demonstrable benefits to cowcod or enforcement.	1		X					

TABLE 1.4.3-1. Summary of scoping comments received on 2004 Annual Specifications. (Page 2 of 10)

Subject/Comments	No. of comments	Alternative OY specifications (Chapter 2)	Alternative management measures (Chapter 2)	Alternative allocations (Chapter 2)	Baseline description (Chapter 3)	Impacts (Chapter 4)	Monitoring and enforcement (Chapters 2 and 4)	Other comments and observations
Area closures/marine reserves (continued)								
The straight boundaries of the CCA are outdated now that depth-based closed areas have been implemented. The limited entry commercial fishery should be given additional access to deeper waters needlessly enclosed in the CCA. Move the outward line to 180 fm.	1		X					
Bycatch								
Analyze available bycatch reduction techniques.	1				X			
Analyze the current data collection systems for assessing bycatch, and establish a system that accurately measures landed catch and bycatch.	1						X	
Build on arrowtooth exempted fishing permit (EFP) (to reduce bycatch); start exempted fishing permits (EFPs) in other sectors.	2		X					
Concentrate time and effort on solving bycatch problem.	1		X					
Consider "hard" bycatch caps for limiting total allowable fishing mortality.	3		X					
Consider management measures that reduce bycatch of both managed and prey species.	1		X					
Discuss bycatch, including amount and types of bycatch, effects of bycatch on overfished species, and the effect of current management techniques on bycatch.	1				X			
Propose implementing a pilot program for all observed groundfish sectors for 2004: apply hard bycatch caps for all overfished species, annually allocate by sector, based on most current bycatch scorecard. During the fishing year, the bycatch caps would not be transferrable between sectors. Close each sector if it attains its bycatch cap.	2		X					
Require logbook data for landed fish and discards at sea.	1						X	
To reduce bycatch, consider total mortality caps, including fleet-wide, sector-wide and vessel-by-vessel caps.	1		X					
Use performance standards to encourage innovation and shape the fishery to the highest benefit of the nation.	1		X					
Consider full retention of overfished species; allows dockside monitoring.	1		X					
Capacity reduction								
Consider capacity reduction as a management measure.	1		X					

TABLE 1.4.3-1. Summary of scoping comments received on 2004 Annual Specifications. (Page 3 of 10)

Subject/Comments	No. of comments	Alternative OY specifications (Chapter 2)	Alternative management measures (Chapter 2)	Alternative allocations (Chapter 2)	Baseline description (Chapter 3)	Impacts (Chapter 4)	Monitoring and enforcement (Chapters 2 and 4)	Other comments and observations
Cumulative impacts								
Comprehensively discuss cumulative impacts.	1					X		
Discuss the impact of nongroundfish fishing on groundfish.	1					X		
Enforcement								
Begin recruitment and training of an enforcement staff large enough to make regulations effective.	1						X	
Discuss NMFS' ability to enforce harvest limits.	1	X						
Adequately enforce closed areas for certain gear types or fishing methods.	1						X	
In California, use a computer-based recreational licensing system as in Oregon to limit days that anglers can target rockfish.	1		X					
Increase penalties for violations associated with groundfish.	1						X	
Support use of a vessel monitoring system.	1						X	
Gears and techniques								
Allow fixed gear permit holders to use either pot or longline; encourage pot fishing (less bycatch and interaction with mammals, seabirds).	1		X					
Conduct studies of the pineapple trawl net - it could solve the rockfish problem.	1						X	

TABLE 1.4.3-1. Summary of scoping comments received on 2004 Annual Specifications. (Page 4 of 10)

Subject/Comments	No. of comments	Alternative OY specifications (Chapter 2)	Alternative management measures (Chapter 2)	Alternative allocations (Chapter 2)	Baseline description (Chapter 3)	Impacts (Chapter 4)	Monitoring and enforcement (Chapters 2 and 4)	Other comments and observations
Gears and techniques (continued)								
Consider emergency action to allow the take of sculpin and lingcod in the southern region by open access rod-and-reel gear.	1		X					
Consider gear modifications to reduce bycatch.	1		X					
Consider gear modifications to reduce impacts on marine habitats.	1		X					
Encourage use of the "pineapple trawl net," which allows more selective and efficient fishing.	2		X					
End the use of fish traps for catching fish.	1		X					
Evaluate the environmental impacts of different fishing gears and techniques.	1					X		
Expand fishing grounds or quotas for draggers using the pineapple trawl net.	1		X					
Restrict commercial fishing to rod-and-reel gear in waters less than 60 fathoms, and limit fish caught per day per vessel (support United Anglers limit fo 20 fish per day per commercial fishing vessel).	1		X					
Do not eliminate the "B Platoon" in the limited entry trawl fishery. Many fishermen and processors favor this measure.	1		X					
Habitat								
Analyze the past, present, and reasonably foreseeable adverse impacts of fishing and non-fishing activities on overfished groundfish species' habitats.	1					X		
Consider management measures (such as capacity reduction, total mortality caps, bycatch reduction measures, etc.) to reduce impacts to marine habitats.	1		X					

TABLE 1.4.3-1. Summary of scoping comments received on 2004 Annual Specifications. (Page 5 of 10)

Subject/Comments	No. of comments	Alternative OY specifications (Chapter 2)	Alternative management measures (Chapter 2)	Alternative allocations (Chapter 2)	Baseline description (Chapter 3)	Impacts (Chapter 4)	Monitoring and enforcement (Chapters 2 and 4)	Other comments and observations
Hardship								
Current limits will cause the demise of the California sportfish fishery and those who depend on it.	1					X		
Fishermen will have a hard time surviving unless quotas or fishing grounds increase; cannot operate business.	1					X		
Regulations are putting me out of business.	1					X		
The market infrastructure seems about to collapse.	1				X			
With the current trip limits in the California sportfish fishery, people are not going fishing.	1					X		
IFQs/ITQs								
ITQs should be implemented in the groundfish fishery as soon as possible.	2		X					
Observers and monitoring								
Consider monitoring the depths at which species are caught.	1						X	
Evaluate the adequacy of observers for assessing bycatch and administering management measures and catch limits.	1						X	
Require all rockfish catches be landed at designated landing sites with department of fish and game employees present to monitor, sample, and document the catch. To be paid for by commercial fishers.	1						X	
Require merchants to document purchases and sales of rockfish, so they can be tracked to fishermen.	1						X	
Use observers to provide bycatch data to managers in real time.	1						X	
Would like to see monitoring of all sectors.	1						X	

TABLE 1.4.3-1. Summary of scoping comments received on 2004 Annual Specifications. (Page 6 of 10)

Subject/Comments	No. of comments	Alternative OY specifications (Chapter 2)	Alternative management measures (Chapter 2)	Alternative allocations (Chapter 2)	Baseline description (Chapter 3)	Impacts (Chapter 4)	Monitoring and enforcement (Chapters 2 and 4)	Other comments and observations
Other comments/general comments								
Commendations on revising the science on bocaccio.	1							X
Management staff are anti-fishing.	1							X
Move forward with plan amendment to allow limited entry trawl permit owners to use fixed gear.	1							X
Need full accountability (by fishermen/fishing sectors).	1							X
Nice to see more fishing possibilities for 2004.	1							X
Support tougher groundfish regulations.	1							X
The Council is controlled by fishermen who set quotas too high, so the fish can never recover.	1							X
The voices of the sportfishing industry are ignored by state and regional management.	1							X
While American commercial fishermen go extinct, imports of endangered species are allowed from countries with no regulations.	1							X
OY's; constraining fishing								
Discuss the ability of current management measures to constrain fishing mortality within OY's.	1				X			
Discuss whether actual mortality levels have exceeded OY in past years.	1				X			
Provide a range of options for managing groundfish at OY with varying probability of success.	1	X						

TABLE 1.4.3-1. Summary of scoping comments received on 2004 Annual Specifications. (Page 7 of 10)

Subject/Comments	No. of comments	Alternative OY specifications (Chapter 2)	Alternative management measures (Chapter 2)	Alternative allocations (Chapter 2)	Baseline description (Chapter 3)	Impacts (Chapter 4)	Monitoring and enforcement (Chapters 2 and 4)	Other comments and observations
Rebuilding								
OY values and proxies recommended by the technical guidance should be included in the range of alternatives with accompanying analysis of both short- and long-term environmental and economic impacts.	1	X						
Consider zero mortality levels for cowcod, bocaccio, and canary rockfish.	1	X						
Establish a rebuilding control rule that guides rebuilding so that a strong year class does not create a management response where short-term yields are increased in response to a strong recruitment event.	1	X						
Evaluate alternatives that include a 90% probability of recovery of overfished stocks in the maximum allowable time under National Standard Guidelines (T_{MAX}).	1	X						
Evaluate different rebuilding periods for each overfished species.	1	X						
Evaluate time periods for rebuilding overfished species that are as short as possible.	1	X						
Explore a full range of management measures to successfully rebuild overfished species within the rebuilding target time.	1		X					
Include a full range of management strategies for returning depleted species to healthy levels and managing non-depleted species at OY.	1		X					
Include a target time period that is the mid-point between T_{MIN} and T_{MAX}, which serves as the upper bounds of the rebuilding time frame.	1	X						
Present a full range of rebuilding time period alternatives that are as short as possible.	1	X						
The EIS must explore a full range of management measures necessary to ensure a high probability of successfully rebuilding depleted species within the rebuilding target time.	1	X						

TABLE 1.4.3-1. Summary of scoping comments received on 2004 Annual Specifications. (Page 8 of 10)

Subject/Comments	No. of comments	Alternative OY specifications (Chapter 2)	Alternative management measures (Chapter 2)	Alternative allocations (Chapter 2)	Baseline description (Chapter 3)	Impacts (Chapter 4)	Monitoring and enforcement (Chapters 2 and 4)	Other comments and observations
Recreational fishing, general								
California needs additional recreational fishing options.	1		X					
Please relax current regulations for the California sportfish fishery.	1		X					
Regional management								
Need regional management, also with respect to RCA configurations.	1		X					
Seasons								
California live fish fishery seasons discriminate against hook-and-line open access fishermen.	1							X
Need a longer season for sablefish in order to defend against market for farmed sablefish.	1		X					
Seasonal closures should be timed when the majority of species in an area are spawning.	1		X					
Science								
Are the catch-by-depth data accurate enough to analyze different closed area configurations whose boundaries vary in 10 fathom increments?	2						X	
Describe the current status of different managed groundfish species.	1				X			
Don’t trust the way stock assessments are conducted (doesn't take into account seasons, fish congregation in certain areas); needs to be improved.	1						X	
Don't trust science: bocaccio don't need the level of protection they are getting.	1							X
Don’t trust science: it is controlled by the fishing industry.	1							X
Science (continued)								

TABLE 1.4.3-1. Summary of scoping comments received on 2004 Annual Specifications. (Page 9 of 10)

Subject/Comments	No. of comments	Alternative OY specifications (Chapter 2)	Alternative management measures (Chapter 2)	Alternative allocations (Chapter 2)	Baseline description (Chapter 3)	Impacts (Chapter 4)	Monitoring and enforcement (Chapters 2 and 4)	Other comments and observations
Don't trust science: there are many areas that can be fished for whitefish and/or sculpin without catching bocaccio.	1							X
Need a more scientific, defined and reasonable approach to closures.	1						X	
Need real-time data collection.	1						X	
Need to understand how stock assessments work.	1							X
Review current sources of data for fishing-related mortality in all fisheries and update the groundfish FMP to specify the pertinent data necessary to identify catch types and amounts, areas where fish are caught, time of fishing, and other information needed for proper application of the proposed 2003 management regime.	1				X			
Take into account uncertainties associated with fishing mortality.	1				X			
Use fishermen's knowledge in stock assessments.	1						X	
Trip limits								
Allow 6 permits per vessel so that 2 permit owners can consolidate on one boat to cut expenses.	1							X
Consider trip or bag limits to meet management goals.	1		X					
Do not include within the range of alternatives zero retention of cabezon. If this is included, make it apply to both commercial and recreational fisheries.	1		X					
Evaluate the environmental impact of small trip limits.	1					X		
Set appropriate trip limits that allow the commercial limited entry fleet to more fully utilize the minor shelf OY.	1		X					
Zero retention of cabezon is always an option, but wary of slipping it in now.	1		X					
Year-round fishery								
Evaluate the objective of a year-round groundfish fishery and alternatives to a year-round fishery.	1		X		X			
Allow fishing all year (open access hook-and-line).	1		X					

TABLE 1.4.3-1. Summary of scoping comments received on 2004 Annual Specifications. (Page 10 of 10)

Subject/Comments	No. of comments	Alternative OY specifications (Chapter 2)	Alternative management measures (Chapter 2)	Alternative allocations (Chapter 2)	Baseline description (Chapter 3)	Impacts (Chapter 4)	Monitoring and enforcement (Chapters 2 and 4)	Other comments and observations
Total comments	117							

1.4.4 Potentially Significant Environmental Impacts Identified Through Scoping and Criteria Used to Evaluate Them

Chapter 4 is organized around different components of the human environment that could be significantly affected by the proposed action. The alternatives are evaluated in terms of the ways in which they may affect these environmental components. The nature and intensity of these effects constitute evaluation criteria used to determine the effect of the alternatives. Evaluation criteria are summarized below under headings for the different environmental components, which mirror the headings in Chapter 4. (Chapter 3, describing the affected environment, is similarly organized.)

1.4.4.1 Habitat and Ecosystem

Essential fish habitat (EFH) may be damaged by both fishing and non-fishing activities. Marine ecosystems may be affected by removal of biomass at different trophic levels that results in long-term changes in ecosystem structure. Direct and indirect effects of the proposed action result from the location and intensity of fishing activity as authorized under each alternative. Cumulative effects stem from the proposed action when combined with past fishing authorized under the groundfish FMP, fishing in the future, and non-fishing impacts. Currently, the location and intensity of fishing effort cannot be directly predicted. Instead, it is inferred from the harvest levels established under the different alternatives and the types of management measures. The proposed action would have a significant impact on essential habitat or fishery ecosystems if it resulted in a measurable change in the productivity of managed stocks equivalent to or greater than productivity changes due to natural fluctuations in environmental conditions.

1.4.4.2 The Fishery Management Unit

The fishery management unit (stocks managed under the FMP) my be subdivided into three categories for the purposes of evaluating impacts: overfished species, species subject to precautionary management, and species believed to be at or above B_{MSY}. A goal of the management framework is to maintain stocks at B_{MSY}; for stocks below that size harvests must be limited in order to allow the stock, over time, to reach that size. The management framework takes a precautionary approach by requiring increasing reductions in harvest levels the more stock size falls below B_{MSY}. If a stock falls below the minimum stock size threshold (MSST) defining an overfished stock (which for groundfish is 25% of unfished biomass) a still more stringent framework applies: for a given harvest rate managers identify a time frame for recovery and assess the likelihood of recovery during that time period. Fishing mortality, or the removal of stock biomass, in 2004 is the direct effect of the proposed action. From the standpoint of impact assessment, this has relatively little utility; fishery management depends on the cumulative effects of past management (which partly determines current biomass) and focuses on the future effect of current fishing mortality. One criterion for evaluating alternatives, therefore, is their likelihood of satisfying the B_{MSY} management goal. The framework for overfished species provides a quantification of this likelihood, the probability of stock recovery within a given time period. For stocks above MSST the evaluation must rely on a more qualitative discussion of the types of risk associated with a given harvest level. Any harvest level that constitutes overfishing, a rate that exceeds F_{MSY} or its proxy, represents a clear threshold for significance. (F_{MSY} is shorthand for the fishing mortality rate that will maintain the stock at maximum sustainable yield [MSY] biomass. The true value for this rate is not known for groundfish species. Instead, proxy values are used.) The MSA does not allow the Council to knowingly authorize overfishing (that is, a harvest rate that keeps stock size below B_{MSY}). Therefore, the alternatives must be assessed for overfishing risk—failing to maintain stocks at B_{MSY} over the long term and on a continuing basis—which would represent a significant impact.

Once a range of OYs has been identified, the Council formulates a suite of management measures and estimates the resulting projected catch (or total fishing mortality, including bycatch). The management measures must constrain total fishing mortality of each stock or stock complex to a level at or below the OYs in a given alternative; if they don't, further adjustments are made until projected catch of each stock or stock complex falls below the OYs for that alternative. Thus, the impact of management measures represents another level of the same analytical question: what is the likelihood that *actual* harvests (as opposed to the potential harvest levels represented by OYs) will satisfy the goal of maintaining stocks at B_{MSY}? Because the intent is to manage within OYs, the likelihood that management measures will not sufficiently constrain fishing mortality represents the impact to be evaluated. However, this risk remains unquantified and must be evaluated qualitatively. The level of bycatch resulting from a given suite of management measures is an important aspect of this evaluation. From a biological perspective, the amount of bycatch is immaterial as long as total fishing mortality is sufficiently constrained (assuming that discarding fish into the marine environment does not by itself result in significant impacts).[16/] However, bycatch mortality is much more difficult to monitor and assess than landed catch mortality. Thus, as bycatch increases there is a greater risk that total fishing mortality will be under-estimated. As harvest limits for certain species are reduced, there is greater incentive for fishermen to discard fish, so they may continue fishing for other species with higher limits. Alternatives, therefore, must be evaluated for their bycatch-producing effect.

1.4.4.3 Protected Species

A range of species other than federally-managed fish, are protected under the Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), and the Migratory Bird Treaty Act (MBTA). Groundfish fisheries may interact with these species, causing mortality or otherwise harming them. Although data on these interactions are limited, impact may be evaluated using a similar framework as described for habitat and ecosystem impacts. The relative level of fishing effort is assumed to correlate with projected catch and also increase the likelihood of interactions with protected species. Significant impacts would occur if standards established pursuant to the relevant laws were exceeded.

1.4.4.4 Monitoring and Enforcement

Management measures included in the alternatives affect the ability of government agencies to enforce management regulations. The cost and feasibility of enforcing these measures is evaluated qualitatively.

Determining total catch mortality, both in advance of and during the fishing year, is also needed for effective management. Landed catch is relatively easily monitored at dockside. However, fish are also discarded at sea for economic or regulatory reasons; and these are most often overfished species, which have low harvest limits. The cost and feasibility of monitoring catch is evaluated for each alternative.

1.4.4.5 Socioeconomic Impacts

The socioeconomic environment is divided into four categories for the purposes of analysis: fisheries, buyers and processors, fishing communities, and the general public. Fisheries are categorized for the purpose of

16/ It is important to recognize that bycatch may represent a social cost. Marketable fish may be discarded due to regulatory restrictions, decreasing potential revenue. Even if fish are discarded because there is no market for them, or because production costs exceed potential revenues, a social cost may be incurred. This cost represents foregone opportunities, environmental services provided by the living fish, the value society attaches to the mere existence of the fish, and other values not adequately captured in prices.

analysis; the broadest categories are commercial, recreational, and tribal fisheries. There are further subdivisions of the commercial fishery based on regulatory category and fishing strategies, as discussed in Section 3.5. In order to account for total fishing mortality to fishery management unit species, groundfish fisheries are defined broadly, including vessels targeting fishery management unit species, with catches mainly comprising groundfish species, to those catching groundfish incidentally, and in small proportion to their total catch.

Issues raised during scoping through public comments were screened to identify potentially significant socioeconomic impacts. Screening of issues raised by the public was augmented by the analysts' assessment of additional areas of potentially significant impacts. Table 1.4.4-1 summarizes the screening criteria applied to different components of the socioeconomic environment; these form the table rows. These criteria are screened against the socioeconomic environment components listed in the column headings. (The column headings also list the Chapter 4 sections addressing each component.) For each criterion the body of the table indicates the components of the socioeconomic environment for which additional analysis to assess the potential for significant impacts is warranted and the section of Chapter 4 in which the analysis is provided (see the table key). Note that all socioeconomic impacts ultimately affect communities and the general public.

TABLE 1.4.4-1. Evaluation criteria screening matrix. (Page 1 of 1)

	4.5.1 All Sectors	4.5.2 Commercial Fisheries	4.5.3 Buyers and Processors	4.5.4 Recreational Fishers	4.5.5 Tribal Fisheries	4.5.6 Communities	4.5.7 General Public
Net Value and Profits	I	I	I	I	I		I
- Revenue		I	I	I	I		
- Compliance		I	I	I			
- Flexiblity		I	I				
- Capacity		I	I				
- Debt Servicing		I		I			
Long-term Issues (Production Levels and Risk)	I	AS	AS	AS	AS	AS	AS
Markets Distortions and Barriers							
Distribution of Benefits and Costs	I	I	I	I	I	I	
Adjacent Fisheries		I		I			
Public Health and Safety		I		I			
Fairness and Equity	I	AS	AS	AS	AS	AS	
Bargaining Strength/Competitive Position			I				
Income		C	C	C	C	I	
Employment		C	C	C	C	I	

Key:
"I": potential impacts warranting analysis and addressed in the indicated section.
"AS": potential impacts were identified but are addressed in Section 4.5.1, covering all sectors.
"C": potential impacts were identified but are addressed in Section 4.5.6, covering coastal communities.

Government institutions are also part of the socioeconomic environment. As mentioned above in Section 1.4.4.4, there are costs to government for management and enforcement. These are discussed in Section 4.4.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

The Council adopted alternatives analyzed in this EIS for managing the 2004 West Coast groundfish fishery at its June 2003 meeting in Foster City, California. In general, alternative management specifications address measures designed to reduce total mortality of overfished groundfish stocks and are analyzed for their potential effect on groundfish habitats, groundfish stocks and other marine resources, and the socioeconomic infrastructure of the West Coast fishery and fishing-dependent coastal communities. The proposed action was decided by the Council at its September 2003 meeting in Seattle, Washington. The harvest specifications and management measures that are part of the proposed action are described and analyzed under the *Council OY* alternative (Section 2.2.5).

2.1 How the Alternatives Address Key Management Issues

Target harvest levels for groundfish stocks and stock complexes for 2004 are based on results of new stock assessments and rebuilding analyses for overfished stocks, projected harvest levels from previous assessments and rebuilding analyses, Council-adopted rebuilding plans, or precautionary adjustments to the historical harvest of unassessed stocks based on catch trends and other considerations as laid out in the National Standard Guidelines (NSGs) and/or the groundfish FMP. Harvest levels for stocks managed under the latter case tend to be set at status quo levels unless new information is brought forward recommending a change.

Management measure options for 2004 were scoped during the Council process and are structured in this EIS to capture the full range of outcomes and considerations the Council and other entities have recommended for analysis. The Council decided a range of catch sharing options, management measures and specifications, and policy choices for analysis. These management measure options are structured in the alternatives analyzed in this EIS to understand the full effect of implementing them in combination. One overriding evaluation criterion in this analysis is the effectiveness of management measures to attain, but not exceed, alternative harvest levels. To the extent possible, sensitivity analyses are offered to better understand the impact, contribution, and effect of individual management measures and specifications. The following is a description and rationale for considering alternative 2004 groundfish harvest levels, catch sharing options, and other management measures and specifications.

2.1.1 Alternative Harvest Levels

New stock assessments for black rockfish (*Sebastes melanops*), bocaccio (*S. paucispinis*), darkblotched rockfish (*S. crameri*), Pacific ocean perch (*S. alutus*), widow rockfish (*S. entomelas*), and yellowtail rockfish (*S. flavidus*), as well as a cowcod (*S. levis*) rebuilding review, and rebuilding analyses for bocaccio, darkblotched rockfish, Pacific ocean perch, and widow rockfish have been approved by the Council for 2004 groundfish management. These new assessments and rebuilding analyses were used to range alternative harvest levels for these stocks as depicted in Table 2.1.1-1. Alternative ABC and OY specifications are structured to capture a range of rebuilding probabilities for the overfished stocks and/or the key scientific uncertainties in assessments. The 2004 harvest specifications for the other groundfish stocks and stock complexes managed under the groundfish FMP, shown in Table 2.1.1-1, are projected from past assessments and rebuilding analyses or are unchanged from 2003 (status quo). The rationale for ranging alternative harvest levels are described in this section for those stocks with new assessments and for those stocks with harvest levels different than status quo.

2.1.1.1 Black Rockfish

A new black rockfish assessment was done for the portion of the coastwide stock occurring off the coasts of Oregon and California (Ralston and Dick 2003). Previous assessments were done for the portion of the stock occurring off the coasts of Oregon north of Cape Falcon and Washington. Alternative harvest levels for the portion of the black rockfish stock occurring off Oregon and California were ranged to capture the major uncertainty of historical landings prior to 1978. Black rockfish catches prior to 1945 were assumed to be zero in the assessment. Many gaps in historical landings of black rockfish since 1945 were evident, and these landings were reconstructed using a variety of data sources. The base model assumed cumulative landings of black rockfish from all fisheries was 17,100 mt from 1945 to 1977. This base case catch scenario formed the basis for the *Medium OY* harvest alternative and the *Council OY* preferred alternative, which specifies a 2004 ABC and total catch OY of 775 mt for fisheries off Oregon and California. The *Low OY* harvest alternative for black rockfish assumes lower landings in recreational and trawl fisheries prior to 1978 than used in the base model and assumes a cumulative catch from 1945 to 1977 of 9,400 mt. The high catch scenario in the assessment assumes a cumulative catch of 26,100 mt from 1945 to 1977 and forms the basis for the *High OY* alternative.

2.1.1.2 Bocaccio

A new bocaccio assessment (MacCall 2003b) and rebuilding analysis (MacCall 2003a) were done for the portion of the stock declared overfished occurring off California south of Cape Mendocino at 40°10' N latitude. Three models are presented in the rebuilding analysis: STARb1 and STARb2 were recommended by the bocaccio Stock Assessment Review (STAR) Panel to bracket the uncertainty in the assessment, and STATc, which combines the assumptions in the two STAR Panel-recommended models (MacCall 2003a). Model STARb1 omits data from the NMFS triennial surveys and holds estimated recruitment constant to 1959, whereas model STARb2 omits the recreational catch per unit effort (CPUE) data and holds estimated recruitment constant to 1969. Model STATc omits neither data source, holds estimated recruitment constant to 1959, and places a low emphasis on the stock-recruitment relationship to stabilize estimates of recent (post-1999) recruitment. The alternative bocaccio harvest levels recommended by the Council for analysis were ranged to capture uncertainty in these models as well as the different rebuilding likelihoods represented by probabilities of rebuilding within the maximum allowable time (P_{MAX}). The *Low OY* alternative harvest level is based on the use of model STARb2 with a P_{MAX} of 80%. The *Medium OY* alternative assumes model STATc with a P_{MAX} of 70%. The *High OY* alternative assumes model STARb1 with a P_{MAX} of 60%. The *Council OY* alternative bocaccio harvest level (ABC = 400 mt, OY = 250 mt) is the preferred alternative with a total catch OY intermediate to those specified in the *Low OY* and *Medium OY* alternatives. However, given the uncertainty in catch estimates, especially recreational catch estimates derived from the California Marine Recreational Fisheries Statistical Survey (MRFSS), the Council directed that management measures stay within the bocaccio total catch OY of 199 mt analyzed under the *Low OY* alternative. Therefore, the 51 mt difference between the *Council OY* and direction to achieve total catch OY of 199 mt provides a management buffer against potential overharvest of bocaccio in the face of uncertainty in current catch monitoring systems.

2.1.1.3 Canary Rockfish

Although canary rockfish were not assessed in 2003, alternative harvest levels are analyzed because OY values depend on recreational and commercial catch sharing (see Section 2.1.2). This is because the recreational fishery tends to take smaller canary rockfish than the commercial fishery, and therefore, has a greater "per ton" impact on canary rockfish rebuilding than the commercial fishery. That is, as the recreational share of the available canary rockfish harvest increases, the OY decreases. Alternative canary rockfish harvest levels are based on projections from the 2002 rebuilding analysis (Methot and Piner 2002a) and the Council's adoption of a canary rockfish rebuilding plan as part of FMP Amendment 16-2, which specifies rebuilding targets consistent with a P_{MAX} of 60% (the target rebuilding year [T_{TARGET}] specified in FMP Amendment 16-2 is 2074 and the harvest control rule (F) is 0.0220). The *Low OY* canary rockfish harvest level is based on 50% recreational and 50% commercial catch shares. The *Medium OY* and *High OY* alternatives are based on 39% recreational and 61% commercial catch shares, which represent the status quo catch shares adopted as harvest guidelines in 2003. The *Council OY*, or preferred alternative, specifies a total catch OY of 47.3 mt, which is based on the recreational:commercial catch share that resulted from Council decisions in September. All OY alternatives have the same rebuilding impact on canary rockfish and do not require re-specification of the target rebuilding year or harvest control rule adopted under FMP Amendment 16-2.

2.1.1.4 Darkblotched Rockfish

Darkblotched rockfish alternative harvest levels are based on variable rebuilding projections from the new stock assessment and rebuilding analysis (Rogers 2003). Harvest projections are influenced by recent strong recruitment (the 2000 and 2001 year classes), which has not been completely validated in the data used to assess the stock. The Scientific and Statistical Committee (SSC) STAR Lite Panel requested progressive inclusion of 1997-1999, 2000, and 2001 recruitment estimates (Ralston *et al.* 2003). Risk of error progressively increased from including those recruitment estimates because they were based on increasingly limited data. Rebuilding results were sensitive to the high 2000 and 2001 recruitment estimates, and including them allowed much greater 2004 OYs because those recruits are projected to enter the fishery in the future and help rebuild the stock before T_{MAX}. The ABCs, on the other hand, were not as affected because the 2000 and 2001 recruits were too small to have entered the fishery in 2004. This led to 2004 OY estimates which were higher than the ABC, even given a 90% probability of rebuilding by the maximum allowable year (T_{MAX}). When the ending year for projecting future recruitment was 1999 (2000 and 2001 estimates not included), the ABC was lower than the OY at an 80% probability of rebuilding by 2031.

The *Low OY* harvest level projects the OY by resampling recruits from the 1983-1999 period, the *Medium OY* harvest level projects the OY by resampling recruits from the 1983-2000 period, and the *High OY* harvest level projects the OY by resampling recruits from the 1983-2001 period. To reiterate, the *Medium OY* and *High OY* ABCs are lower than the projected OYs for these alternatives. Since the Magnuson-Stevens Act does not allow harvest greater than the ABC, these ABC values are the harvest limits for these 2004 alternatives. The Council chose the *Medium OY* darkblotched rockfish harvest level (total catch OY = ABC = 240 mt) as its preferred alternative. The proposed action (*Council OY*) is to raise the harvest control rule (F) from 0.027 estimated in the previous rebuilding analysis (Methot and Rogers 2001) and specified in FMP Amendment 16-2 to 0.032 estimated in the recent rebuilding analysis (Rogers 2003). However, the target rebuilding year of 2030 is not being revised as part of the proposed action, resulting in an increased probability of rebuilding by T_{MAX} (P_{MAX} increases from 80% to >90%).

2.1.1.5 Lingcod

The 2004 lingcod ABC (1,385 mt) and OY (735 mt) are projected from the most recent rebuilding analysis (Jagielo and Hastie 2001). The same OY is analyzed under each alternative and is consistent with the Council's adoption of a lingcod rebuilding plan as part of FMP Amendment 16-2, which specifies rebuilding targets consistent with a P_{MAX} of 60% (the T_{TARGET} specified in FMP Amendment 16-2 is 2009, and the harvest control rule (F) is 0.0531 for the Columbia and U.S./Vancouver International North Pacific Fishery Commission (INPFC) areas and 0.0610 in the Conception, Monterey, and Eureka INPFC areas). No departure from this rebuilding plan is contemplated in this EIS.

2.1.1.6 Pacific Ocean Perch

Alternative harvest levels for Pacific ocean perch were derived from a new rebuilding analysis done this year (Punt *et al.* 2003). Many cases were presented in the rebuilding analysis; and, based on SSC advice, the Council chose the one based on the full Bayesian posterior distribution where recruits were resampled to project future recruitment (Case C). Using the full Bayesian posterior distribution captured more of the assessment model uncertainty than using the maximum of the posterior density function. Resampling recruits rather than recruits per spawner was recommended because only the southern fringe of the stock occurs in waters off the U.S. West Coast. One would want to resample recruits per spawner if measured recruitment is a function of measured stock size. However, it is unlikely that the recruitment measured off the U.S. West Coast is wholly from the portion of the parental stock occurring in these same waters. Therefore, resampling recruits was advised. Harvest alternatives were, therefore, ranged using Case C with different rebuilding probabilities. The *Low OY*, *Medium OY*, and *High OY* alternatives are based on rebuilding probabilities of 80%, 70%, and 60%, respectively.

A Pacific ocean perch rebuilding plan was adopted by the Council and submitted for incorporation in the groundfish FMP under Amendment 16-2. The rebuilding plan established a target rebuilding year of 2027 and the harvest control rule of F = 0.0082 (with a P_{MAX} of 70%). The proposed action (*Council OY*) is to change the harvest control rule (F) from 0.0082 estimated in the previous rebuilding analysis (Punt and Ianelli 2001) and specified in FMP Amendment 16-2 to 0.0257 estimated in the most recent rebuilding analysis (Punt *et al.* 2003). However, the target rebuilding year of 2027 is not being revised as part of the proposed action (*Council OY*) resulting in an increased probability of rebuilding by T_{MAX} (P_{MAX} increases from 70% to >70%).

2.1.1.7 Pacific Whiting

The portion of the Pacific whiting stock in waters off the U.S. West Coast was declared overfished in April 2002. However, no formal rebuilding analysis has been approved for use in managing the stock and directing a rebuilding program. Furthermore, the SSC recommended the 2002 assessment (Helser *et al.* 2002) not be used to project future harvest levels. A new assessment and rebuilding analysis are expected to be completed this winter and brought to the Council for approval in March 2004, prior to the April 1, 2004 start of the whiting fishery. These new analyses will form the basis for managing the 2004 whiting fishery. In lieu of a more informed range of possible 2004 whiting harvest levels, the Council initially decided to range whiting OYs ±50% of the status quo (2003) harvest level for analytical purposes. Therefore, the *Low OY* harvest level is -50% of the 2003 OY, the *Medium OY* is equal to the 2003 OY, and the *High OY* harvest level is +50% of the 2003 OY. The *High OY* alternative (total catch OY in U.S. waters) was subsequently increased to 250,000 mt for the EIS analysis. It is expected this range is adequately broad to encompass the range of outcomes from the new assessment and rebuilding analysis anticipated early next year.

2.1.1.8 Sablefish

The GMT recommended updating the sablefish ABC and OY ranges analyzed in last year's EIS for 2003 management. Therefore, updated harvest level alternatives are presented as derived in the 2002 assessment update (Schirripa 2002). The *Low OY* harvest level is based on an $F_{60\%}$ harvest rate under the assumption that sablefish recruitment is driven by the density of the parental stock (density-dependence hypothesis). The $F_{60\%}$ harvest rate is one predicted to result in increased abundance of the spawning stock biomass in the next ten years after the strong 2000 and 2001 year classes have finished contributing to stock productivity. The *Medium OY* harvest level also assumes a density-dependence recruitment hypothesis, but is derived using the stock's default F_{MSY} harvest rate of $F_{45\%}$. The *High OY* harvest level is based on the default $F_{45\%}$ harvest rate, but assumes recruitment variability is driven more by environmental regime shifts (regime shift hypothesis) than parental stock density. The 40-10 adjustment is applied to all the alternative OYs since the stock's spawning biomass is predicted to be less than 40% of its initial, unfished level ($B_{32\%}$ under a density-dependence hypothesis and $B_{39\%}$ under a regime shift hypothesis).

During the course of updating sablefish harvest level alternatives, a mistake was discovered in the 2003 sablefish harvest specifications. Past sablefish assessments assessed only the portion of the stock occurring north of Pt. Conception at 34°27' N latitude. A separate sablefish allocation was made for Conception area fishers, since the trawl/nontrawl sablefish allocation is specified in the FMP only for the Monterey area north (north of 36° N latitude). Therefore, the GMT had made an adjustment to sablefish specifications in the past to calculate the OY for the portion of the stock in the assessed area between 34°27' N latitude and 36° N. latitude (the “Conception wedge”). This amount of available harvest was then added to the rest of the Conception area ABC and OY, which was based on the proportion of recent coastwide landings made south of Pt. Conception. The north of Conception OY was reduced accordingly to represent the OY for the Monterey, Eureka, Columbia, and U.S./Vancouver INPFC areas. This adjustment was made to the 2003 sablefish specifications without realizing the new assessment determined coastwide stock status and ABCs/OYs. The 2003 coastwide ABC and OY depicted in Table 2.1.1-1 are the correct specifications projected in the most recent assessment. The alternative coastwide 2004 specifications depicted in Table 2.1.1-1 are projected from the Schirripa (2002) assessment. These were stratified for the Conception and north of Conception areas by apportioning the coastwide ABCs and OYs based on average sablefish landings north and south of 36° N latitude during 1998-2002 (see Section 2.1.2.5).

The Council chose the *Medium OY* sablefish harvest specification as its preferred alternative. Therefore, a coastwide OY of 7,786 mt of sablefish (7,510 mt for north of the Conception INPFC area; and 276 mt for the Conception INPFC area) is proposed under the *Council OY* alternative.

2.1.1.9 Shortspine Thornyhead

The 2004 shortspine thornyhead ABC and OY are projected from the 2001 assessment (Piner and Methot 2001). The 40-10 adjustment was applied to the ABC to derive the OY, since the stock's spawning biomass is estimated to be below 40% of its initial, unfished level.

2.1.1.10 Widow Rockfish

A new widow rockfish stock assessment (He *et al.* 2003b) and rebuilding analysis (He *et al.* 2003a) were approved this year for use in 2004 management. The models and simulations presented in the rebuilding analysis and recommended by the SSC were used to range 2004 widow rockfish ABCs and OYs for analysis in this EIS. The SSC recommended the rebuilding simulations presented in the rebuilding analysis under models 7, 8, and 9. These models 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 2.0 and 4.0 in the Santa Cruz midwater juvenile survey. Models 7, 8, and 9 assume a midwater survey power coefficient of 2.0, 3.0, and 4.0, respectively. All harvest level alternatives chosen by the Council have a rebuilding probability (P_{MAX}) of 60%. The *Low OY*, *Medium OY*, and *High OY* harvest level alternatives are based on models 7, 8, and 9, respectively. The Council chose the *Medium OY* harvest specification as its preferred alternative.

2.1.1.11 Yelloweye Rockfish

The 2004 yelloweye rockfish ABC and OY were projected from the 2002 rebuilding analysis (Methot and Piner 2002b). Both the ABC and OY are projected higher in 2004 relative to 2003; however, the increase is so small that the OY rounds to the same value as the 2003 OY, while the ABC rounds to one mt higher.

2.1.1.12 Yellowtail Rockfish

A new yellowtail rockfish stock assessment (Lai *et al.* 2003) was approved for 2004 management. The 2004 ABC and OY are derived using model YT2003N in the assessment, which updates the catch series used in the previous assessment (Tagart *et al.* 2000) with a newly revised series from Pacific Coast Fisheries Information Network (PacFIN), revised Canadian catches in INPFC area 3C, and new estimates of 1967-1976 foreign catches (Rogers In prep). The OY equals the ABC, since the stock is estimated to be above the abundance level that supports MSY (or 40% of initial, unfished biomass). The yellowtail rockfish stock was estimated to be at 46% of its initial, unfished biomass in 2002 (Lai *et al.* 2003).

2.1.1.13 Other Harvest Level Changes from Status Quo

The only other changes to status quo harvest levels were to the rockfish complexes that used to contain the black rockfish stock. The ABCs and OYs for the “Remaining Rockfish North” and “Other Rockfish South” complexes were reduced when the black rockfish component was removed. Table 2.1.1-1 displays the 2004 harvest specifications for these two complexes as well as the ABCs and OYs for black rockfish in waters off Washington and waters off Oregon and California.

TABLE 2.1.1-1. Pacific Fishery Management Council-recommended alternatives for acceptable biological catches (ABCs) and total catch optimum yields (OYs) (mt) for 2004 (Overfished stocks in CAPS). (Page 1 of 2)

Stock	2003 ABCs/OYs		2004 ABC and OY Alternatives							
			Low OY		Med OY		High OY		Council OY [a/]	
	ABC	OY	ABC	OY	ABC	OY	ABC	OY	ABC	OY
LINGCOD	841	651			1,385	735			1,385	735
Pacific Cod	3,200	3,200			3,200	3,200			3,200	3,200
PACIFIC WHITING	188,000	148,200	94,000	74,100	188,000	148,200	325,000	250,000	Decision deferred	
Sablefish (Coastwide) [b/]	8,460	6,794	8,487	4,812	8,487	7,786	8,487	8,423	8,487	7,786
North of Conception			8,185	4,641	8,185	7,510	8,185	8,124	8,185	7,510
Conception area			302	171	302	276	302	299	302	276
PACIFIC OCEAN PERCH	689	377	980	318	980	444	980	555	980	444
Shortbelly Rockfish	13,900	13,900			13,900	13,900			13,900	13,900
WIDOW ROCKFISH	3,871	832	3,076	181	3,460	284	3,908	501	3,460	284
CANARY ROCKFISH [c/]	256	44	256	42	256	46	256	46	256	47
Chilipepper Rockfish	2,700	2,000			2,700	2,000			2,700	2,000
BOCACCIO	198	#20	400	199	501	306	660	526	400	250
Splitnose Rockfish	615	461			615	461			615	461
Yellowtail Rockfish	3,146	3,146			4,320	4,320			4,320	4,320
Shortspine Thornyhead	1,004	955			1,030	983			1,030	983
Longspine Thornyhead	2,461	2,461			2,461	2,461			2,461	2,461
S. of Pt. Conception	390	195			390	195			390	195
COWCOD (S. Conception)	5	2			5	2			5	2
N. Conception & Monterey	19	2			19	2			19	2
DARKBLOTCHED [d/]	205	172	217	172	240	240	247	247	240	240
YELLOWEYE	52	22			53	22			53	22
Nearshore Species										
Black WA	1,115	835			540	540			540	540
Black OR-CA			729	729	775	775	861	861	775	775
Minor Rockfish North	4,795	3,115			3,680	2,250			3,680	2,250
Remaining Rockfish North	2,727	2,081			1,612	1,216			1,612	1,216
Bocaccio	318	239			318	239			318	239
Chilipepper - Eureka	32	32			32	32			32	32
Redstripe	576	432			576	432			576	432
Sharpchin	307	230			307	230			307	230
Silvergrey	38	29			38	29			38	29
Splitnose	242	182			242	182			242	182
Yellowmouth	99	74			99	74			99	74
Other Rockfish North	2,068	1,034			2,068	1,034			2,068	1,034
Minor Rockfish South	3,506	2,015			3,412	1,968			3,412	1,968
Remaining Rockfish South	854	689			854	689			854	689
Bank	350	263			350	263			350	263
Blackgill	343	306			343	306			343	306
Sharpchin	45	34			45	34			45	34
Yellowtail	116	87			116	87			116	87
Other Rockfish South	2,652	1,326			2,558	1,279			2,558	1,279
Dover Sole	8,510	7,440			8,510	7,440			8,510	7,440
English Sole	3,100	3,100			3,100	3,100			3,100	3,100
Petrale Sole	2,762	2,762			2,762	2,762			2,762	2,762
Arrowtooth Flounder	5,800	5,800			5,800	5,800			5,800	5,800
Other Flatfish	7,700	7,700			7,700	7,700			7,700	7,700
Other Fish	14,700	14,700			14,700	14,700			14,700	14,700

TABLE 2.1.1-1. Pacific Fishery Management Council-recommended alternatives for acceptable biological catches (ABCs) and total catch optimum yields (OYs) (mt) for 2004 (Overfished stocks in CAPS). (Page 2 of 2)

a/ Council OY is the Council's preferred harvest alternative for 2004.

b/ The coastwide sablefish ABCs and OYs are projected from the most recent assessment (Schirripa 2002). A mistake was discovered in the specifications adopted in the last two years. The 2003 coastwide ABC and OY depicted in this table are corrected from those adopted in federal regulations (see Section 2.1.1.8). The alternative 2004 coastwide specifications were apportioned to the north of Conception and Conception areas by applying the average proportion of landings north and south of the Conception-Monterey INPFC area boundary during 1998-2002 (see Section 2.1.2.5).

c/ The canary rockfish ABC and OY are based on the Council's adopted rebuilding strategy that has a P_{MAX} (probability of successful rebuilding within the maximum allowable time period) of 60%. 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" impact than the commercial fishery. The canary stock was not assessed in 2003.

d/ The total catch OYs for darkblotched rockfish under the Medium OY, High OY, and Council OY alternatives are projected to be higher than the ABC (see Section 2.1.1.4). The specified OY under these alternatives is capped at the ABC since the ABC cannot be exceeded under federal regulations.

2.1.2 Catch Sharing Options

Harvest allocations for the most constraining groundfish stocks and those newly assessed stocks that have not been formally allocated (i.e., black rockfish) are based on criteria provided by the Council in June. Table 2.1.2-1 provides the catch sharing scenarios and analytical basis for these scenarios that are part of the analysis of alternatives presented in this EIS.

The following are some of the equity concerns expressed by Council members in identifying harvest levels for various sectors in the fishery:

- Recent and historic periods used as the basis for allocation should have total harvest levels similar to the levels proposed for 2004. In the past, sectors may have been differentially affected by changes in fishing opportunity. When available harvests were greater, absent a significant conservation issue, some sectors may have been allowed to take more of a now overfished species than was necessary to prosecute their primary target fisheries.

- Historic periods used for allocation should not penalize groups or geographic regions that voluntarily reduced harvest based on preliminary indications of future conservation issues (for example, Washington reduced its recreational yelloweye bag limits in 2000, but the Council did not have a reviewed and validated stock assessment indicating the need for such a reduction prior to the time it made final recommendations for the 2002 fishery).

- In evaluating historic catch, sectors should not receive credit for harvest in a particular year that was in excess of that sector's harvest guideline, and sectors should not be penalized if its harvest was cut short due to the overage of another sector.

- Data reliability and validity need to be taken into account. In particular, there was a break in the MRFSS data in the early 1990s. The data series was partially restored in 1993 and not fully restored until 1997. Additionally, there have been serious concerns about differences between MRFSS estimates and state estimates of recreational harvest. For the commercial fisheries, consideration should be given to whether or not sorting of the species to be allocated was required in the years on which an allocation was based. If sorting was not required, some harvest of the species may have been grouped in a market fishery category. In such cases, the reliability of species composition data collected by port samplers for a particular gear type will affect the harvest estimate.

In the above listed concerns, an importance appears to be placed on the degree to which a sector utilized a particular species during a base period. Given this concern, and that a sector will need to cover its discard mortality with the amount of fish it is allocated in 2004, it may be appropriate to consider whether or not estimates of discard mortality during the historical harvest should be included as part of the base period harvest.

The species where alternative catch sharing options were offered for analysis and the rationale for these options are described as follows.

2.1.2.1 Black Rockfish

The black rockfish ABC/OY for the portion of the stock in waters off California and Oregon is derived from the new assessment (Ralston and Dick 2003). This EIS analyzes various catch sharing options for California and Oregon nearshore fisheries. The Council considered a variety of criteria for analyzing catch share alternatives. Recent historical catches of black rockfish in California and Oregon commercial and recreational fisheries are used as a basis for two of the options analyzed. The time periods for these catch-based options are the 1990-2002, where the average shares are 37% California and 63% Oregon, and 1985-2002, where the average shares are 42% California and 58% Oregon. Two catch sharing options are based on the relative amount of area where black rockfish are generally found in each state. These area-based options assume the southern limit of the black rockfish distribution is San Francisco. The relative area within zero fm to 50 fm off each coast is 44% California and 56% Oregon which is the catch share under this option. Alternatively the relative lineal distance of coastline in each state where black rockfish occur is 51% California and 49% Oregon, which is the catch share under this option. Lastly, the GMT recommended a fifth catch sharing option where the available harvest greater than the actual 2002 harvest in each state is shared equally.

Black rockfish catch sharing options analyzed in the alternatives are the 49% Oregon, 51% California option under the *Low OY* alternative, the 58% Oregon, 42% California option under the *Medium OY* alternative, and the 65% Oregon, 35% California option under the *High OY* alternative. The proposed action (*Council OY*) is to adopt a black rockfish catch sharing plan of 58% Oregon, 42% California. This catch sharing option is expected to meet the needs of Oregon and California. Their respective nearshore FMPs specify precautionary harvest limits that are expected to be less than that provided by the black rockfish catch shares proposed by the Council for 2004.

2.1.2.2 Bocaccio

Decisions on how to share the available harvest of bocaccio only need to be made for California fisheries, since the stock is only declared overfished south of Cape Mendocino, and the specified OY alternatives only apply for that area. The commercial:recreational fishery sharing options the Council chose for analysis are a 50:50 option and a 44:56 option based on the 2002 harvest guidelines decided by the Council.

The bocaccio harvest sharing option for the affected commercial fishing sectors in California is 60% trawl:40% nontrawl based on the average catch sharing percentage during 1997-1999. These years were used since the fishery was significantly constrained by bocaccio rebuilding needs after this period (stock was declared overfished in 1999) and there was no limited entry:open access allocation of bocaccio prior to this period. Therefore, the GMT judged that 1997-1999 was a period best reflecting an unconstrained catch sharing of bocaccio.

2.1.2.3 Canary Rockfish

Canary rockfish are distributed coastwide and are caught with a variety of fishing gears. Given the low available harvest of canary rockfish under the Council's adopted rebuilding plan and the wide variety of fisheries that incidentally catch canary rockfish, this stock is the most binding constraint to West Coast groundfish fisheries. Sharing the available canary rockfish harvest is perhaps the most difficult decision facing the Council and NMFS. With bocaccio constraints significantly eased in 2004 relative to 2003, canary rockfish catch sharing will now be an even weightier decision, with California fisheries vying for available harvest to allow some increased shelf fishing opportunity.

The Council decided two commercial:recreational fishery canary rockfish sharing options for analysis, (1) a 50:50 share which would result in a 42 mt OY in 2004 under the Council's rebuilding plan, and (2) a 61:39 share which would result in a 46 mt OY in 2004 under the Council's rebuilding plan. The Council expressed a preference for the latter since it is based on the same catch shares adopted for 2003. Catch shares based on other years were not favored by the Council, since canary rockfish OYs were significantly higher prior to 2003, and canary rockfish rebuilding did not constrain fishing opportunities to the same extent.

The same rationale for catch sharing options among commercial fishery sectors compelled the Council to recommend using the 2003 catch projections as the basis for analyzing commercial catch shares. These projections and resulting catch shares for analyzing allocation of the commercial harvest guideline among commercial sectors are 59% trawl, 3% limited entry fixed gear, 12% open access, and 26% tribal fisheries.

Sharing the available harvest of canary rockfish among states for the state-managed recreational fisheries could not be based on 2003 catch projections, since California fisheries were largely constrained by bocaccio rebuilding measures. This year, with the bocaccio OY increasing significantly, shaping the California recreational fishery by some relaxation of the seasonal and depth restrictions imposed in 2003 to protect bocaccio will require a greater share of the available harvest of canary rockfish. A less biased approach recommended by the Council was to use recreational catch histories from the 1990s to analyze impacts in recreational fisheries. The choice of these data was based on the fact that the catches occurred prior to canary rockfish being declared overfished, and thus, rebuilding canary rockfish was not a primary factor in constraining fisheries. Older recreational data is less reliable, since species catch compositions were not uniformly calculated and/or reported. The GMT recommended that catch histories from the 1993-1999 period be used for these reasons. The GMT also underscored other data biases such as California recreational catch estimates being generated from MRFSS, which has generally estimated higher catches than other data systems, while Oregon and Washington estimates are largely derived from the states' ocean sampling programs. Likewise, estimates of recreational discards are differentially sampled and reported by the coastal states. States also differentially implemented more conservative constraints on their recreational fisheries during the 1990s. For instance, in 1996 Washington went from a 15 rockfish daily-bag-limit to a 10 rockfish limit, while the other states maintained a 15 rockfish limit. Despite recognized data bias, the GMT recommended using Recreational Fishery Information Network (RecFIN) estimates of landed catch during 1993-1999 to analyze recreational catch shares among the states. The resulting catch shares are 60% California, 34% Oregon, and 6% Washington.

The proposed action under the *Council OY* alternative is to adopt a 2004 commercial:recreational canary rockfish catch share of 63%:37%.

2.1.2.4 Lingcod

A similar analytical approach and rationale for sharing the available lingcod harvest to sharing canary rockfish harvest was proposed by the Council, since access to lingcod was and will largely depend on controlling canary rockfish impacts. Therefore, the Council proposed using 2003 projected catch shares to determine the commercial:recreational lingcod catch sharing for analysis. This catch share is 31% commercial and 69% recreational. The same rationale for analyzing lingcod catch shares among commercial fishery sectors using 2003 catch projections gives 49% trawl, 12% limited entry fixed gear, 32% open access, and 7% tribal fisheries. Sharing the recreational harvest guideline of lingcod among the states by calculating the percentage of coastwide recreational landings during 1993-1999 using RecFIN data gives shares of 65% California, 22% Oregon, and 13% Washington. As in the canary rockfish example, the Council is expected to use the analyses in this EIS to understand the tradeoffs of different allocation scenarios, and negotiate and adopt a final lingcod harvest sharing strategy and OY at the September meeting in Seattle, Washington.

2.1.2.5 Sablefish

Trawl and nontrawl sablefish allocations are frameworked in the groundfish FMP and specified in federal regulations. Since all the specified allocations are based on the available harvest of sablefish north of 36° N latitude (the Conception/Monterey INPFC area boundary), sablefish specifications discussed in Section 2.1.1.8 require apportioning the coastwide sablefish OY to the Conception and north of Conception areas. The GMT proposed using the last five years (1998-2002) of commercial sablefish landings north and south of 36°N latitude to proportionally stratify the coastwide OY. The average share of total sablefish landings occurring in the Conception area during 1998-2002 is 3.5%.

Sablefish catch sharing would be based on the north of Conception OY alternatives. The allocations specified in the 2003 federal regulations (50 CFR 660) are as follows: 10% of the north of Conception OY off the top as a tribal set-aside, the expected research catch and estimated take in nongroundfish fisheries off the top with the remaining north of Conception OY allocated to the commercial fishery. This commercial OY is then allocated 9.4% to open access fisheries north of Conception with the remainder allocated to limited entry. The trawl/nontrawl limited entry allocation is 58% trawl and 42% nontrawl with the expected take of sablefish in the at-sea whiting fishery taken off the top of the limited entry trawl allocation. Assumed sablefish discard mortality rates are 8% of landed catch in limited entry and fixed gear non-tribal fisheries and 3% of landed catch in fixed gear tribal fisheries. Although a 21% discard mortality rate has been assumed in the past for limited entry trawl fisheries, observed sablefish discard rates from the federal groundfish observer program will be used to analyze expected trawl impacts in this EIS. Observer data from the federal groundfish observer program for limited entry and open access fixed gear fisheries is anticipated in early 2004. These data are expected to be used inseason in 2004 to manage fixed gear fisheries.

2.1.2.6 Widow Rockfish

Directed non-tribal midwater fisheries targeting yellowtail and widow rockfish have not been considered since 2002 due to high canary rockfish bycatch. Canary and widow rockfish constraints in 2004 will likely continue to exclude consideration of directed midwater fisheries. Therefore, without directed yellowtail/widow rockfish midwater fisheries, the sectors that have the highest bycatch of widow rockfish are the at-sea and shoreside whiting fisheries. The Council directed that the analysis of 2004 management options presume that non-whiting fisheries be held harmless in managing widow rockfish bycatch and that all the widow rockfish impacts be managed in the tribal at-sea whiting, non-tribal at-sea whiting, and shoreside whiting sectors. The GMT recommended that the widow rockfish bycatch rate used for the at-sea whiting sectors be derived from the 1999-2002 average bycatch. Prior to this period, widow rockfish were not fully sorted in landings; they were often specified as mixed *Sebastes* in landings.

2.1.2.7 Yelloweye Rockfish

Yelloweye rockfish catch sharing will assume the proportion of the estimated take of yelloweye rockfish in the 2003 catch projections as depicted in the bycatch scorecard under the *No Action* alternative (Table 2.2.1-1) for analysis of 2004 alternatives.

TABLE 2.1.2-1. Catch sharing options to be analyzed in the 2004 Annual Groundfish Specifications and Management Measures EIS. (Page 1 of 2)

	Recreational:Commercial		Among Commercial Sectors		Among States	
Species	Catch Shares	Analytical Basis	Catch Shares	Analytical Basis	Catch Shares	Analytical Basis
Black Rockfish (OR and CA)	Specified in each state's nearshore management plans or policies and adopted in federal regulations		To be allocated for the first time in 2004 independently of the minor rockfish north and south complexes		37% CA, 63% OR	1990-2002 average catch share
					42% CA, 58% OR	1985-2002 average catch share
					44% CA, 56% OR	Relative ratio of area (within 50 fm) of affected coastline in each state
					51% CA, 49% OR	Relative ratio of miles of affected coastline in each state
					35% CA, 65% OR	Use 2002 catches for each state and apply any increase or decrease in the OY equally to each state
Bocaccio	50:50	Not specified	60% LE Trawl	1997-1999 ave. catch share pct.	Overfishing OY's and catch shares only applied south of Cape Mendocino	NA
	56:44	Catch share in 2002				
Canary Rockfish	50:50	Not specified	59% trawl, 3% LE FG, 12% OA, 26% tribes	2003 projected catch share	60% CA, 34% OR, 6% WA	1993-1999 average catch share
	39:61	2003 projected catch share				
	Calculated shares	Est. impacts from 2004 bycatch scorecards	Calculated shares	Est. impacts from 2004 bycatch scorecards	Calculated shares	Est. impacts from 2004 bycatch scorecards

TABLE 2.1.2-1. Catch sharing options to be analyzed in the 2004 Annual Groundfish Specifications and Management Measures EIS. (Page 2 of 2)

	Recreational:Commercial		Among Commercial Sectors		Among States	
Species	Catch Shares	Analytical Basis	Catch Shares	Analytical Basis	Catch Shares	Analytical Basis
Lingcod	69:31	2003 projected catch share	49% trawl, 12% LE FG, 32% OA, 7% tribes	2003 projected catch share	65% CA, 22% OR, 13% WA	1993-1999 average catch share
	Calculated shares	Est. impacts from 2004 bycatch scorecards	Calculated shares	Est. impacts from 2004 bycatch scorecards	Calculated shares	Est. impacts from 2004 bycatch scorecards
Widow Rockfish	Impacts to be addressed in Pacific whiting fisheries					
Yelloweye Rockfish	Catch shares decided for 2003 to be discussed in the EIS					

2.1.3 Trawl B Platoon

The GMT recommended the trawl B platoon be eliminated in 2004 and beyond because the costs to management and regulatory systems resulting from offering the trawl B platoon option to the groundfish trawl fishery currently outweigh the benefits to the industry. Implementation and enforcement of inseason line movements, administration of vessel monitoring systems, bycatch modeling, real time catch accounting, and observer scheduling are all complicated by a trawl fleet fishing under two different regulatory time periods. Originally, the trawl B platoon was implemented as a means of dispersing landings over a longer period of time, increasing the value of the product and improving the stability of the supply. In 2003 only 28 vessels are currently in the trawl B platoon, and smoothing of product flow can be accomplished by the scheduling of landings between the vessel and processor. Also, should an emergency fishing closure be required as a result of attaining an OY for an overfished species, the trawl B platoon could be deprived of fishing time equal to the rest of the fleet, or the Council could be faced with the decision of allowing continued fishing in order to provide equal opportunity to the trawl B platoon.

The GAP objected because it is the experience of both fishermen and processors who are involved with the dual platoon system that having the ability to better spread deliveries, even of smaller amounts of fish, produces a better product and more economic efficiency. Vessels also have more opportunities to take advantage of weather breaks, thereby promoting vessel safety, a key component of Magnuson-Stevens Act requirements and an issue often raised by the Coast Guard member of the Council. Use of a dual platoon system does not detract from conservation but does promote the economic welfare of coastal communities. In sum, the dual platoon system directly embodies National Standards 8 and 10. The GAP understands there may be some minor additional cost and inconvenience with the dual platoon structure.

The Council included this as a management measure for analysis in order to weigh the potential costs and benefits of eliminating the dual platoon system. The proposed action (*Council OY*) is to eliminate platooning in the trawl fishery. In 2003, enforcement concerns were raised when trip limits or RCA boundary lines were changed inseason because of complications from tracking trawlers in different platoons with different RCA boundaries. Therefore, the Council elected to eliminate the trawl B platoon next year.

2.1.4 New Management Lines

The California Department of Fish and Game (CDFG) proposed establishing four marine regions to manage nearshore commercial (both limited entry and open access fixed gears) and recreational fisheries off California under all 2004 alternatives. These regions are described as follows:

1. U.S./Mexico border to Pt. Conception at 34°27' N latitude.
2. Pt. Conception to Pt. San Pedro (near San Francisco Bay entrance- latitude to be specified in federal regulations if the line adjustment is adopted).
3. Pt. San Pedro to Cape Mendocino at 40°10' N latitude.
4. Cape Mendocino to the California/Oregon border at 42° N latitude.

Latitudes describing the U.S./Mexico border, Pt. Conception, and Cape Mendocino management lines are already specified in federal regulations. The Council adopted new management lines at Pt. San Pedro and the California/Oregon border to accommodate the CDFG proposal. The Council also adopted a new management line at the Oregon/Washington border to facilitate a more regional approach to groundfish management. These new management lines are, therefore, part of the proposed action analyzed under the *Council OY* alternative.

2.2 Description of the Alternatives

The alternatives analyzed in this EIS include a *No Action* alternative that describes the status quo regulations implemented in 2003, a *Low OY* alternative that describes the most conservative harvest levels analyzed, a *Medium OY* alternative that describes an intermediate level of harvest, a *High OY* alternative that describes the most liberal harvest levels analyzed, and a *Council OY* alternative that describes the harvest levels and management measures preferred by the Council. All alternatives analyzed utilize the best available science for determining stock status, monitoring total catch, and understanding stock impacts. A description of the alternatives follows.

2.2.1 The *No Action* Alternative

The *No Action* alternative (or Status Quo) represents the harvest specifications and management measures implemented in regulations for the 2003 West Coast groundfish fishery. Depth-based restrictions, imposed by implementing seasonal area restrictions, termed RCAs, and other significant constraints to fishing opportunities imposed by rebuilding measures for bocaccio, canary rockfish, darkblotched rockfish, and yelloweye rockfish generally characterize 2003 management measures (Figure 2.2.1-1). The trip limits, area restrictions, and other regulatory constraints decided through September 2003 form the basis for the *No Action* alternative. The estimated mortality of overfished groundfish species under these regulations are shown in Table 2.1.1-1. All other alternatives analyzed in this EIS are compared to *No Action*. The estimated mortality of overfished groundfish species under the *No Action* alternative are depicted in Table 2.2.1-1. A description of the *No Action* alternative by fishery sector follows.

2.2.1.1 Limited Entry Trawl

Trip limits, cumulative landing limits, and the depth lines describing the trawl RCA by two-month period in 2003 are shown in Tables 2.2.1-2 and 2.2.1-3 for the limited entry trawl fishery north and south of 40°10' N latitude, respectively.

Non-Whiting Trawl

The limited entry trawl fishery was largely constrained at the outset of 2003 to waters deeper than a line specified by latitude/longitude waypoints approximating 250 fm north of 38° N latitude (near Pt. Reyes, California) to reduce mortality of darkblotched rockfish and Pacific ocean perch (overfished slope rockfish species). Specific areas between 150 fm and 250 fm were opened in periods 1 and 6 (the fishery is managed using two-month periods where period 1 = January-February, period 2 = March-April, etc.) to provide access to petrale sole which aggregate in winter months in these areas and are an important trawl target species. Shallow water opportunities inside 100 fm except period 4, when the RCA was extended inshore to 75 fm, were available to trawlers using small footropes to access shelf flatfish species north of 40°10' N latitude (near Cape Mendocino, California). The 100 fm to 150 fm depth zone was closed year-round to trawling to protect overfished slope rockfish species and canary rockfish.

The limited entry trawl RCA south of 38° N latitude extended offshore to a specified line approximating 150 fm to protect bocaccio, canary rockfish, cowcod, and other overfished groundfish species inhabiting the shelf off California. Inshore opportunities to target shelf flatfish were provided by allowing trawl vessels south of 40°10' N latitude and north of Pt. Conception at 34°27' N latitude to fish from the bounds of the California state jurisdiction at three miles offshore to a line approximating 50 fm during period 1 and out to a line approximating 60 fm for the rest of the year. Trawlers fishing south of Pt. Conception were able to fish from three miles offshore out to a line approximating 100 fm along the mainland coast and offshore from a line approximating 150 fm.

In January 2003 a report from the first year of the NMFS Groundfish Observer Program with raw trawl discard data was provided by the Northwest Fisheries Science Center. An analysis of these data that included a reconciliation of total catch impacts in the trawl fishery using observer data and fish receiving tickets was presented to the Council at the April 2003 meeting in Vancouver, Washington. These data were also filtered using logbook records to emulate depth-based management by only including records where tows were initiated in currently open depth zones. The results of this analysis indicated the trawl bycatch rates used to manage bycatch of bocaccio, canary rockfish (*S. pinniger*), and lingcod (*Ophiodon elongatus*) were significantly higher than previously modeled. The Council decided to use these new observer-based bycatch rates for inseason management. Therefore, as of May 1, 2003, the trawl RCA was extended inshore to a line approximating 50 fm north of Cape Mendocino primarily to reduce canary rockfish and lingcod impacts. In June the Council decided to move the inshore RCA line to 75 fm during period 4 to avoid trawl interactions with molting Dungeness crab. The offshore trawl RCA line was moved from 250 fm to 200 fm coastwide as of May 1 since new observer-based trawl bycatch rates for darkblotched rockfish indicated there would still be a buffer between expected impacts on this stock and the total catch OY of 172 mt. The rationale for moving the deeper trawl RCA line out from 150 fm to 200 fm south of Pt. Reyes was to reduce mortality of bocaccio. Additionally, the Council decided to adopt differential trip limits for trawl-caught Dover sole, thornyheads, and sablefish (DTS species) using small footropes. Smaller trip limits for DTS species were applied to trawlers forced to use small footropes when fishing inshore of the trawl RCA. The larger limits allowed for trawlers fishing offshore of the RCA using large footropes were designed to provide an incentive for trawlers to fish deeper and avoid overfished groundfish species (particularly canary rockfish) residing on the shelf. The smaller DTS limits would apply for the entire two-month cumulative limit period if DTS species were landed using small footrope gear.

Whiting Trawl

The U.S. portion of the calculated U.S./Canada total catch Pacific whiting OY in 2003 was 148,200 mt. This was 80% of the projected U.S./Canada OY from the most recent assessment (Helser *et al.* 2002). The OY was apportioned among commercial sectors according to the allocations in federal regulations (50 CFR 660.306 and 550 CFR 660.323(a)(4)). The tribal allocation was based on the sliding scale methodology that has been in use since 1999, which specifies tribal allocation relative to incremental changes to the U.S. whiting OY. The 2003 tribal whiting allocation was 25,000 mt based on this methodology, which was taken off the top of the U.S. OY. An additional 2,000 mt of whiting was set aside to accommodate bycatch in non-whiting fisheries to derive the non-tribal commercial OY of 121,200 mt. This commercial OY was allocated 34% (41,288 mt) to the catcher-processor sector, 24% (29,080 mt) to the mothership sector, and 42% (50,904 mt) to the shoreside sector.

2.2.1.2 Limited Entry Fixed Gear

The 2003 limited entry fixed gear fishery north of 40°10' N latitude was largely constrained to areas deeper than a line approximating 100 fm and nearshore areas inside of 27 fm in state waters off northern California and Oregon. No nearshore commercial groundfish opportunities were available in Washington State waters. This depth restriction was imposed on the northern fixed gear fisheries to reduce mortality of the overfished shelf groundfish species and particularly canary and yelloweye (*S. ruberrimus*) rockfish. Fixed gears are particularly efficient targeting valuable canary and yelloweye rockfish in the high relief, rocky habitats they reside. Gear restrictions, such as the small footrope restrictions imposed on the trawl sector when operating on the shelf, were not judged effective in controlling total mortality of shelf rockfish in fixed gear fisheries.

Therefore, a conservative nontrawl RCA was established based on the depth distribution of these species and the depth-based species catch composition in fixed gear International Pacific Halibut Commission (IPHC) surveys (PFMC 2003b). More direct sources of bycatch data such as direct observations and logbook records were not available for the fixed gear fleets.

The limited entry fixed gear fishery south of 40°10' N latitude in 2003 was largely constrained to waters deeper than a line approximating 150 fm and inshore of the 20 fm contour. As in the northern fishery, this RCA was designed to reduce mortality of overfished shelf groundfish species. However, unlike the northern fishery, the extent of the RCA was primarily based on the need to significantly reduce mortality of bocaccio. One exception to the southern nontrawl RCA in 2003 was adopted for a small area in the Southern California Bight to access aggregating California scorpionfish (*Scorpaena guttata*). During period 4, on Huntington Flats between a line drawn due south from Point Fermin (33°42'30" N latitude/118°17'30" W longitude) and a line drawn due west from the Newport South Jetty (33°35'37" N latitude/117°52'50" W longitude) vessels fishing for all federal groundfish species, except all rockfish and lingcod, with fixed gears were able to operate from shore to a line approximating 50 fm.

Trip limits, cumulative landing limits, and the depth lines describing the nontrawl RCA by two-month period in 2003 are shown in Tables 2.2.1-4 and 2.2.1-5 for the limited entry fixed gear fishery north and south of 40°10' N latitude, respectively.

2.2.1.3 Open Access

The open access sectors include directed groundfish fisheries that use fixed gears and a sector comprised of vessels targeting nongroundfish species but which incidentally catch groundfish species. The latter incidental open access sector uses a variety of gears including fixed gears and exempted trawl gears (the groundfish FMP only allows groundfish targeting by trawls in the limited entry trawl sector). All nontrawl commercial groundfish fishing sectors in 2003 were subject to the nontrawl RCA described for the limited entry fixed gear fleet in Section 2.1.2. Many of the incidental open access fisheries such as the pink shrimp, Dungeness crab, and salmon troll fisheries were not subject to the RCA restrictions given either the lack of groundfish bycatch in the fishery or new gear modifications imposed to reduce groundfish bycatch. Mandatory use of finfish excluders or bycatch reduction devices (BRDs) in the pink shrimp fishery is an example of a precautionary gear modification in an incidental open access fishery. Finfish excluders became mandatory in the pink shrimp fishery coastwide beginning in 2003.

Trip limits, cumulative landing limits, and the depth lines describing the nontrawl RCA by two-month period in 2003 are shown in Tables 2.2.1-6 and 2.2.1-7 for the open access fisheries north and south of 40°10' N latitude, respectively.

2.2.1.4 Tribal Fisheries

The Washington coastal tribes (Makah, Quileute, Hoh, and Quinault) prosecuted their groundfish fisheries in 2003 with the following allocations and trip limits. The sablefish allocation was 10% of the total catch OY (for the portion of the stock north of 36° N latitude) of 6,500 mt. This provided an allocation of 631 mt of sablefish after deducting an assumed 3% discard mortality. The tribal commercial harvest of black rockfish was managed with a harvest guideline of 20,000 pounds north of Cape Alava, Washington at 48°09'30" N latitude, and 10,000 pounds between Destruction Island, Washington at 47°40' N latitude and Leadbetter Point, Washington at 46°38'10" N latitude Thornyheads were subject to a 300-pound trip limit as were canary rockfish. Yelloweye rockfish were subject to a 100-pound trip limit. Yellowtail rockfish taken in tribal midwater trawl fisheries were subject to a 30,000-pound, two-month cumulative landing limit and widow rockfish landings were limited to 10% of the weight of yellowtail rockfish landed in any two-month period. These midwater landing limits were subject to inseason adjustments to minimize the take of canary and widow rockfish. The tribes also delayed the start of their midwater fishery until September 2003 to minimize canary rockfish impacts. Other rockfish, including species in the minor nearshore, minor shelf, and minor slope rockfish complexes were subject to either a 300-pound trip limit per species or complex, or to the non-tribal limited entry trip limit for those species if those limits were less restrictive. Rockfish taken during the open competitive tribal commercial fisheries for Pacific halibut were not subject to trip limits. A full rockfish retention program as well as a tribal observer program were instituted to provide catch accountability. Lingcod were subject to a 300-pound trip limit and a 900-pound weekly landing limit. Trip limits for Pacific cod, petrale sole, English sole, rex sole, arrowtooth flounder, and other flatfish in the tribal bottom trawl fishery were the same as for non-tribal limited entry fixed gear at the start of the season (Table 2.2.1-2) using the same Council-approved gear. The tribal plan was not to reduce these limits inseason because of the low expected catch unless catch statistics indicated that the tribes would attain more than half the harvest of these species in their usual and accustomed (U and A) fishing areas. The tribal allocation of Pacific whiting in 2003 was described in Section 2.2.1.1. The Makah tribe was the only one of the four tribes prosecuting a whiting-directed fishery in 2003.

2.2.1.5 Washington Recreational

In 2003, the Washington recreational fishery was open year round for groundfish except lingcod, which was open from March 16 to October 15. There was a recreational groundfish bag limit of 15 fish per day including rockfish and lingcod. Of the 15 recreational groundfish allowed to be landed per day, only 10 could be rockfish, with a sublimit of one canary rockfish, no retention of yelloweye rockfish, and a sublimit of two lingcod with a 24-inch minimum size during the open lingcod season. A “C-shaped” Yelloweye Rockfish Conservation Area (YRCA) was established where recreational groundfish and recreational halibut fishing was prohibited. The YRCA was defined by the following coordinates:

48°18' N latitude/125°18' W longitude,
48°18' N latitude/124°59' W longitude,
48°11' N latitude/125°11' W longitude,
48°11' N latitude/124°59' W longitude,
48°04' N latitude/125°11' W longitude,
48°04' N latitude/124°59' W longitude,
48°00' N latitude/125°18' W longitude, and
48°00' N latitude/124°59' W longitude.

The Washington Department of Fish and Wildlife (WDFW) used their Ocean Sampling Program to monitor groundfish catches inseason. If canary or yelloweye rockfish harvest guidelines were projected to be attained inseason, WDFW would close the recreational groundfish fishery to inside the 25 fm contour to reduce impacts on these species.

2.2.1.6 Oregon Recreational

In 2003, the Oregon recreational groundfish fishery was open year round. Catches were managed using a 10 marine fish daily-bag-limit including rockfish, greenling (*Hexagrammos* spp.), cabezon (*Scorpaenichthys marmoratus*), and other groundfish species, but excluding salmon, lingcod, perch species, sturgeon, sanddabs, striped bass, tuna, and baitfish. Included in the marine fish daily-bag-limit were sublimits of one canary and one yelloweye rockfish. Additionally, anglers could keep two lingcod with a 24-inch minimum size and one Pacific halibut with a 32-inch minimum size when the halibut season was open. No canary or yelloweye were allowed to be retained if Pacific halibut were on board during the all-depth halibut season.

The Oregon Department of Fish and Wildlife (ODFW) used their Ocean Sampling Program to monitor groundfish catches inseason. If canary or yelloweye rockfish harvest guidelines were projected to be attained inseason, ODFW would close the recreational groundfish fishery to inside the 27 fm contour to reduce impacts on these species.

2.2.1.7 California Recreational

South of Cape Mendocino

The California recreational groundfish fishery south of Cape Mendocino was restricted to waters shallower than 20 fm in most areas with a six-month July through December season to significantly reduce bocaccio, canary rockfish, and yelloweye rockfish mortality. The area restriction exception is the Huntington Flats (as described for the nontrawl RCA exception in Section 2.2.1.2) where recreational fishing could occur out to 50 fm during July and August to access aggregating California scorpionfish. The daily-bag-limit was 10 fish in the RGC (rockfish, greenling, cabezon) complex, of which two could be from the shallow nearshore rockfish group (black and yellow rockfish (*S. chrysomelas*), gopher rockfish (*S. carnatus*), China rockfish (*S. nebulosus*), kelp rockfish (*S. atrovirens*), and grass rockfish (*S. rastrelliger*), three could be cabezon (15-inch minimum size), and two could be greenling species (12 inch minimum size). Additionally, two lingcod with a 24-inch minimum size could be caught during the July through December recreational groundfish season. Up to five California scorpionfish could be taken per day with a 10-inch minimum size limit during January through February and July through December. Ocean whitefish could only be taken during July through December in waters shallower than 20 fm due to the close association with bocaccio on the shelf. No retention of bocaccio, canary rockfish, cowcod, or yelloweye rockfish was allowed.

North of Cape Mendocino

The recreational groundfish fishery north of Cape Mendocino was managed to closely match the Oregon recreational management measures. The recreational groundfish season was open year round. An aggregate of 20 marine finfish were allowed per day of which 10 could be rockfish (with sublimits of two bocaccio, one canary rockfish, one yelloweye rockfish, and no retention of cowcod), 10 could be cabezon (15-inch minimum size), 10 could be greenling species (12-inch minimum size), two could be lingcod (24-inch minimum size), 10 could be California scorpionfish (10-inch minimum size), five could be California sheephead (*Semicossyphus pulcher*, 12-inch minimum size), and three could be California halibut (*Paralichthys californicus*, 22-inch minimum size). The CDFG used the MRFSS to monitor groundfish catches inseason. If canary or yelloweye rockfish harvest guidelines were projected to be attained inseason, CDFG would close the recreational groundfish fishery to inside the 27 fm contour to reduce impacts on these species.

TABLE 2.2.1-1. Estimated mortality (mt) of overfished West Coast groundfish species by fishery in 2003 under the *No Action* alternative. (Page 1 of 2)

Fishery	Bocaccio a/	Canary	Cowcod	Darkblotched	Lingcod [b/]	POP	Whiting [c/]	Widow	Yelloweye
Limited Entry Groundfish									
Trawl- Non-whiting [d/]	8.6	11.1	0.1	88.4	64.0	67.6	K/	1.6	0.8
Fixed Gear	1.0	0.5	K/	1.5	0.2	0.2	K/	30.0	K/
Whiting									
At-sea whiting motherships	K/	0.1	K/	0.1	0.1	0.1	29,088	0.8	0.0
At-sea whiting catcher-processor	K/	0.2	K/	4.6	0.4	5.6	41,208	12.8	0.0
Shoreside whiting [e/]	K/	0.1	K/	0.3	0.4	0.3	50,965	9.0	0.0
Tribal whiting	K/	0.9	K/	0.0	0.1	1.4	25,000	2.8	0.0
Open Access									
Groundfish directed	0.2	0.3	0.0	K/	50.0	K/	K/	K/	0.5
CA Halibut	0.5	0.1	0.1	0.0	0.0	0.0	0	0.0	0.1
CA Gillnet [f/]	0.5	K/	K/	K/	K/	K/	K/	K/	K/
CA Sheephead [f/]	K/	K/	K/	K/	K/	K/	K/	K/	K/
Coastal pelagic species- wetfish [f/]	0.5	K/	K/	K/	K/	K/	K/	K/	K/
Coastal pelagic species- squid [f/]	K/	K/	K/	K/	K/	K/	K/	K/	K/
Dungeness crab [g/]	K/	K/	K/	0.0	K/	K/	K/	K/	K/
Highly migratory species [f/]	K/	0.0	0.0	0.0	K/	K/	K/	K/	K/
Pacific Halibut [f/]	0.0	0.0	K/	0.0	K/	0.0	K/	0.0	0.5
Pink shrimp	0.1	0.5	K/	0.0	0.5	0.0	1	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0
Salmon troll	0.2	1.6	K/	K/	0.3	K/	K/	0.0	0.2
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0
Spot Prawn (trap)	K/	K/	K/	K/	K/	K/	K/	K/	K/
Spot Prawn (trawl)	K/	K/	K/	K/	K/	K/	K/	K/	K/
Tribal									
Midwater Trawl	K/	1.1	K/	0.0	0.0	0.0	0	45.0	0.0
Bottom Trawl	K/		K/	0.0	4.5	0.0	K/	0.0	0.0
Troll	K/	0.5	K/	0.0	0.9	0.0	K/	K/	0.1
Fixed gear	K/	0.3	K/	0.0	5.5	0.0	K/	0.0	3.0
Recreational Groundfish									
WA	K/	1.5	K/	K/	35.0	K/	K/	K/	3.5
OR	K/	9.6	K/	K/	97.3	K/	K/	2.9	3.9
CA (N)	K/	0.5	K/	K/	195.0	K/	K/	1.0	0.1
CA (S)	6.3	2.8	K/	K/	20.0	K/	K/	0.0	0.4
Research: Based on 2 most recent NMFS trawl shelf and slope surveys, the IPHC halibut survey, and LOAs with expanded estimates for south of Pt. Conception.									
	2.0	1.0	K/	1.6	3.0	3.0	200	1.5	1.1
Non-EFP Total	20.0	32.6	0.2	96.5	477.2	78.2	K/	107.4	14.3

TABLE 2.2.1-1. Estimated mortality (mt) of overfished West Coast groundfish species by fishery in 2003 under the *No Action* alternative. (Page 2 of 2)

Fishery	Bocaccio a/	Canary	Cowcod	Darkblotched	Lingcod b/	POP	Whiting c/	Widow	Yelloweye
EFPs: h/									
CA: Nearshore flatfish trawl	0.5	0.5	0.2	K/	20.0	K/	K/	K/	0.5
OR: Selective flatfish trawl	K/	4.0	K/	3.1	13.0	K/	K/	1.0	1.2
WA: Arrowtooth flounder trawl i/	K/	2.0	K/	0.8	2.0	10.6	K/	0.1	0.1
WA: Dogfish longline j/	K/	0.0	K/	0.0	0.0	0.0	0	0.0	0.0
WA: Pollock j/	K/	0.0	K/	0.0	0.0	0.0	0	0.0	0.0
EFP Subtotal	0.5	6.5	0.2	3.9	35.0	10.6	0.0	1.1	1.8
TOTAL	20.5	39.1	0.4	100.5	512.2	88.9	148,261	108.6	16.1
2003 OY	< 20	44	4.8	172	651	377	148,200	832	22

a/ South of 40/10' N latitude

b/ Lingcod total reflects total catch, not mortality.

c/ At-sea sector whiting catches based on 2003 allocations, while actual catch is estimated in the shoreside sector. Catch estimates of overfished non-whiting groundfish species for the at-sea sector based on observed catch rates through September 25, 2003 applied to at-sea sector whiting allocations. These data incomplete since all at-sea sectors still fishing after this date. Shoreside catches of overfished groundfish species are actual estimates. Estimated whiting mortality in non-whiting fisheries assumes a cumulative 2,000 mt impact in 2004. Tribal catch based on OY sliding scale.

d/ Using observer data, all estimates from the Hastie trawl bycatch model.

e/ Impacts in the shoreside whiting fishery are based on observed whiting catch and overfished species bycatch rates while the at-sea sectors' bycatch rates are based on the 1998-2002 average bycatch rate for overfished species. Once the at-sea sector fisheries are done for the season the actual observed bycatch rates will be applied.

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

g/ 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.

h/ Values are EFP bycatch caps, not estimates of total mortality. The EFP is terminated inseason if the cap is projected to be attained early. The Council capped the 2003 canary rockfish set-aside for all the EFPs in combination at 7.5 mt to derive an expected total catch of 44 mt of canary rockfish in 2003.

i/ This is the resulting impact of this EFP which is completed for the year and not the cap, except for lingcod which represents the original cap.

j/ These are the resulting impacts from these completed EFPs and not the original caps.

k/ Either not applicable; trace amount (<0.01 mt); or not reported in available data sources.

TABLE 2.2.1-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] as specified October 1, 2003 and analyzed under the *No Action* alternative. (Page 1 of 4)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area[j/] (RCA): North of 40°10' N latitude	100 fm - 250 fm (line modified to incorporate petrale sole fishing grounds)	100 fm - 250 fm	50 fm - 200 fm	75 fm - 200 fm	50 fm - 200 fm	50 fm - 200 fm (line modified to incorporate petrale sole fishing grounds)
Small footrope[g/] or midwater trawl gear is required shoreward of the RCA; all trawl gear (large footrope, midwater trawl, and small footrope gear) is permitted seaward of the RCA.						
A vessel may have more than one type of limited entry bottom trawl gear on board, but the most restrictive trip limit associated with the gear on board applies for that trip and will count toward the cumulative trip limit for that gear. A vessel may not have limited entry bottom trawl gear on board if that vessel also has trawl gear on board that is permitted for use within a RCA, including limited entry midwater trawl gear, regardless of whether the vessel is intending to fish within a RCA on that fishing trip.						
Minor slope rockfish[c/]	1,800 lb/2 months					
Pacific ocean perch	3,000 lb/2 months					
DTS complex						
Sablefish	6,000 lb/2 months		10,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 3,000 lb/2 months	9,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the sablefish limit is 3,000 lb/2 months.		7,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the sablefish limit is 2,300 lb/2 months

TABLE 2.2.1-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] as specified October 1, 2003 and analyzed under the *No Action* alternative. (Page 2 of 4)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Longspine thornyhead	8,000 lb/2 months	9,000 lb/2 months	14,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then retention of thornyheads prohibited.	11,500 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the longspine thornyhead limit is 5,000 lb/2 months.		4,500 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the longspine thornyhead limit is 2,000 lb/2 months.
Shortspine thornyhead	2,300 lb/2 months	2,400 lb/2 months	2,800 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then retention of thornyheads prohibited.	2,400 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the shortspoine thornyheads limit is 1,000 lb/2 months.		900 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the shortspine thornyheads limit is 300 lb/2 months.

TABLE 2.2.1-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] as specified October 1, 2003 and analyzed under the *No Action* alternative. (Page 3 of 4)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Dover sole	26,000 lb/2 months		31,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 12,500 lb/2 months	34,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the Dover sole limit is 12,500 lb/2 months.		30,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the Dover sole limit is 11,000 lb/2 months.
Flatfish						
All other flatfish[d/]	100,000 lb/2 months	All other flatfish plus petrale & rex sole: 100,000 lb/2 months, no more than 30,000 lb/2 months of which may be petrale sole providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 20,000 lb/2 months, no more than 10,000 lb/2 months of which may be petrale sole.				100,000 lb/2 months
Petrale sole	Not limited					Not limited
Rex sole	Included in all other flatfish					
Arrowtooth flounder	30,000 lb/trip	200,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 5,000 lb/2 months				
Whiting[e/]	20,000 lb/trip		Primary Season (only mid-water trawl permitted in the RCA)	10,000 lb/trip		
Other Fish[i/]	Not limited					

TABLE 2.2.1-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] as specified October 1, 2003 and analyzed under the *No Action* alternative. (Page 4 of 4)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Use of small footrope bottom trawl[g/] or mid-water trawl is required for landing all of the following species:						
Minor shelf rockfish and widow rockfish[c/]	300 lb/month		1,000 lb/month, no more than 200 lb/month of which may be yelloweye rockfish			300 lb/month
Widow rockfish						
mid-water trawl - permitted within the RCA	CLOSED[f/]		During primary whiting season, in trips of at least 10,000 lb of whiting: combined widow and yellowtail limit of 500 lb/trip, cumulative widow limit of 1,500 lb/month			CLOSED[f/]
Canary rockfish	100 lb/month		300 lb/month		100 lb/month	
Yellowtail						
mid-water trawl - permitted within the RCA	CLOSED[f/]		During primary whiting season, in trips of at least 10,000 lb of whiting: combined widow and yellowtail limit of 500 lb/trip, cumulative yellowtail limit of 2,000 lb/month			CLOSED[f/]
small footrope trawl[g/]	In landings without flatfish, 1,000 lb/month. As flatfish bycatch, per trip limit is the sum of 33% (by weight) of all flatfish except arrowtooth flounder, plus 10% (by weight) of arrowtooth flounder. Total yellowtail landings not to exceed 10,000 lb/2 months, no more than 1,000 lb of which may be landed without flatfish.					
Minor nearshore rockfish	300 lb/month					
Lingcod[h/]	800 lb/2 months		1,000 lb/2 months		800 lb/2 months	

a/ Gear requirements and prohibitions are explained above.
b/ "North" means 40°10' N latitude to the U.S./Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.
c/ Bocaccio and chilipepper are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.
d/ "Other" flatfish means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
e/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.
f/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
g/ Small footrope trawl means a bottom trawl net with a footrope no larger than 8 inches (20 cm) in diameter.
h/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
i/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
j/ 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 that may vary seasonally.

TABLE 2.2.1-3. Trip limits and gear requirements[a/] for limited entry trawl gear south of 40°10' N latitude[b/] as specified October 1, 2003 and analyzed under the *No Action* alternative. (Page 1 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area[j/] (RCA):						
40°10' - 38° N latitude	50 fm - 250 fm (line modified to incorporate petrale sole fishing grounds)	60 fm - 250 fm	60 fm - 200 fm	60 fm - 200 fm	60 fm - 200 fm	60 fm - 200 fm (line modified to incorporate petrale sole fishing grounds)
38° - 34°27' N latitude	50 fm - 150 fm	60 fm - 150 fm	60 fm - 200 fm	60 fm - 200 fm	60 fm - 200 fm	60 fm - 200 fm (line modified to incorporate petrale sole fishing grounds)
South of 34°27' N latitude	100 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands		100 fm - 200 fm along the mainland coast; shoreline - 200 fm around islands	100 fm - 200 fm along the mainland coast; shoreline - 200 fm around islands	100 fm - 200 fm along the mainland coast; shoreline - 200 fm around islands	100 fm - 200 fm along the mainland coast; shoreline - 200 fm around islands (line modified to incorporate petrale sole fishing grounds)
Small footrope[g/] or midwater trawl gear is required shoreward of the RCA; all trawl gear (large footrope, midwater trawl, and small footrope gear) is permitted seaward of the RCA.						
A vessel may have more than one type of limited entry bottom trawl gear on board, but the most restrictive trip limit associated with the gear on board applies for that trip and will count toward the cumulative trip limit for that gear. A vessel may not have limited entry bottom trawl gear on board if that vessel also has trawl gear on board that is permitted for use within a RCA, including limited entry midwater trawl gear, regardless of whether the vessel is intending to fish within a RCA on that fishing trip.						
Minor slope rockfish[c/]						
40°10' - 38° N latitude	1,800 lb/2 months					
South of 38° N latitude	30,000 lb/2 months					
Splitnose						
40°10' - 38° N latitude	1,800 lb/2 months					
South of 38° N latitude	30,000 lb/2 months					

TABLE 2.2.1-3. Trip limits and gear requirements[a/] for limited entry trawl gear south of 40°10' N latitude[b/] as specified October 1, 2003 and analyzed under the *No Action* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
DTS complex						
Sablefish	6,000 lb/2 months		10,000 lb/2 months	9,000 lb/2 months		7,000 lb/2 months
Longspine thornyhead	8,000 lb /2 months	9,000 lb/2 months	14,000 lb/2 months	11,500 lb/2 months		4,500 lb/2 months
Shortspine thornyhead	2,300 lb/2 months	2,400 lb/2 months	2,800 lb/2 months	2,400 lb/2 months		900 lb/2 months
Dover sole	26,000 lb/2 months		31,000 lb/2 months	34,000 lb/2 months		30,000 lb/2 months
Flatfish						
All other flatfish[d/]	70,000 lb/2 months	All other flatfish plus petrale & rex sole: 70,000 lb/2 months, no more than 20,000 lb/2 months of which may be petrale sole				70,000 lb/2 months
Petrale sole	No limit					No limit
Rex sole	Included in all other flatfish					
Arrowtooth flounder	No limit	1,000 lb/2 months				No limit
Whiting[e/]	20,000 lb/trip		Primary Season (only mid-water trawl permitted within the RCA)		10,000 lb/trip	
Other Fish[i/]	Not limited					
Use of small footrope bottom trawl[g/] or mid-water trawl is required for landing all of the following species:						
Minor shelf rockfish, widow, and chilipepper rockfish[c/]	300 lb/month					
Widow rockfish						
mid-water trawl - permitted within the RCA	CLOSED[f/]					
Canary rockfish	100 lb/month		300 lb/month		100 lb/month	
Bocaccio	CLOSED[f/]					
Cowcod	CLOSED[f/]					
Minor nearshore rockfish	300 lb/month					
Lingcod[h/]	800 lb/2 months		1,000 lb/2 months		800 lb/2 months	

a/ Gear requirements and prohibitions are explained above.
b/ "South" means 40°10' N latitude to the U.S./Mexico border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.
c/ Yellowtail is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.
d/ "Other" flatfish means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
e/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.
f/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
g/ Small footrope trawl means a bottom trawl net with a footrope no larger than 8 inches (20 cm) in diameter.
h/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
i/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
j/ 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 that may vary seasonally.

TABLE 2.2.1-4. Trip limits for limited entry fixed gear north of 40°10' N latitude[a/] as specified October 1, 2003 and analyzed under the *No Action* alternative. (Page 1 of 1)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area[h/] (RCA):						
North of 46°16' N. lat.	shoreline - 100 fm					
46°16' N. lat. - 40°10' N. lat.	27 fm - 100 fm					
Minor slope rockfish[d/]	1,800 lb/2 months	No more than 25% of the weight of sablefish landed/trip				1,800 lb/2 months
Pacific ocean perch	1,800 lb/2 months					
Sablefish	300 lb/day, or 1 landing per week of up to 800 lb, not to exceed 3,200 lb/2 months					300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months
Longspine thornyhead	9,000 lb/2 months					
Shortspine thornyhead	2,000 lb/2 months					
Dover sole	5,000 lb/month					
Arrowtooth flounder						
Petrale sole						
Rex sole						
All other flatfish[b/]						
Whiting[c/]	10,000 lb/trip					
Minor shelf rockfish, widow, and yellowtail rockfish[d/]	200 lb/month					
Canary rockfish	CLOSED[e/]					
Yelloweye rockfish	CLOSED[e/]					
Cowcod	CLOSED[e/]					
Minor nearshore rockfish	3,000 lb/2 months, no more than 900 lb of which may be species other than black or blue rockfish[f/]			4,000 lb/2 months, no more than 1,200 lb of which may be species other than black or blue rockfish[f/]		
Lingcod[g/]	CLOSED[e/]		400 lb/month			CLOSED[e/]
Other fish[i/]	Not limited					

a/ "North" means 40°10' N latitude to the U.S./Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.
b/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
c/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.
d/ Bocaccio and chilipepper are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.
e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
f/ For black rockfish north of Cape Alava (48°09'30" N latitude), and between Destruction Island (47°40'00" N latitude) and Leadbetter Point (46°38'10" N latitude), there is an additional limit of 100 lb or 30% by weight of all fish on board, whichever is greater, per vessel, per fishing trip.
g/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
h/ 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 that may vary seasonally.
i/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.

TABLE 2.2.1-5. Trip limits for limited entry fixed gear south of 40°10' N latitude[a/] as specified October 1, 2003 and analyzed under the *No Action* alternative. (Page 1 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area[g/] (RCA):						
40°10' - 34°27' N latitude	20 fm - 150 fm					
South of 34°27' N latitude	20 fm - 150 fm (also applies around islands)			20 fm - 150 fm (also applies around islands) (See footnote 8 for description of Pt. Fermin/Newport South Jetty open area)	30 fm - 150 fm (also applies around islands)	
Minor slope rockfish[d/]						
40°10' - 38° N latitude	1,800 lb/2 months	No more than 25% of weight of sablefish landed/trip				1,800 lb/2 months
South of 38° N latitude	30,000 lb/2 months					
Splitnose						
40°10' - 36° N latitude	1,800 lb/2 months					
South of 36° N latitude	20,000 lb/2 months					
Sablefish						
40°10' - 36° N latitude	300 lb/day, or 1 landing per week of up to 800 lb, not to exceed 3,200 lb/2 months					300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months
South of 36° N latitude	350 lb/day, or 1 landing per week of up to 1,050 lb					
Longspine thornyhead	9,000 lb/2 months					
Shortspine thornyhead	2,000 lb/2 months					
Dover sole **Arrowtooth flounder** **Petrale sole** **Rex sole** **All other flatfish[b/]**	5,000 lb/month When fishing for Pacific sanddabs, vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to 1 lb (0.45 kg) of weight per line are not subject to the RCAs.					
Whiting[c/]	10,000 lb/trip					
Minor shelf rockfish, widow, and yellowtail rockfish[d/]	100 lb/2 month	CLOSED[e/]	200 lb/2 months	250 lb/2 months	200 lb/2 months	100 lb/2 months
Canary rockfish	CLOSED[e/]					
Yelloweye rockfish	CLOSED[e/]					
Cowcod	CLOSED[e/]					
Bocaccio	CLOSED[e/]					

TABLE 2.2.1-5. Trip limits for limited entry fixed gear south of 40°10' N latitude[a/] as specified October 1, 2003 and analyzed under the *No Action* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Minor nearshore rockfish						
Shallow nearshore	200 lb/2 months	CLOSED[e/]	400 lb/2 months	400 lb/2 months	300 lb/2 months	200 lb/2 months
Deep nearshore	200 lb/2 months		200 lb/2 months	500 lb/2 months	400 lb/2 months	
California scorpionfish	CLOSED[e/]		800 lb/2 months		CLOSED[e/]	
Lingcod[f/]	CLOSED[e/]		400 lb/month, when nearshore open			CLOSED[e/]
Other fish[h/]	Not limited					

a/ "South" means 40°10' N latitude to the U.S./Mexico border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.

c/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.

d/ Chilipepper rockfish is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.

e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.

f/ The minimum size limit for lingcod is 24 inches (61 cm) total length.

g/ 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 that may vary seasonally.

h/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.

i/ During July-August, between a line drawn due south from Point Fermin (33°42'30" N latitude; 118° 17' 30" W. long.) and a line drawn due west from the Newport South Jetty (33° 35' 37" N .lat.; 117° 52' 50" W. long.,) vessels fishing for all federal groundfish species, except lingcod and all rockfish other than California scorpionfish, with hook & line and/or trap (or pot) gear may operate from shore to a seaward boundary line which approximates 50 fm.

TABLE 2.2.1-6. Trip limits for open access gears north of 40°10' N latitude[a/] as specified October 1, 2003 and analyzed under the *No Action* alternative. (Page 1 of 2)

<table>
<tr><th></th><th>JAN-FEB</th><th>MAR-APR</th><th>MAY-JUN</th><th>JUL-AUG</th><th>SEP-OCT</th><th>NOV-DEC</th></tr>
<tr><td colspan="7">Rockfish Conservation Area[h/] (RCA):</td></tr>
<tr><td>North of 46°16' N. lat.</td><td colspan="6">0 fm - 100 fm</td></tr>
<tr><td>46°16' N. lat. - 40°10' N. lat.</td><td colspan="6">27 fm - 100 fm</td></tr>
<tr><td>Minor slope rockfish[b/]</td><td colspan="6">Per trip, no more than 25% of weight of the sablefish landed</td></tr>
<tr><td>Pacific ocean perch</td><td colspan="6">100 lb/month</td></tr>
<tr><td>Sablefish</td><td colspan="5">300 lb/day, or 1 landing per week of up to 800 lb, not to exceed 3,200 lb/2 months</td><td>300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months</td></tr>
<tr><td>Thornyheads</td><td colspan="6">CLOSED[e/]</td></tr>
<tr><td>Dover sole</td><td colspan="6" rowspan="5">3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs.</td></tr>
<tr><td>Arrowtooth flounder</td></tr>
<tr><td>Petrale sole</td></tr>
<tr><td>Rex sole</td></tr>
<tr><td>All other flatfish[c/]</td></tr>
<tr><td>Whiting</td><td colspan="6">300 lb/month</td></tr>
<tr><td>Minor shelf rockfish, widow and yellowtail rockfish[b/]</td><td colspan="6">200 lb/month</td></tr>
<tr><td>Canary rockfish</td><td colspan="6">CLOSED[e/]</td></tr>
<tr><td>Yelloweye rockfish</td><td colspan="6">CLOSED[e/]</td></tr>
<tr><td>Cowcod</td><td colspan="6">CLOSED[e/]</td></tr>
<tr><td>Minor nearshore rockfish</td><td colspan="3">3,000 lb/2 months, no more than 900 lb of which may be species other than black or blue rockfish [d/]</td><td colspan="3">4,000 lb/2 months, no more than 1,200 lb of which may be species other than black or blue rockfish[d/]</td></tr>
<tr><td>Lingcod[f/]</td><td colspan="2">CLOSED e/</td><td colspan="3">300 lb/month</td><td>CLOSED e/</td></tr>
<tr><td>Other Fish[g/]</td><td colspan="6">Not limited</td></tr>
<tr><td colspan="7">PINK SHRIMP EXEMPTED TRAWL (not subject to RCAs)</td></tr>
<tr><td>North</td><td colspan="6">Effective April 1 - October 31, 2003: 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.</td></tr>
<tr><td colspan="7">PRAWN EXEMPTED TRAWL (not subject to RCAs)</td></tr>
<tr><td>North</td><td colspan="6">Groundfish 300 lb/trip. Limits and closures 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 the overall groundfish "per trip" limit may not be multiplied by the number of days of the trip.</td></tr>
</table>

TABLE 2.2.1-6. Trip limits for open access gears north of 40°10' N latitude[a/] as specified October 1, 2003 and analyzed under the *No Action* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
SALMON TROLL						
North	Salmon trollers may retain and land up to 1lb 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.					

a/ "North" means 40°10' N latitude to the U.S./Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ Bocaccio and chilipepper rockfishes are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.

c/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.

d/ For black rockfish north of Cape Alava (48°09'30" N latitude), and between Destruction Island (47°40' N latitude) and Leadbetter Point (46°38'10" N latitude), there is an additional limit of 100 lbs or 30% by weight of all fish on board, whichever is greater, per vessel, per fishing trip.

e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.

f/ The size limit for lingcod is 24 inches (61 cm) total length.

g/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.

h/ 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 that may vary seasonally.

TABLE 2.2.1-7. Trip limits for open access gears south of 40°10' N latitude[a/] as specified October 1, 2003 and analyzed under the *No Action* alternative. (Page 1 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area[g/] (RCA):						
40°10' - 34°27' N. lat.	20 fm - 150 fm					
South of 34°27' N. lat.	20 fm - 150 fm (also applies around islands)			20 fm - 150 fm (also applies around islands) (See footnote 8 for description of Pt. Fermin/Newport South Jetty open area)	30 fm - 150 fm (also applies around islands)	
Minor slope rockfish[b/]						
40°10' - 38° N. lat.	Per trip, no more than 25% of weight of the sablefish landed					
South of 38° N. lat.	10,000 lb/2 months					
Splitnose	200 lb/month					
Sablefish						
40°10' - 36° N. lat.	300 lb/day, or 1 landing per week of up to 800 lb, not to exceed 3,200 lb/2 months					300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months
South of 36° N. lat.	350 lb/day, or 1 landing per week of up to 1,050 lb					
Thornyheads						
40°10' - 34°27' N. lat.	CLOSED[e/]					
South of 34°27' N. lat.	50 lb/day, no more than 2,000 lb/2 months					
Dover sole	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs. When fishing for Pacific sanddabs, vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to 1 lb of weight per line are not subject to the RCAs.					
Arrowtooth flounder						
Petrale sole						
Rex sole						
All other flatfish[c/]						
Whiting	300 lb/month					
Minor shelf rockfish, widow and chilipepper rockfish[b/]	100 lb/2 month	CLOSED[e/]	200 lb/2 months	250 lb/2 months	200 lb/2 months	100 lb/2 months
Canary rockfish	CLOSED[e/]					
Yelloweye rockfish	CLOSED[e/]					
Cowcod	CLOSED[e/]					
Bocaccio	CLOSED[e/]					
Minor nearshore rockfish						
Shallow nearshore	200 lb/2 months	CLOSED[e/]	400 lb/2 months	400 lb/2 months	300 lb/2 months	200 lb/2 months
Deep nearshore	200 lb/2 months		200 lb/2 months	500 lb/2 months	400 lb/2 months	
California scorpionfish	CLOSED[e/]		800 lb/2 months		CLOSED[e/]	

TABLE 2.2.1-7. Trip limits for open access gears south of 40°10' N latitude[a/] as specified October 1, 2003 and analyzed under the *No Action* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Lingcod[d/]	CLOSED[e/]		300 lb/month, when nearshore open			CLOSED[e/]
Other Fish[f/]	Not limited					
PINK SHRIMP EXEMPTED TRAWL GEAR *(not subject to RCAs)*						
South	Effective April 1 - October 31, 2003: 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.					
PRAWN AND, SOUTH OF 38°57'30" N LATITUDE, CALIFORNIA HALIBUT AND SEA CUCUMBER EXEMPTED TRAWL						
EXEMPTED TRAWL Rockfish Conservation Area[g/] (RCA):						
40°10' - 38° N. lat.	50 fm - 250 fm	60 fm - 250 fm	60 fm - 200 fm			
38º - 34º27' N. lat.	50 fm - 150 fm	60 fm - 150 fm	60 fm - 200 fm			
South of 34°27' N. lat.	100 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands		100 fm - 200 fm along the mainland coast; shoreline - 200 fm around islands			
	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 38o57'30" N latitude 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 25).					

a/ "South" means 40°10' N latitude to the U.S./Mexico border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.
b/ Yellowtail rockfish is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.
c/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
d/ The size limit for lingcod is 24 inches (61 cm) total length.
e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
f/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
g/ 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 that may vary seasonally.
h/ During July-August, between a line drawn due south from Point Fermin (33°42' 30" N latitude; 118°17' 30" W. long.) and a line drawn due west from the Newport South Jetty (33°35' 37" N .lat.; 117°52' 50" W. long.,) vessels fishing for all federal groundfish species, except lingcod and all rockfish other than California scorpionfish, with hook & line and/or trap (or pot) gear may operate from shore to a seaward boundary line which approximates 50 fm.

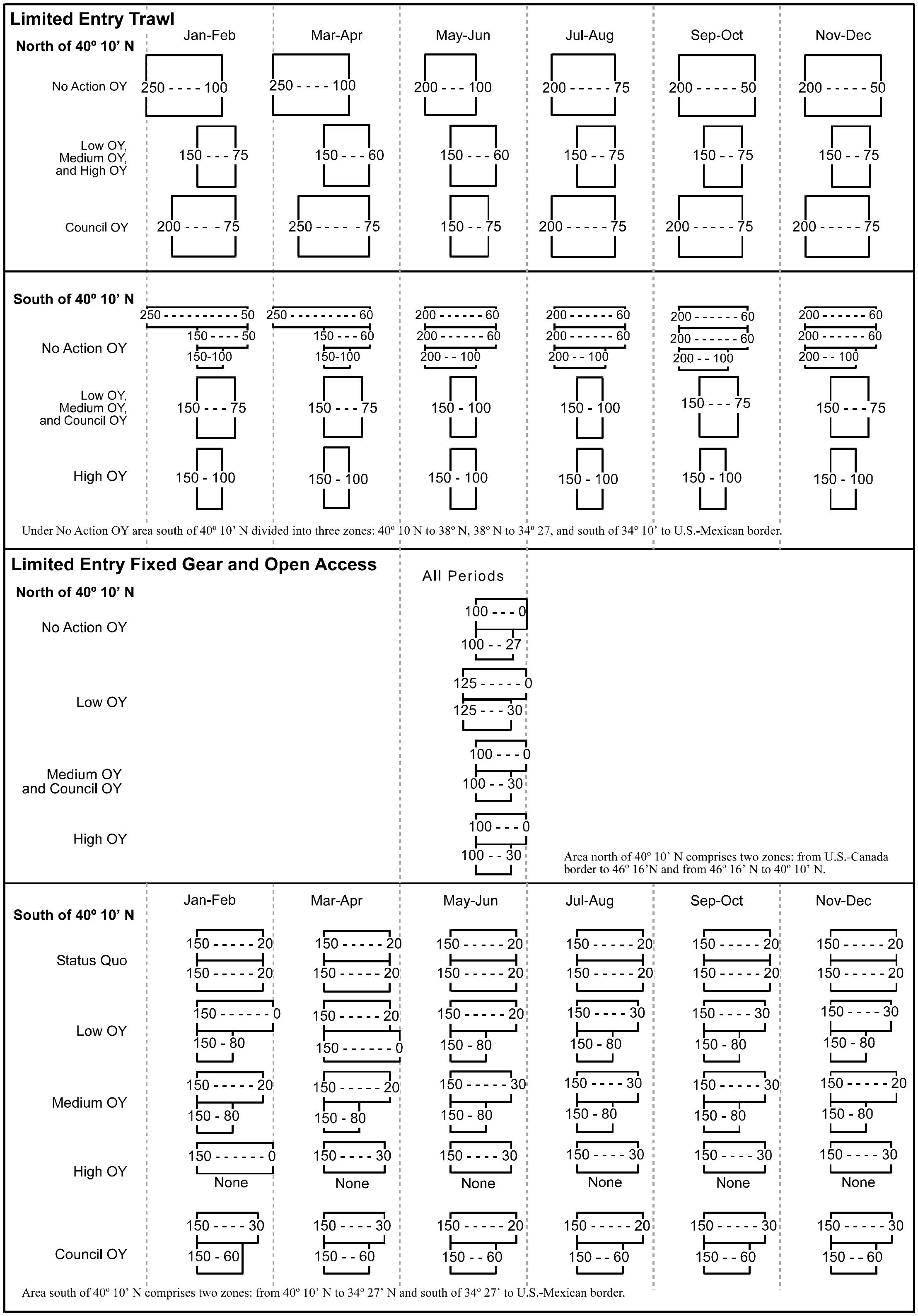

FIGURE 2.2.1-1. Schematic showing closed area boundaries under the different alternatives.

2.2.2 The Low OY Alternative

The *Low OY* alternative represents the most conservative harvest specifications and management measures analyzed in this EIS for the 2004 West Coast groundfish fishery. These specifications and management measures were generally decided by the Council at its June 2003 meeting and subsequently refined by the GMT. The estimated mortality of overfished groundfish species under the *Low OY* alternative are shown in Table 2.2.2-1. The *Low OY* alternative is the <u>environmentally preferable alternative</u> (noting the environmentally preferable alternative is required in NEPA analyses. This is the alternative that has the least impact on the physical environment (i.e., habitat) of those considered). The *Low OY* alternative results in the lowest levels of fishing mortality and is based on generally higher modeled probabilities of overfished species reaching target biomass within the time frame specified in the management framework. A description of the *Low OY* alternative by fishery sector follows.

2.2.2.1 Limited Entry Trawl

Trip limits, cumulative landing limits, and the depth lines describing the trawl RCA by two-month period under the *Low OY* alternative for 2004 are shown in Tables 2.2.2-2 and 2.2.2-3 for the limited entry trawl fishery north and south of 40°10' N latitude, respectively.

Non-Whiting Trawl

The limited entry trawl fishery would be constrained under the *Low OY* alternative to waters deeper than a line specified by latitude/longitude waypoints approximating 150 fm coastwide. Shallow water opportunities north of 40°10' N latitude inside 75 fm, except periods 2 and 3 when the RCA is extended inshore to 60 fm, would be available to trawlers using small footropes to access shelf flatfish species. The 75 fm to 150 fm depth zone would be closed year-round to trawling to protect overfished shelf and slope rockfish species.

The limited entry trawl RCA south of 40°10' N latitude would be extended offshore to a specified line approximating 150 fm to protect bocaccio, canary rockfish, cowcod, and other overfished groundfish species inhabiting the shelf off California. Inshore opportunities to target shelf flatfish would be provided by allowing trawl vessels to fish from the bounds of the California state jurisdiction at three miles offshore to a line approximating 75 fm during periods 1, 2, 5, and 6, and out to a line approximating 100 fm for periods 3 and 4.

As in 2003, the *Low OY* alternative specifies smaller trip limits north of 40°10' N latitude for DTS species for trawlers forced to use small footropes when fishing inshore of the trawl RCA. The larger limits allowed for trawlers fishing offshore of the RCA using large footropes are designed to provide an incentive for trawlers to fish deeper and avoid overfished groundfish species (particularly canary rockfish) residing on the shelf. The smaller DTS limits would apply for the entire two-month cumulative limit period if DTS species were landed using small footrope gear.

Whiting Trawl

The U.S. portion of the total catch Pacific whiting OY under the *Low OY* alternative is 74,100 mt. This OY was apportioned among commercial sectors according to the allocations in federal regulations (50 CFR 660.306 and 550 CFR 660.323(a)(4). The tribal allocation was based on the sliding scale methodology that has been in use since 1999, which specifies tribal allocation relative to incremental changes to the U.S. whiting OY. The *Low OY* tribal whiting allocation is 12,967.5 mt based on this methodology, which was taken off the top of the U.S. OY. An additional 2,000 mt of whiting was set-aside to accommodate bycatch in non-whiting fisheries and 1,000 mt to accommodate a cap for a WDFW-sponsored pollock EFP to derive the non-tribal commercial OY of 58,133 mt. This commercial OY was allocated 34% (19,765 mt) to the catcher-processor sector, 24% (13,952 mt) to the mothership sector, and 42% (24,416 mt) to the shoreside sector.

2.2.2.2 Limited Entry Fixed Gear

Trip limits, cumulative landing limits, and the depth lines describing the nontrawl RCA by two-month period under the *Low OY* alternative for 2004 are shown in Tables 2.2.2-4 and 2.2.2-5 for the limited entry fixed gear fishery north and south of 40°10' N latitude, respectively.

Discard rates of groundfish in the limited entry fixed gear fishery, determined using the first two years of observations from the NMFS West Coast Groundfish Observer Program, are anticipated to be available for management use inseason during 2004. Although the management implications of using these new data are not yet known, the Council wanted consideration of a deeper nontrawl RCA boundary in case it is needed to manage the 2004 fishery. Therefore, under the *Low OY* alternative, an option of a 125 fm deeper line is considered to describe the outer bounds of the nontrawl RCA north of Cape Mendocino.

All the nearshore commercial seasons and depth restrictions by region would be the same as for the recreational fishery (see Section 2.2.2.7). A 50-pound bocaccio trip limit is specified under the *Low OY* alternative for nearshore commercial fisheries south of Cape Mendocino. There would be no cabezon retention, and the greenling minimum size limit would be 16 inches

2.2.2.3 Open Access

Trip limits, cumulative landing limits, and the depth lines describing the nontrawl RCA by two-month period under the *Low OY* alternative for 2004 are shown in Tables 2.2.2-6 and 2.2.2-7 for open access gears north and south of 40°10' N latitude, respectively.

Discard rates of groundfish using open access gears, determined using the first two years of observations from the federal groundfish observer program, are anticipated to be available for management use inseason during 2004. Although the management implications of using these new data are not yet known, the Council wanted consideration of a deeper nontrawl RCA boundary in case it is needed to manage 2004 fixed gear fisheries. Therefore, under the *Low OY* alternative, an option of a 125 fm deeper line is considered to define the outer bounds of the nontrawl RCA.

All the nearshore commercial seasons and depth restrictions by region would be the same as for the recreational fishery under the *Low OY* alternative (see Section 2.2.2.7). A 50-pound bocaccio trip limit is specified under the *Low OY* alternative for nearshore commercial fisheries south of Cape Mendocino. There would be no cabezon retention, and the greenling minimum size limit would be 16 inches

Elimination of the spot prawn trawl fishery in Oregon is anticipated under the *Low OY* alternative and all other 2004 alternatives. The pink shrimp fishery will be required to install approved BRDs in their trawls as was the case in 2003. This became a permanent rule last year for all the West Coast states.

2.2.2.4 Tribal Fisheries

Tribal allocations and harvest guidelines for black rockfish, canary rockfish, thornyheads, yelloweye rockfish, minor nearshore, minor shelf, and minor slope rockfish under the *Low OY* alternative (and all other

2004 alternatives) are status quo (same as *No Action*). The sablefish harvest guideline under the *Low OY* alternative is 441 mt, which assumes a 4.38% average discard rate in tribal trawl and fixed gear fisheries. The proposed flatfish limits in tribal bottom trawl fisheries are based on the framework described under the *No Action* alternative. Trip limits for these species will be the same as those adopted for the non-tribal limited entry trawl fishery at the start of the year with the same gear restrictions. The tribes will continue to develop depth, area, and time restrictions in their directed Pacific halibut fishery to minimize impacts on yelloweye rockfish. The tribes are proposing an overall lingcod harvest guideline of 25 mt in 2004 for all tribal fisheries combined. Tribal fisheries would be restricted to 450 pounds per day and 1,350 pound, per week lingcod limits for all fisheries, which would be adjusted inseason to stay within the overall harvest guideline. The tribes propose a midwater trawl option of 150,000 pound, two-month limit of yellowtail rockfish on a fleet-wide basis, which is the same as the status quo vessel-based landing limit of 30,000 pounds per two months given that there are about five participating vessels in the fleet. Widow rockfish would be limited to 10% of the landed yellowtail rockfish. The tribes are proposing to again delay the start of their midwater trawl fishery until September 2004 to reduce the incidental take of canary rockfish.

2.2.2.5 Washington Recreational

The Washington recreational groundfish fishery regulations under the *Low OY* alternative would be the same as status quo except for the following changes:

- The canary rockfish sublimit is reduced from one per day to no retention.
- The lingcod season changes from March 16 through October 15 to the Saturday closest to March 16 through the Sunday closest to October 15.
- The nearshore line of 25 fm (used in inseason management to restrict depths where the recreational fishery would operate if the canary or yelloweye rockfish harvest guideline is projected to be attained early) would change to a 30-fm line; an inseason depth restriction would apply only in specific high bycatch areas.

2.2.2.6 Oregon Recreational

The Oregon recreational groundfish fishery regulations under the *Low OY* alternative would be the same as status quo except for the following changes:

- Groundfish open inside 40 fm year round.
- The canary rockfish sublimit is reduced from one per day to no retention.
- The yelloweye rockfish sublimit is reduced from one per day to no retention.
- The minimum size limit for lingcod increases from 24 inches to 26 inches.
- Cabezon retention is disallowed.
- A 12-inch minimum size limit is established for greenling species.

2.2.2.7 California Recreational

U.S./Mexico Border to Pt. Conception

The California recreational groundfish fishery regulations south of Pt. Conception under the *Low OY* alternative would be the same as status quo except for the following changes:

- Groundfish open January through February and May through December inside 80 fm.
- The bocaccio sublimit is increased from no retention to one fish per day.

- The lingcod minimum size limit is increased from 24 inches to 26 inches.
- Cabezon retention is disallowed.
- The greenling species' minimum size limit is increased from 12 inches to 16 inches.

Pt. Conception to Pt. San Pedro

The California recreational groundfish fishery regulations for the area between Pt. Conception and Pt. San Pedro under the *Low OY* alternative would be the same as status quo except for the following changes:

- Groundfish open March through June inside 20 fm and July through December inside 30 fm.
- The bocaccio sublimit is increased from no retention to one fish per day.
- The lingcod minimum size limit is increased from 24 inches to 26 inches.
- Cabezon retention is disallowed.
- The greenling species' minimum size limit is increased from 12 inches to 16 inches.

Pt. San Pedro to Cape Mendocino

The California recreational groundfish fishery regulations for the area between Pt. San Pedro and Cape Mendocino under the *Low OY* alternative would be the same as described for the area between Pt. Conception and Pt. San Pedro.

Cape Mendocino to the California/Oregon Border

The California recreational groundfish fishery regulations for the area between Cape Mendocino and the California/Oregon border under the *Low OY* alternative would be the same as status quo except for the following changes:

- Groundfish open March through December inside 30 fm.
- The lingcod minimum size limit is increased from 24 inches to 26 inches.
- Cabezon retention is disallowed.
- The greenling species' minimum size limit is increased from 12 inches to 16 inches.

TABLE 2.2.2-1. Estimated mortality (mt) of overfished West Coast groundfish species by fishery in 2004 under the *Low OY* alternative. (Page 1 of 2)

Fishery	Bocaccio [a]	Canary	Cowcod	Darkblotched	Lingcod [b]	POP	Whiting [c]	Widow	Yelloweye
Limited Entry Groundfish									
Trawl- Non-whiting [d]	21.9	9.6	0.6	156.4	76.1	112.3	[j]	2.0	0.4
Fixed Gear	13.4	0.4	0.1	1.5	12.7	0.2	[j]	30.0	0.1
Whiting									
At-sea whiting motherships	[j]	0.3	[j]	1.2	0.1	0.9	14,192	21.9	0.0
At-sea whiting catcher-processor	[j]	0.3	[j]	2.1	0.1	3.2	20,105	33.9	0.0
Shoreside whiting	[j]	0.1	[j]	0.3	0.2	1.6	23,836	32.7	0.0
Tribal whiting	[j]	2.2	[j]	0.0	0.2	0.5	12,968	11.0	0.0
Open Access									
Groundfish directed	10.6	0.2	0.1	[j]	62.5	[j]	[j]	[j]	0.6
CA Halibut	0.1	[j]	[j]	0.0	2.0	0.0	[j]	[j]	[j]
CA Gillnet [e]	0.5	[j]	[j]	0.0	[j]	0.0	0.0	0.0	[j]
CA Sheephead [e]	[j]	[j]	[j]	0.0	[j]	0.0	0.0	0.0	0.0
Coastal pelagic species- wetfish [e]	0.3	[j]	[j]	[j]	[j]	[j]	[j]	[j]	[j]
Coastal pelagic species- squid [f]	[j]	[j]	[j]	[j]	[j]	[j]	[j]	[j]	[j]
Dungeness crab [e]	0.0	[j]	0.0	0.0	[j]	0.0	[j]	[j]	[j]
Highly migratory species [e]	[j]	0.0	0.0	0.0	[j]	[j]	[j]	[j]	[j]
Pacific Halibut [e]	0.0	[j]	0.0	0.0	[j]	0.0	[j]	0.0	0.5
Pink shrimp	0.1	0.5	0.0	0.0	0.5	0.0	1.0	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	1.6	0.0	0.0	0.3	0.0	[j]	0.0	0.2
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)	[j]	[j]	[j]	[j]	[j]	[j]	[j]	[j]	[j]
Tribal (Non-whiting)									
Midwater Trawl	[j]	2.3	[j]	0.0	0.1	0.0	[j]	40.0	0.0
Bottom Trawl	[j]	0.5	[j]	0.0	9.0	0.0	[j]	0.0	0.0
Troll	[j]	0.5	[j]	0.0	1.0	0.0	[j]	[j]	0.0
Fixed gear	[j]	0.3	[j]	0.0	15.0	0.0	[j]	0.0	2.3
Recreational Groundfish									
WA	[j]	1.5	[j]	[j]	35.0	[j]	[j]	[j]	3.5
OR	[j]	5.0	[j]	[j]	70.3	[j]	[j]	0.4	2.6
CA (N)	[j]	0.5	[j]	[j]	195.0	[j]	[j]	1.0	0.1
CA (S)	82.6	8.3	2.4	[j]	152.6	[j]	[j]	0.3	1.2
Research: Based on 2 most recent NMFS trawl shelf and slope surveys, the IPHC halibut survey, and LOAs with expanded estimates for south of Pt. Conception.	2.0	1.0	[j]	1.6	3.0	3.0	200	1.5	1.1
Non-EFP Total	131.8	35.0	3.2	163.1	635.7	121.8	[j]	174.8	12.8

TABLE 2.2.2-1. Estimated mortality (mt) of overfished West Coast groundfish species by fishery in 2004 under the *Low OY* alternative. (Page 2 of 2)

Fishery	Bocaccio [a/]	Canary	Cowcod	Darkblotched	Lingcod [b/]	POP	Whiting [c/]	Widow	Yelloweye
EFPs [g/]									
CA: Nearshore flatfish trawl [h/]	0.5	0.5	0.2	j/	20.0	j/	j/	j/	0.5
CA: Commercial passenger fishing vessel	3.1	2.5	0.3	j/	2.4	j/	j/	j/	1.4
OR: Selective flatfish trawl [h/ i/]	j/	4.0	j/	3.1	24.0	j/	j/	1.0	1.7
WA: Arrowtooth flounder trawl [h/]	j/	2.5	j/	3.0	2.0	18.0	j/	3.0	0.5
WA: Dogfish longline	j/	0.1	j/	0.5	2.0	0.5	j/	0.5	1.0
WA: Pollock	j/	0.1	j/	j/	j/	j/	1,000	3.0	0.1
WA: Nearshore flatfish trawl [h/]	j/	1.0	j/	3.0	2.0	j/	j/	1.0	0.1
EFP Subtotal	3.6	10.7	0.5	9.6	52.4	18.5	1,000	8.5	5.3
TOTALk/	135.4	**45.7**	3.7	**172.7**	688.1	140.3	74,100	**183.3**	18.1
2004 OY	199	42	5	172	735	318	74,100	181	22

a/ South of 40/10' N latitude
b/ Lingcod total reflects total catch, not mortality.
c/ Catch estimates of overfished non-whiting groundfish species based on average annual bycatch rates during 1998-2003. 2003 bycatch rates calculated for the at-sea sector based on observed catch rates through September 25, 2003. These data incomplete since all at-sea sectors still fishing after this date. Shoreside catches of overfished groundfish species are actual estimates through the entire 1998-2003 period. Estimated whiting mortality in non-whiting fisheries assumes a cumulative 2,000 mt impact in 2004. Tribal catch based on OY sliding scale. Non-tribal whiting fishery catch based on set allocations applied after tribal and non-whiting fishery impacts subtracted from the OY.
d/ Using observer data, all estimates from the Hastie trawl bycatch model.
e/ Mortality estimates are not hard numbers; based on the GMT's best professional judgement.
f/ 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.
g/ 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.
h/ EFP could be converted into regulations in 2004.
i/ Based on participation of 12 vessels for 8 months.
j/ Either not applicable; trace amount (<0.01 mt); or not reported in available data sources.
k/ Bold values exceed the OY for the species under this alternative.

TABLE 2.2.2-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] analyzed under the *Low OY* alternative. (Page 1 of 3)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area [i/] (RCA):						
North of 40°10' N. lat.	75 fm - 150 fm	60 fm - 150 fm		75 fm - 150 fm		
Small footrope[g/] or midwater trawl gear is required shoreward of the RCA; all trawl gear (large footrope, midwater trawl, and small footrope gear) is permitted seaward of the RCA.						
A vessel may have more than one type of limited entry bottom trawl gear on board, but the most restrictive trip limit associated with the gear on board applies for that trip and will count toward the cumulative trip limit for that gear. A vessel may not have limited entry bottom trawl gear on board if that vessel also has trawl gear on board that is permitted for use within a RCA, including limited entry midwater trawl gear, regardless of whether the vessel is intending to fish within a RCA on that fishing trip.						
Minor slope rockfish [c/]	1,800 lb/2 months					
Pacific ocean perch	3,000 lb/2 months					
DTS complex						
Sablefish	3,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 1,900 lb/2 months		2,900 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 1,900 lb/2 months		3,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 1,900 lb/2 months	
Longspine thornyhead	10,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the longspine thornyhead limit is 3,000 lb/2 months.					
Shortspine thornyhead	2,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the shortspoine thornyheads limit is 1,000 lb/2 months.					
Dover sole	26,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the Dover sole limit is 15,000 lb/2 months.					

TABLE 2.2.2-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] analyzed under the *Low OY* alternative. (Page 2 of 3)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Flatfish						
All other flatfish [d/]	All other flatfish plus rex sole: 100,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 50,000 lb/2 months.	All other flatfish plus petrale & rex sole: 100,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 50,000 lb/2 months, no more than 20,000 lb/2 months of which may be petrale sole.				All other flatfish plus rex sole: 100,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 50,000 lb/2 months.
Petrale sole	Not limited					Not limited
Rex sole	Included in all other flatfish					
Arrowtooth flounder	Not limited providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 5,000 lb/2 months		150,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 5,000 lb/2 months			Not limited providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 5,000 lb/2 months
Whiting [e/]	20,000 lb/trip		Primary Season (only mid-water trawl permitted in the RCA)		10,000 lb/trip	
Other Fish [i/]	Not limited					
Use of small footrope bottom trawl [g/] or mid-water trawl is required for landing all of the following species:						
Minor shelf rockfish and widow rockfish [c/]	300 lb/month		1,000 lb/month, no more than 200 lb/month of which may be yelloweye rockfish			300 lb/month

TABLE 2.2.2-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] analyzed under the *Low OY* alternative. (Page 3 of 3)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Widow rockfish						
mid-water trawl - permitted within the RCA	CLOSED [f/]		During primary whiting season, in trips of at least 10,000 lb of whiting: combined widow and yellowtail limit of 500 lb/trip, cumulative widow limit of 1,500 lb/month		CLOSED [f/]	
Canary rockfish	100 lb/month		300 lb/month		100 lb/month	
Yellowtail						
mid-water trawl - permitted within the RCA	CLOSED [f/]		During primary whiting season, in trips of at least 10,000 lb of whiting: combined widow and yellowtail limit of 500 lb/trip, cumulative yellowtail limit of 2,000 lb/month			CLOSED [f/]
small footrope trawl [g/]	In landings without flatfish, 1,000 lb/month. As flatfish bycatch, per trip limit is the sum of 33% (by weight) of all flatfish except arrowtooth flounder, plus 10% (by weight) of arrowtooth flounder. Total yellowtail landings not to exceed 10,000 lb/2 months, no more than 1,000 lb of which may be landed without flatfish.					
Minor nearshore rockfish	300 lb/month					
Lingcod [h/]	800 lb/2 months		1,000 lb/2 months		800 lb/2 months	

a/ Gear requirements and prohibitions are explained above.
b/ "North" means 40°10' N latitude to the U.S./Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.
c/ Bocaccio and chilipepper are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.
d/ "Other" flatfish means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
e/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.
f/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
g/ Small footrope trawl means a bottom trawl net with a footrope no larger than 8 inches (20 cm) in diameter.
h/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
i/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
j/ 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 that may vary seasonally.

TABLE 2.2.2-3. Trip limits and gear requirements[a/] for limited entry trawl gear south of 40°10' N latitude[b/] analyzed under the *Low OY* alternative. (Page 1 of 2)

<table>
<tr><th></th><th>JAN-FEB</th><th>MAR-APR</th><th>MAY-JUN</th><th>JUL-AUG</th><th>SEP-OCT</th><th>NOV-DEC</th></tr>
<tr><td colspan="7">Rockfish Conservation Area [i/] (RCA):</td></tr>
<tr><td>40°10' - 38° N latitude</td><td colspan="2" rowspan="2">75 fm - 150 fm</td><td colspan="2" rowspan="2">100 fm - 150 fm</td><td colspan="2" rowspan="2">75 fm - 150 fm</td></tr>
<tr><td>South of 38° N latitude</td></tr>
<tr><td colspan="7">Small footrope or midwater trawl gear is required shoreward of the RCA; all trawl gear (large footrope, midwater trawl, and small footrope gear) is permitted seaward of the RCA.</td></tr>
<tr><td colspan="7">A vessel may have more than one type of limited entry bottom trawl gear on board, but the most restrictive trip limit associated with the gear on board applies for that trip and will count toward the cumulative trip limit for that gear. A vessel may not have limited entry bottom trawl gear on board if that vessel also has trawl gear on board that is permitted for use within a RCA, including limited entry midwater trawl gear, regardless of whether the vessel is intending to fish within a RCA on that fishing trip.</td></tr>
<tr><td colspan="7">Minor slope rockfish [c/]</td></tr>
<tr><td>40°10' - 38° N latitude</td><td colspan="6">1,800 lb/2 months</td></tr>
<tr><td>South of 38° N latitude</td><td colspan="6">30,000 lb/2 months</td></tr>
<tr><td colspan="7">Splitnose</td></tr>
<tr><td>40°10' - 38° N latitude</td><td colspan="6">1,800 lb/2 months</td></tr>
<tr><td>South of 38° N latitude</td><td colspan="6">30,000 lb/2 months</td></tr>
<tr><td colspan="7">DTS complex</td></tr>
<tr><td>Sablefish</td><td colspan="2">3,000 lb/2 months</td><td colspan="2">2,900 lb/2 months</td><td colspan="2">3,000 lb/2 months</td></tr>
<tr><td>Longspine thornyhead</td><td colspan="6">10,000 lb /2 months</td></tr>
<tr><td>Shortspine thornyhead</td><td colspan="6">2,000 lb/2 months</td></tr>
<tr><td>Dover sole</td><td colspan="6">26,000 lb/2 months</td></tr>
<tr><td colspan="7">Flatfish</td></tr>
<tr><td>All other flatfish [d/]</td><td>100,000 lb/2 months</td><td colspan="4" rowspan="2">All other flatfish plus petrale & rex sole: 100,000 lb/2 months, no more than 20,000 lb/2 months of which may be petrale sole.</td><td>100,000 lb/2 months</td></tr>
<tr><td>Petrale sole</td><td>No limit</td><td>No limit</td></tr>
<tr><td>Rex sole</td><td colspan="6">Included in all other flatfish</td></tr>
<tr><td>Arrowtooth flounder</td><td>No limit</td><td colspan="4">10,000 lb/2 months</td><td>No limit</td></tr>
<tr><td>Whiting [e/]</td><td colspan="2">20,000 lb/trip</td><td colspan="2">Primary Season (only mid-water trawl permitted within the RCA)</td><td colspan="2">10,000 lb/trip</td></tr>
<tr><td>Other Fish [i/]</td><td colspan="6">Not limited</td></tr>
</table>

TABLE 2.2.2-3. Trip limits and gear requirements[a/] for limited entry trawl gear south of 40°10' N latitude[b/] analyzed under the *Low OY* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Use of small footrope bottom trawl [g/] or mid-water trawl is required for landing all of the following species:						
Minor shelf rockfish, widow, and chilipepper rockfish [c/]	300 lb/month					
Widow rockfish						
mid-water trawl - permitted within the RCA	CLOSED [f/]					12, 000 lb/2 months
Canary rockfish	100 lb/month		300 lb/month		100 lb/month	
Bocaccio	CLOSED [f/]					
Cowcod	CLOSED [f/]					
Minor nearshore rockfish	300 lb/month					
Lingcod [h/]	800 lb/2 months		1,000 lb/2 months		800 lb/2 months	

a/ Gear requirements and prohibitions are explained above.
b/ "South" means 40°10' N latitude to the U.S./Mexico border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.
c/ Yellowtail is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.
d/ "Other" flatfish means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
e/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.
f/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
g/ Small footrope trawl means a bottom trawl net with a footrope no larger than 8 inches (20 cm) in diameter.
h/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
i/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
j/ 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 that may vary seasonally.

TABLE 2.2.2-4. Trip limits for limited entry fixed gear north of 40°10' N latitude[a/] analyzed under the *Low OY* alternative. (Page 1 of 1)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area [h/] **(RCA):**						
North of 46°16' N. lat.	shoreline - 125 fm					
46°16' N. lat. - 40°10' N. lat.	30 fm - 125 fm					
Minor slope rockfish [d/]	4,000 lb/2 months					
Pacific ocean perch	1,800 lb/2 months					
Sablefish	300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months					
Longspine thornyhead	10,000 lb/2 months					
Shortspine thornyhead	2,100 lb/2 months					
Dover sole	5,000 lb/month					
Arrowtooth flounder						
Petrale sole						
Rex sole						
All other flatfish [b/]						
Whiting [c/]	10,000 lb/trip					
Minor shelf rockfish, widow, and yellowtail rockfish [d/]	200 lb/month					
Canary rockfish	CLOSED [e/]					
Yelloweye rockfish	CLOSED [e/]					
Cowcod	CLOSED [e/]					
Minor nearshore rockfish	5,000 lb/2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [f/]					
Lingcod[g/]	CLOSED [e/]		400 lb/month			CLOSED [e/]
Other fish[i/]	Not limited					

a/ "North" means 40°10' N latitude to the U.S./Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.
b/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
c/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.
d/ Bocaccio and chilipepper are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.
e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
f/ For black rockfish north of Cape Alava (48°09'30" N latitude), and between Destruction Island (47°40'00" N latitude) and Leadbetter Point (46°38'10" N latitude), there is an additional limit of 100 lb or 30% by weight of all fish on board, whichever is greater, per vessel, per fishing trip.
g/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
h/ 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 that may vary seasonally.

TABLE 2.2.2-5. Trip limits for limited entry fixed gear south of 40°10' N latitude[a/] analyzed under the Low OY alternative. (Page 1 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area[g/] (RCA):						
40°10' N. lat. - 34°27' N. lat.	Shoreline - 150 fm	20 fm - 150 fm		30 fm - 150 fm		
South of 34°27' N. lat.	80 fm - 150 fm	Shoreline - 150 fm	80 fm - 150 fm			
Minor slope rockfish [d/]						
40°10' - 38° N. lat.	7,000 lb/2 months					
South of 38° N. lat.	40,000 lb/2 months					
Splitnose						
40°10' - 38° N. lat.	7,000 lb/2 months					
South of 38° N. lat.	40,000 lb/2 months					
Sablefish						
40°10' - 36° N. lat.	300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months					
South of 36° N. lat.	350 lb/day, or 1 landing per week of up to 1,050 lb					
Longspine thornyhead	10,000 lb/2 months					
Shortspine thornyhead	2,000 lb/2 months					
Dover sole **Arrowtooth flounder** **Petrale sole** **Rex sole** **All other flatfish [b/]**	5,000 lb/month When fishing for Pacific sanddabs, vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to 1 lb (0.45 kg) of weight per line are not subject to the RCAs.					
Whiting [c/]	10,000 lb/trip					
Minor shelf rockfish, widow, and yellowtail rockfish [d/]						
40°10' - 34°27' N. lat.	300 lb/2 months	CLOSED [e/]	200 lb/2 months		300 lb/2 months	
South of 34°27' N. lat.	CLOSED [e/]	2,000 lb/2 months				
Chilipepper rockfish	2,000 lb/2 months, this opportunity only available seaward of the nontrawl RCA					
Canary rockfish	CLOSED [e/]					
Yelloweye rockfish	CLOSED [e/]					
Cowcod	CLOSED [e/]					
Bocaccio						
40°10' - 34°27' N. lat.	200 lb/2 months	CLOSED [e/]	100 lb/2 months		200 lb/2 months	
South of 34°27' N. lat.	CLOSED [e/]	300 lb/2 months				

TABLE 2.2.2-5. Trip limits for limited entry fixed gear south of 40°10' N latitude[a/] analyzed under the Low OY alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Minor nearshore rockfish						
Shallow nearshore						
40°10' - 34°27' N. lat.	300 lb/2 months	CLOSED [e/]	500 lb/2 months	600 lb/2 months	500 lb/2 months	300 lb/2 months
South of 34°27' N. lat.	CLOSED [e/]	300 lb/2 months				
Deep nearshore						
40°10' - 34°27' N. lat.	500 lb/2 months	CLOSED [e/]	500 lb/2 months		400 lb/month	500 lb/2 months
South of 34°27' N. lat.	CLOSED [e/]	500 lb/2 months	600 lb/2 months			400 lb/2 months
California scorpionfish	CLOSED [e/]	300 lb/2 months		400 lb/2 months		300 lb/2 months
Lingcod [f/]	CLOSED [e/]		400 lb/month, when nearshore open			CLOSED [e/]
Other fish [h/]	Not limited					

a/ "South" means 40°10' N latitude to the U.S./Mexico border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.

c/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.

d/ Chilipepper rockfish is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.

e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.

f/ The minimum size limit for lingcod is 24 inches (61 cm) total length.

g/ 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 that may vary seasonally.

h/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.

TABLE 2.2.2-6. Trip limits for open access gears north of 40°10' N latitude[a/] analyzed under the *Low OY* alternative.

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area[h/] (RCA):						
North of 46°16' N. lat.	0 fm - 125 fm					
46°16' N. lat. - 40°10' N. lat.	30 fm - 125 fm					
Minor slope rockfish [b/]	Per trip, no more than 25% of weight of the sablefish landed					
Pacific ocean perch	100 lb/month					
Sablefish	300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months					
Thornyheads	CLOSED [e/]					
Dover sole	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs.					
Arrowtooth flounder						
Petrale sole						
Rex sole						
All other flatfish [c/]						
Whiting	300 lb/month					
Minor shelf rockfish, widow and yellowtail rockfish b/	200 lb/month					
Canary rockfish	CLOSED [e/]					
Yelloweye rockfish	CLOSED [e/]					
Cowcod	CLOSED [e/]					
Minor nearshore rockfish	5,000 lb/2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [d/]					
Lingcod [f/]	CLOSED [e/]		300 lb/month			CLOSED [e/]
Other Fish [g/]	Not limited					

TABLE 2.2.2-6. Trip limits for open access gears north of 40°10' N latitude[a/] analyzed under the *Low OY* alternative.
(Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
PINK SHRIMP EXEMPTED TRAWL ***(not subject to RCAs)***						
North	Effective April 1 - October 31, 2004: 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.					
SALMON TROLL						
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.					

a/ "North" means 40°10' N latitude to the U.S./Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.
b/ Bocaccio and chilipepper rockfishes are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.
c/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
d/ For black rockfish north of Cape Alava (48°09'30" N latitude), and between Destruction Island (47°40' N latitude) and Leadbetter Point (46°38'10" N latitude), there is an additional limit of 100 lbs or 30% by weight of all fish on board, whichever is greater, per vessel, per fishing trip.
e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
f/ The size limit for lingcod is 24 inches (61 cm) total length.
g/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
h/ 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 that may vary seasonally.

TABLE 2.2.2-7. Trip limits for open access gears south of 40°10' N latitude[a/] analyzed under the *Low OY* alternative. (Page 1 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area[g/] (RCA):						
40°10' N. lat. - 34°27' N. lat.	Shoreline - 150 fm	20 fm - 150 fm		30 fm - 150 fm		
South of 34°27' N. lat.	80 fm - 150 fm	Shoreline - 150 fm	80 fm - 150 fm			
Minor slope rockfish b/						
40°10' - 38° N. lat.	Per trip, no more than 25% of weight of the sablefish landed					
South of 38° N. lat.	10,000 lb/2 months					
Splitnose	200 lb/month					
Sablefish						
40°10' - 36° N. lat.	300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months					
South of 36° N. lat.	350 lb/day, or 1 landing per week of up to 1,050 lb					
Thornyheads						
40°10' - 34°27' N. lat.	CLOSED [e/]					
South of 34°27' N. lat.	50 lb/day, no more than 1,000 lb/2 months					
Dover sole **Arrowtooth flounder** **Petrale sole** **Rex sole** **All other flatfish** [c/]	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs. When fishing for Pacific sanddabs, vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to 1 lb of weight per line are not subject to the RCAs.					
Whiting	300 lb/month					
Minor shelf rockfish, widow and chilipepper rockfish b/						
40°10' - 34°27' N. lat.	300 lb/2 months	CLOSED [e/]	200 lb/2 months		300 lb/2 months	
South of 34°27' N. lat.	CLOSED [e/]	500 lb/2 months				
Canary rockfish	CLOSED [e/]					
Yelloweye rockfish	CLOSED [e/]					
Cowcod	CLOSED [e/]					
Bocaccio						
40°10' - 34°27' N. lat.	200 lb/2 months	CLOSED [e/]	100 lb/2 months		200 lb/2 months	
South of 34°27' N. lat.	CLOSED [e/]	100 lb/2 months				
Minor nearshore rockfish						
Shallow nearshore						
40°10' - 34°27' N. lat.	300 lb/2 months	CLOSED [e/]	500 lb/2 months	600 lb/2 months	500 lb/2 months	300 lb/2 months
South of 34°27' N. lat.	CLOSED [e/]	300 lb/2 months				
Deep nearshore						
40°10' - 34°27' N. lat.	500 lb/2 months	CLOSED [e/]	500 lb/2 months		400 lb/month	500 lb/2 months
South of 34°27' N. lat.	CLOSED [e/]	500 lb/2 months	600 lb/2 months			400 lb/2 months
California scorpionfish	CLOSED [e/]	300 lb/2 months		400 lb/2 months		300 lb/2 months
Lingcod [d/]	CLOSED [e/]		300 lb/month, when nearshore open			CLOSED [e/]
Other Fish [f/]	Not limited					
PINK SHRIMP EXEMPTED TRAWL GEAR ***(not subject to RCAs)***						

TABLE 2.2.2-7. Trip limits for open access gears south of 40°10' N latitude[a/] analyzed under the *Low OY* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
South	Effective April 1 - October 31, 2004: 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.					

PRAWN AND, SOUTH OF 38°57'30" N LATITUDE, CALIFORNIA HALIBUT AND SEA CUCUMBER EXEMPTED TRAWL

EXEMPTED TRAWL Rockfish Conservation Area [g]/(RCA):

	75 fm - 150 fm		100 fm - 150 fm		75 fm - 150 fm	
	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	
	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 38o57'30" N latitude 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 25).					

a/ "South" means 40°10' N latitude to the U.S.-Mexico border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ Yellowtail rockfish is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.
c/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
d/ The size limit for lingcod is 24 inches (61 cm) total length.
e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
f/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
g/ 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 that may vary seasonally.

2.2.3 The Medium OY Alternative

The *Medium OY* alternative represents intermediate harvest specifications and management measures analyzed in this EIS for the 2004 West Coast groundfish fishery. These specifications and management measures were generally decided by the Council at its June 2003 meeting and subsequently refined by the GMT. The estimated mortality of overfished groundfish species under the *Medium OY* alternative are shown in Table 2.2.3-1. A description of the *Medium OY* alternative by fishery sector follows.

2.2.3.1 Limited Entry Trawl

Trip limits, cumulative landing limits, and the depth lines describing the trawl RCA by two-month period under the *Medium OY* alternative for 2004 are shown in Tables 2.2.3-2 and 2.2.3-3 for the limited entry trawl fishery north and south of 40°10' N latitude, respectively.

Non-Whiting Trawl

The limited entry trawl fishery would be constrained under the *Medium OY* alternative to waters deeper than a line specified by latitude/longitude waypoints approximating 150 fm coastwide. Shallow water opportunities north of 40°10' N latitude inside 75 fm, except periods 2 and 3 when the RCA is extended inshore to 60 fm, would be available to trawlers using small footropes to access shelf flatfish species. The 75 fm to 150 fm depth zone would be closed year-round to trawling to protect overfished shelf and slope rockfish species.

The limited entry trawl RCA south of 40°10' N latitude would be extended offshore to a specified line approximating 150 fm to protect bocaccio, canary rockfish, cowcod, and other overfished groundfish species inhabiting the shelf off California. Inshore opportunities to target shelf flatfish would be provided by allowing trawl vessels to fish from the bounds of the California state jurisdiction at three miles offshore to a line approximating 100 fm year-round.

As in 2003, the *Medium OY* alternative specifies smaller trip limits north of 40°10' N latitude for DTS species for trawlers forced to use small footropes when fishing inshore of the trawl RCA. The larger limits allowed for trawlers fishing offshore of the RCA using large footropes are designed to provide an incentive for trawlers to fish deeper and avoid overfished groundfish species (particularly canary rockfish) residing on the shelf. The smaller DTS limits would apply for the entire two-month cumulative limit period if DTS species were landed using small footrope gear.

Whiting Trawl

The U.S. portion of the total catch Pacific whiting OY and the sector allocations under the *Medium OY* alternative are the same as described in Section 2.2.1.1 under the *No Action* alternative, with the exception of an additional 1,000 mt of whiting set-aside to accommodate a cap for a WDFW-sponsored pollock EFP.

2.2.3.2 Limited Entry Fixed Gear

Trip limits, cumulative landing limits, and the depth lines describing the nontrawl RCA by two-month period under the *Medium OY* alternative for 2004 are shown in Tables 2.2.3-4 and 2.2.3-5 for the limited entry fixed gear fishery north and south of 40°10' N latitude, respectively.

Under the *Medium OY* alternative for 2004, the nontrawl RCA would be defined by management lines specified with waypoints at roughly 30 fm to 100 fm in waters off Oregon and zero fm to 100 fm (status quo or same as *No Action*) in waters off Washington.

All the nearshore commercial seasons and depth restrictions by region would be the same as for the recreational fishery under the *Medium OY* alternative (see Section 2.2.3.7). A 100-pound bocaccio trip limit is specified under the *Medium OY* alternative for nearshore commercial fisheries south of Cape Mendocino. There would be a specified cabezon slot limit of 15 inches to 21 inches, and the greenling minimum size limit would be 13 inches

2.2.3.3 Open Access

Trip limits, cumulative landing limits, and the depth lines describing the nontrawl RCA by two-month period under the *Medium OY* alternative for 2004 are shown in Tables 2.2.3-6 and 2.2.3-7 for open access gears north and south of 40°10' N latitude, respectively.

The same nontrawl RCA described for limited entry fixed gears under the *Medium OY* alternative (Section 2.2.3.2) would also apply for those open access fisheries not exempt from the RCA restrictions.

2.2.3.4 Tribal Fisheries

Tribal groundfish allocations and harvest guidelines under the *Medium OY* alternative are the same as described for the other alternatives, except for Pacific whiting which is based on a sliding scale proportioned to the U.S. whiting OY, and sablefish which is 10% of the proportion of the coastwide OY north of 36° N latitude. Under the *Medium OY* alternative, the tribal Pacific whiting harvest guideline is 25,000 mt or status quo. The sablefish harvest guideline is 722 mt, which assumes a 3.85% average discard mortality rate for tribal trawl and fixed gear fisheries.

2.2.3.5 Washington Recreational

The Washington recreational groundfish fishery regulations under the *Medium OY* alternative would be the same as status quo except for the following changes:

- The canary rockfish sublimit is reduced from one per day to no retention.
- The lingcod season changes from March 16 through October 15 to the Saturday closest to March 16 through the Sunday closest to October 15.
- The nearshore line of 25 fm (used in inseason management to restrict depths where the recreational fishery would operate if the canary or yelloweye rockfish harvest guideline is projected to be attained early) would change to a 30 fm line; an inseason depth restriction would apply only in specific high bycatch areas.

2.2.3.6 Oregon Recreational

The Oregon recreational groundfish fishery regulations under the *Medium OY* alternative would be the same as status quo except for the following changes:

- Groundfish open year round with no depth restrictions except during June through September when the fishery is open only inside 40 fm.
- The canary rockfish sublimit is reduced from one per day to no retention.

- The yelloweye rockfish sublimit is reduced from one per day to no retention.
- The minimum size limit for cabezon increases from 15 inches to 16 inches
- An 11-inch minimum size limit is established for greenling species.

2.2.3.7 California Recreational

U.S./Mexico Border to Pt. Conception

The California recreational groundfish fishery regulations south of Pt. Conception under the *Medium OY* alternative would be the same as status quo except for the following changes:

- Groundfish open year round inside 80 fm.
- The bocaccio sublimit is increased from no retention to one fish per day.
- A cabezon slot limit of 15 inches to 21 inches is established.
- The greenling species' minimum size limit is increased from 12 inches to 13 inches

Pt. Conception to Pt. San Pedro

The California recreational groundfish fishery regulations for the area between Pt. Conception and Pt. San Pedro under the *Medium OY* alternative would be the same as status quo except for the following changes:

- Groundfish open January through April and November through December inside 20 fm and May through October inside 30 fm.
- The bocaccio sublimit is increased from no retention to one fish per day.
- A cabezon slot limit of 15 inches to 21 inches is established.
- The greenling species' minimum size limit is increased from 12 inches to 13 inches

Pt. San Pedro to Cape Mendocino

The California recreational groundfish fishery regulations for the area between Pt. San Pedro and Cape Mendocino under the *Medium OY* alternative would be the same as described for the area between Pt. Conception and Pt. San Pedro.

Cape Mendocino to the California/Oregon Border

The California recreational groundfish fishery regulations for the area between Cape Mendocino and the California/Oregon border under the *Medium OY* alternative would be the same as status quo except for the following changes:

- Groundfish open March through December inside 30 fm.
- The yelloweye sublimit is increased from no retention to one fish per day.
- A cabezon slot limit of 15 inches to 21 inches is established.
- The greenling species' minimum size limit is increased from 12 inches to 13 inches

TABLE 2.2.3-1. Estimated mortality (mt) of overfished West Coast groundfish species by fishery in 2004 under the *Medium OY* alternative. (Page 1 of 2)

Fishery	Bocaccio [a/]	Canary	Cowcod	Darkblotched [b/]	Lingcod [c/]	POP	Whiting [d/]	Widow	Yelloweye
Limited Entry Groundfish									
Trawl- Non-whiting [e/]	45.4	10.3	1.2	164.5	89.7	118.0	k/	2.1	0.5
Fixed Gear	13.4	0.5	0.1	1.5	12.7	0.2	k/	30.0	0.1
Whiting									
At-sea whiting motherships	k/	0.6	k/	2.4	0.2	1.8	29,088	44.9	0.0
At-sea whiting cat-proc	k/	0.6	k/	4.3	0.1	6.6	41,208	69.4	0.0
Shoreside whiting	k/	0.3	k/	0.7	0.4	3.4	49,904	68.5	0.0
Tribal whiting	k/	4.2	k/	0.0	0.4	1.1	25,000	21.3	0.0
Open Access									
Groundfish directed	10.6	0.3	0.1	k/	62.5	k/	k/	k/	0.6
CA Halibut	0.1	k/	k/	0.0	2.0	0.0	k/	k/	k/
CA Gillnet [f/]	0.5	k/	k/	0.0	k/	0.0	0.0	0.0	k/
CA Sheephead [f/]	k/	k/	k/	0.0	k/	0.0	0.0	0.0	0.0
Coastal pelagic species- wetfish [f/]	0.3	k/	k/	k/	k/	k/	k/	k/	k/
Coastal pelagic species- squid [g/]	k/	k/	k/	k/	k/	k/	k/	k/	k/
Dungeness crab [f/]	0.0	k/	0.0	0.0	k/	0.0	k/	k/	k/
Highly migratory species [f/]	k/	0.0	0.0	0.0	k/	k/	k/	k/	k/
Pacific Halibut [f/]	0.0	k/	0.0	0.0	k/	0.0	k/	0.0	0.5
Pink shrimp	0.1	0.5	0.0	0.0	0.5	0.0	1.0	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	1.6	0.0	0.0	0.3	0.0	k/	0.0	0.2
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)	k/	k/	k/	k/	k/	k/	k/	k/	k/
Tribal									
Midwater Trawl	k/	2.3	k/	0.0	0.1	0.0	k/	40.0	0.0
Bottom Trawl	k/	0.5	k/	0.0	9.0	0.0	k/	0.0	0.0
Troll	k/	0.5	k/	0.0	1.0	0.0	k/	k/	0.0
Fixed gear	k/	0.3	k/	0.0	15.0	0.0	k/	0.0	2.3
Recreational Groundfish									
WA	k/	1.5	k/	k/	35.0	k/	k/	k/	3.5
OR	k/	6.5	k/	k/	88.9	k/	k/	0.9	2.8
CA (N)	k/	0.5	k/	k/	195.0	k/	k/	1.0	0.1
CA (S)	108.5	9.5	3.0	k/	158.2	k/	k/	0.4	1.3
Research: Based on 2 most recent NMFS trawl shelf and slope surveys, the IPHC halibut survey, and LOAs with expanded estimates for south of Pt. Conception.	2.0	1.0	k/	1.6	3.0	3.0	200	1.5	1.1
Non-EFP Total	181.2	41.4	4.4	175.0	674.0	134.1	k/	280.1	13.1

TABLE 2.2.3-1. Estimated mortality (mt) of overfished West Coast groundfish species by fishery in 2004 under the *Medium OY* alternative. (Page 2 of 2)

Fishery	Bocaccio [a]	Canary	Cowcod	Darkblotched [b]	Lingcod [c]	POP	Whiting [d]	Widow	Yelloweye
EFPs [h]									
CA: Nearshore flatfish trawl [i]	0.5	0.5	0.2	[k]	20.0	[k]	[k]	[k]	0.5
CA: Commercial passenger fishing vessel	3.1	2.5	0.3	[k]	2.4	[k]	[k]	[k]	1.4
OR: Selective flatfish trawl [i] [k]	[k]	4.0	[k]	3.1	24.0	[k]	[k]	1.0	1.7
WA: Arrowtooth flounder trawl [i]	[k]	2.5	[k]	3.0	2.0	18.0	[k]	3.0	0.5
WA: Dogfish longline	[k]	0.1	[k]	0.5	2.0	0.5	[k]	0.5	1.0
WA: Pollock	[k]	0.1	[k]	[k]	[k]	[k]	1,000	3.0	0.1
WA: Nearshore flatfish trawl [i]	[k]	1.0	[k]	3.0	2.0	[k]	[k]	1.0	0.1
EFP Subtotal	3.6	10.7	0.5	9.6	52.4	18.5	1,000	8.5	5.3
TOTAL [l]	184.8	**52.1**	**4.9**	184.6	726.4	152.6	148,200	**288.6**	18.4
2004 OY	306	46	4.8	240	735	444	148,200	284	22

a/ South of 40/10' N latitude
b/ Darkblotched harvest limit ("2004 OY" in this table) is the ABC of 240 mt, which is lower than the projected OY of 272 mt under the *Medium OY* alternative.
c/ Lingcod total reflects total catch, not mortality.
d/ Catch estimates of overfished non-whiting groundfish species based on average annual bycatch rates during 1998-2003. 2003 bycatch rates calculated for the at-sea sector based on observed catch rates through September 25, 2003. These data incomplete since all at-sea sectors still fishing after this date. Shoreside catches of overfished groundfish species are actual estimates through the entire 1998-2003 period. Estimated whiting mortality in non-whiting fisheries assumes a cumulative 2,000 mt impact in 2004. Tribal catch based on OY sliding scale. Non-tribal whiting fishery catch based on set allocations applied after tribal and non-whiting fishery impacts subtracted from the OY.
e/ Using observer data, all estimates from the Hastie trawl bycatch model.
f/ Mortality estimates are not hard numbers; based on the GMT's best professional judgement.
g/ 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.
h/ 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.
i/ This EFP could be converted into regulations in 2004.
j/ Based on participation of 12 vessels for 8 months.
k/ Either not applicable; trace amount (<0.01 mt); or not reported in available data sources.
l/ Bold values exceed the OY for the species under this alternative.

TABLE 2.2.3-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] analyzed under the *Medium OY* alternative. (Page 1 of 3)

<table>
<tr><th></th><th>JAN-FEB</th><th>MAR-APR</th><th>MAY-JUN</th><th>JUL-AUG</th><th>SEP-OCT</th><th>NOV-DEC</th></tr>
<tr><td colspan="7">Rockfish Conservation Area [j/] (RCA)</td></tr>
<tr><td>North of 40°10' N latitude</td><td>75 fm - 150 fm</td><td colspan="2">60 fm - 150 fm</td><td colspan="3">75 fm - 150 fm</td></tr>
<tr><td colspan="7">Small footrope or midwater trawl gear is required shoreward of the RCA; all trawl gear (large footrope, midwater trawl, and small footrope gear) is permitted seaward of the RCA.</td></tr>
<tr><td colspan="7">A vessel may have more than one type of limited entry bottom trawl gear on board, but the most restrictive trip limit associated with the gear on board applies for that trip and will count toward the cumulative trip limit for that gear. A vessel may not have limited entry bottom trawl gear on board if that vessel also has trawl gear on board that is permitted for use within a RCA, including limited entry midwater trawl gear, regardless of whether the vessel is intending to fish within a RCA on that fishing trip.</td></tr>
<tr><td>Minor slope rockfish [c/]</td><td colspan="6">1,800 lb/2 months</td></tr>
<tr><td>Pacific ocean perch</td><td colspan="6">3,000 lb/2 months</td></tr>
<tr><td colspan="7">DTS complex</td></tr>
<tr><td>Sablefish</td><td colspan="6">7,500 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 3,500 lb/2 months</td></tr>
<tr><td>Longspine thornyhead</td><td colspan="6">10,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the longspine thornyhead limit is 3,000 lb/2 months.</td></tr>
<tr><td>Shortspine thornyhead</td><td colspan="6">2,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the shortspoine thornyheads limit is 1,000 lb/2 months.</td></tr>
<tr><td>Dover sole</td><td colspan="6">26,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the Dover sole limit is 15,000 lb/2 months.</td></tr>
<tr><td colspan="7">Flatfish</td></tr>
<tr><td>All other flatfish [d/]</td><td>All other flatfish plus rex sole: 100,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 50,000 lb/2 months.</td><td colspan="4" rowspan="2">All other flatfish plus petrale & rex sole: 100,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 50,000 lb/2 months, no more than 20,000 lb/2 months of which may be petrale sole.</td><td>All other flatfish plus rex sole: 100,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 50,000 lb/2 months.</td></tr>
<tr><td>Petrale sole</td><td>Not limited</td><td>Not limited</td></tr>
<tr><td>Rex sole</td><td colspan="6">Included in all other flatfish</td></tr>
</table>

TABLE 2.2.3-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] analyzed under the *Medium OY* alternative. (Page 2 of 3)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Arrowtooth flounder	Not limited providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 5,000 lb/2 months		150,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 5,000 lb/2 months			Not limited providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 5,000 lb/2 months
Whiting [e/]	20,000 lb/trip		Primary Season (only mid-water trawl permitted in the RCA)		10,000 lb/trip	
Other Fish [i/]	Not limited					
Use of small footrope bottom trawl [g/] or mid-water trawl is required for landing all of the following species:						
Minor shelf rockfish and widow rockfish [c/]	300 lb/month		1,000 lb/month, no more than 200 lb/month of which may be yelloweye rockfish			300 lb/month
Widow rockfish						
mid-water trawl - permitted within the RCA	CLOSED [f/]		During primary whiting season, in trips of at least 10,000 lb of whiting: combined widow and yellowtail limit of 500 lb/trip, cumulative widow limit of 1,500 lb/month		CLOSED [f/]	12,000 lb/2 months
Canary rockfish	100 lb/month		300 lb/month		100 lb/month	
Yellowtail						
mid-water trawl - permitted within the RCA	CLOSED [f/]		During primary whiting season, in trips of at least 10,000 lb of whiting: combined widow and yellowtail limit of 500 lb/trip, cumulative yellowtail limit of 2,000 lb/month			18,000 lb/2 months
small footrope trawl [g/]	In landings without flatfish, 1,000 lb/month. As flatfish bycatch, per trip limit is the sum of 33% (by weight) of all flatfish except arrowtooth flounder, plus 10% (by weight) of arrowtooth flounder. Total yellowtail landings not to exceed 10,000 lb/2 months, no more than 1,000 lb of which may be landed without flatfish.					
Minor nearshore rockfish	300 lb/month					
Lingcod [h/]	800 lb/2 months		1,000 lb/2 months		800 lb/2 months	

TABLE 2.2.3-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] analyzed under the *Medium OY* alternative. (Page 3 of 3)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC

a/ Gear requirements and prohibitions are explained above.

b/ "North" means 40°10' N latitude to the U.S.-Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

c/ Bocaccio and chilipepper are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.

d/ "Other" flatfish means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.

e/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.

f/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.

g/ Small footrope trawl means a bottom trawl net with a footrope no larger than 8 inches (20 cm) in diameter.

h/ The minimum size limit for lingcod is 24 inches (61 cm) total length.

i/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.

j/ 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 that may vary seasonally.

TABLE 2.2.3-3. Trip limits and gear requirements[a/] for limited entry trawl gear south of 40°10' N latitude[b/] analyzed under the *Medium OY* alternative. (Page 1 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area [j/] (RCA):						
40°10' - 38° N latitude	100 fm - 150 fm					
South of 38° N latitude	100 fm - 150 fm					
Small footrope or midwater trawl gear is required shoreward of the RCA; all trawl gear (large footrope, midwater trawl, and small footrope gear) is permitted seaward of the RCA.						
A vessel may have more than one type of limited entry bottom trawl gear on board, but the most restrictive trip limit associated with the gear on board applies for that trip and will count toward the cumulative trip limit for that gear. A vessel may not have limited entry bottom trawl gear on board if that vessel also has trawl gear on board that is permitted for use within a RCA, including limited entry midwater trawl gear, regardless of whether the vessel is intending to fish within a RCA on that fishing trip.						
Minor slope rockfish [c/]						
40°10' - 38° N latitude	1,800 lb/2 months					
South of 38° N latitude	30,000 lb/2 months					
Splitnose						
40°10' - 38° N latitude	1,800 lb/2 months					
South of 38° N latitude	30,000 lb/2 months					
DTS complex						
Sablefish	7,500 lb/2 months					
Longspine thornyhead	10,000 lb /2 months					
Shortspine thornyhead	2,000 lb/2 months					
Dover sole	26,000 lb/2 months					
Flatfish						
All other flatfish [d/]	100,000 lb/2 months	All other flatfish plus petrale & rex sole: 100,000 lb/2 months, no more than 20,000 lb/2 months of which may be petrale sole.				100,000 lb/2 months
Petrale sole	No limit	All other flatfish plus petrale & rex sole: 100,000 lb/2 months, no more than 20,000 lb/2 months of which may be petrale sole.				No limit
Rex sole	Included in all other flatfish					
Arrowtooth flounder	No limit	10,000 lb/2 months				No limit
Whiting [e/]	20,000 lb/trip		Primary Season (only mid-water trawl permitted within the RCA)		10,000 lb/trip	
Other Fish [i/]	Not limited					

TABLE 2.2.3-3. Trip limits and gear requirements[a/] for limited entry trawl gear south of 40°10' N latitude[b/] analyzed under the *Medium OY* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Use of small footrope bottom trawl [g/] or mid-water trawl is required for landing all of the following species:						
Minor shelf rockfish, widow, and chilipepper rockfish [c/]	300 lb/month					
Widow rockfish						
mid-water trawl - permitted within the RCA	CLOSED [f/]					
Canary rockfish	100 lb/month		300 lb/month		100 lb/month	
Bocaccio	CLOSED [f/]					
Cowcod	CLOSED [f/]					
Minor nearshore rockfish	300 lb/month					
Lingcod [h/]	800 lb/2 months		1,000 lb/2 months		800 lb/2 months	

a/ Gear requirements and prohibitions are explained above.
b/ "South" means 40°10' N latitude to the U.S.-Mexico border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.
c/ Yellowtail is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.
d/ "Other" flatfish means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
e/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.
f/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
g/ Small footrope trawl means a bottom trawl net with a footrope no larger than 8 inches (20 cm) in diameter.
h/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
i/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
j/ 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 that may vary seasonally.

TABLE 2.2.3-4. Trip limits for limited entry fixed gear north of 40°10' N latitude[a/] analyzed under the *Medium OY* alternative.
Page (1 of 1)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area [h/] (RCA):						
North of 46°16' N. lat.	shoreline - 100 fm					
46°16' N. lat. - 40°10' N lat.	30 fm - 100 fm					
Minor slope rockfish [d/]	4,000 lb/2 months					
Pacific ocean perch	1,800 lb/2 months					
Sablefish	300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months					
Longspine thornyhead	10,000 lb/2 months					
Shortspine thornyhead	2,100 lb/2 months					
Dover sole	5,000 lb/month					
Arrowtooth flounder						
Petrale sole						
Rex sole						
All other flatfish [b/]						
Whiting [c/]	10,000 lb/trip					
Minor shelf rockfish, widow, and yellowtail rockfish [d/]	200 lb/month					
Canary rockfish	CLOSED [e/]					
Yelloweye rockfish	CLOSED [e/]					
Cowcod	CLOSED [e/]					
Minor nearshore rockfish	5,000 lb/2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [f/]					
Lingcod [g/]	CLOSED [e/]		400 lb/month			CLOSED [e/]
Other fish [i/]	Not limited					

a/ "North" means 40°10' N latitude to the U.S.-Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.

c/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.

d/ Bocaccio and chilipepper are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.

e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.

f/ For black rockfish north of Cape Alava (48°09'30" N latitude), and between Destruction Island (47°40'00" N latitude) and Leadbetter Point (46°38'10" N latitude), there is an additional limit of 100 lb or 30% by weight of all fish on board, whichever is greater, per vessel, per fishing trip.

g/ The minimum size limit for lingcod is 24 inches (61 cm) total length.

h/ 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 that may vary seasonally.

i/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.

TABLE 2.2.3-5. Trip limits for limited entry fixed gear south of 40°10' N latitude[a/] analyzed under the *Medium OY* alternative. Page (1 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area g/ (RCA):						
40°10' - 34°27' N latitude	20 fm - 150 fm (also applies around islands)		30 fm - 150 fm (also applies around islands)			20 fm - 150 fm (also applies around islands)
South of 34°27' N. lat.	80 fm - 150 fm (also applies around islands)					
Minor slope rockfish [d/]						
40°10' - 38° N. lat.	7,000 lb/2 months					
South of 38°' N. lat.	40,000 lb/2 months					
Splitnose						
	7,000 lb/2 months					
	40,000 lb/2 months					
Sablefish						
40°10' - 36° N. lat.	300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months					
South of 36°' N. lat.	350 lb/day, or 1 landing per week of up to 1,050 lb					
Longspine thornyhead	10,000 lb/2 months					
Shortspine thornyhead	2,000 lb/2 months					
Dover sole **Arrowtooth flounder** **Petrale sole** **Rex sole** **All other flatfish [b/]**	5,000 lb/month When fishing for Pacific sanddabs, vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to 1 lb (0.45 kg) of weight per line are not subject to the RCAs.					
Whiting [c/]	10,000 lb/trip					
Minor shelf rockfish, widow, and yellowtail rockfish [d/]						
40°10' - 34°27' N. lat.	300 lb/2 months	CLOSED [e/]	200 lb/2 months		300 lb/2 months	
South of 34°27' N. lat.	CLOSED [e/]	2,000 lb/2 months				
Chilipepper rockfish	2,000 lb/2 months, this opportunity only available seaward of the nontrawl RCA					
Canary rockfish	CLOSED [e/]					
Yelloweye rockfish	CLOSED [e/]					
Cowcod	CLOSED [e/]					
Bocaccio						
40°10' - 34°27' N. lat.	200 lb/2 months	CLOSED [e/]	100 lb/2 months		200 lb/2 months	
South of 34°27' N. lat.	CLOSED [e/]	300 lb/2 months				

TABLE 2.2.3-5. Trip limits for limited entry fixed gear south of 40°10' N latitude[a/] analyzed under the *Medium OY* alternative. Page (2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Minor nearshore rockfish						
Shallow nearshore						
40°10' - 34°27' N. lat.	300 lb/2 months	CLOSED [e/]	500 lb/2 months	600 lb/2 months	500 lb/2 months	300 lb/2 months
South of 34°27' N. lat.	CLOSED [e/]	300 lb/2 months				
Deep nearshore						
40°10' - 34°27' N. lat.	500 lb/2 months	CLOSED [e/]	500 lb/2 months		400 lb/month	500 lb/2 months
South of 34°27' N. lat.	CLOSED [e/]	500 lb/2 months	600 lb/2 months			400 lb/2 months
California scorpionfish	CLOSED [e/]	300 lb/2 months		400 lb/2 months		300 lb/2 months
Lingcod [f/]	CLOSED [e/]		400 lb/month, when nearshore open			CLOSED [e/]
Other fish [h/]	Not limited					

a/ "South" means 40°10' N latitude to the U.S.-Mexico border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.

c/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.

d/ Chilipepper rockfish is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.

e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.

f/ The minimum size limit for lingcod is 24 inches (61 cm) total length.

g/ 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 that may vary seasonally.

h/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.

TABLE 2.2.3-6. Trip limits for open access gears north of 40°10' N latitude[a/] analyzed under the *Medium OY* alternative. (Page 1 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area [h/] (RCA):						
North of 46°16' N. lat.	shoreline - 100 fm					
46°16' N. lat. - 40°10' N. lat.	30 fm - 100 fm					
Minor slope rockfish [b/]	Per trip, no more than 25% of weight of the sablefish landed					
Pacific ocean perch	100 lb/month					
Sablefish	300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months					
Thornyheads	CLOSED [e/]					
Dover sole	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs.					
Arrowtooth flounder						
Petrale sole						
Rex sole						
All other flatfish [c/]						
Whiting	300 lb/month					
Minor shelf rockfish, widow and yellowtail rockfish [b/]	200 lb/month					
Canary rockfish	CLOSED [e/]					
Yelloweye rockfish	CLOSED [e/]					
Cowcod	CLOSED [e/]					
Minor nearshore rockfish	5,000 lb/2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [d/]					
Lingcod [f/]	CLOSED [e/]		300 lb/month			CLOSED [e/]
Other Fish [g/]	Not limited					
PINK SHRIMP EXEMPTED TRAWL ***(not subject to RCAs)***						
North	Effective April 1 - October 31, 2004: 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.					

TABLE 2.2.3-6. Trip limits for open access gears north of 40°10' N latitude[a/] analyzed under the *Medium OY* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
SALMON TROLL						
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.					

a/ "North" means 40°10' N latitude to the U.S./Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ Bocaccio and chilipepper rockfishes are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.

c/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.

d/ For black rockfish north of Cape Alava (48°09'30" N latitude), and between Destruction Island (47°40' N latitude) and Leadbetter Point (46°38'10" N latitude), there is an additional limit of 100 lbs or 30% by weight of all fish on board, whichever is greater, per vessel, per fishing trip.

e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.

f/ The size limit for lingcod is 24 inches (61 cm) total length.

g/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.

h/ 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 that may vary seasonally.

TABLE 2.2.3-7. Trip limits for open access gears south of 40°10' N latitude[a/] analyzed under the *Medium OY* alternative. (Page 1 of 2)

<table>
<tr><th></th><th>JAN-FEB</th><th>MAR-APR</th><th>MAY-JUN</th><th>JUL-AUG</th><th>SEP-OCT</th><th>NOV-DEC</th></tr>
<tr><td colspan="7">Rockfish Conservation Area [g/] (RCA):</td></tr>
<tr><td>40°10' - 34°27' N. lat.</td><td colspan="2">20 fm - 150 fm (also applies around islands)</td><td colspan="3">30 fm - 150 fm (also applies around islands)</td><td>20 fm - 150 fm (also applies around islands)</td></tr>
<tr><td>South of 34°27' N. lat.</td><td colspan="6">80 fm - 150 fm (also applies around islands)</td></tr>
<tr><td colspan="7">Minor slope rockfish [b/]</td></tr>
<tr><td>40°10' - 38° N. lat.</td><td colspan="6">Per trip, no more than 25% of weight of the sablefish landed</td></tr>
<tr><td>South of 38° N. lat.</td><td colspan="6">10,000 lb/2 months</td></tr>
<tr><td>Splitnose</td><td colspan="6">200 lb/month</td></tr>
<tr><td colspan="7">Sablefish</td></tr>
<tr><td>40°10' - 36° N. lat.</td><td colspan="6">300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months</td></tr>
<tr><td>South of 36° N. lat.</td><td colspan="6">350 lb/day, or 1 landing per week of up to 1,050 lb</td></tr>
<tr><td colspan="7">Thornyheads</td></tr>
<tr><td>40°10' - 34°27' N. lat.</td><td colspan="6">CLOSED [e/]</td></tr>
<tr><td>South of 34°27' N. lat.</td><td colspan="6">50 lb/day, no more than 1,000 lb/2 months</td></tr>
<tr><td>Dover sole</td><td colspan="6" rowspan="5">3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs. When fishing for Pacific sanddabs, vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to 1 lb of weight per line are not subject to the RCAs.</td></tr>
<tr><td>Arrowtooth flounder</td></tr>
<tr><td>Petrale sole</td></tr>
<tr><td>Rex sole</td></tr>
<tr><td>All other flatfish [c/]</td></tr>
<tr><td>Whiting</td><td colspan="6">300 lb/month</td></tr>
<tr><td colspan="7">Minor shelf rockfish, widow and chilipepper rockfish [b/]</td></tr>
<tr><td>40°10' - 34°27' N. lat.</td><td>300 lb/2 months</td><td>CLOSED [e/]</td><td colspan="2">200 lb/2 months</td><td colspan="2">300 lb/2 months</td></tr>
<tr><td>South of 34°27' N. lat.</td><td>CLOSED [e/]</td><td colspan="5">500 lb/2 months</td></tr>
<tr><td>Canary rockfish</td><td colspan="6">CLOSED [e/]</td></tr>
<tr><td>Yelloweye rockfish</td><td colspan="6">CLOSED [e/]</td></tr>
<tr><td>Cowcod</td><td colspan="6">CLOSED [e/]</td></tr>
<tr><td colspan="7">Bocaccio</td></tr>
<tr><td>40°10' - 34°27' N. lat.</td><td>200 lb/2 months</td><td>CLOSED [e/]</td><td colspan="2">100 lb/2 months</td><td colspan="2">200 lb/2 months</td></tr>
<tr><td>South of 34°27' N. lat.</td><td>CLOSED [e/]</td><td colspan="5">100 lb/2 months</td></tr>
<tr><td colspan="7">Minor nearshore rockfish</td></tr>
<tr><td colspan="7">Shallow nearshore</td></tr>
<tr><td>40°10' - 34°27' N. lat.</td><td>300 lb/2 months</td><td>CLOSED [e/]</td><td rowspan="2">500 lb/2 months</td><td rowspan="2">600 lb/2 months</td><td rowspan="2">500 lb/2 months</td><td rowspan="2">300 lb/2 months</td></tr>
<tr><td>South of 34°27' N. lat.</td><td>CLOSED [e/]</td><td>300 lb/2 months</td></tr>
</table>

TABLE 2.2.3-7. Trip limits for open access gears south of 40°10' N latitude[a/] analyzed under the *Medium OY* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Deep nearshore						
40°10' - 34°27' N. lat.	500 lb/2 months	CLOSED [e/]	500 lb/2 months		400 lb/month	500 lb/2 months
South of 34°27' N. lat.	CLOSED [e/]	500 lb/2 months	600 lb/2 months			400 lb/2 months
California scorpionfish	CLOSED [e/]	300 lb/2 months		400 lb/2 months		300 lb/2 months
Lingcod [d/]	CLOSED [e/]		300 lb/month, when nearshore open			CLOSED [e/]
Other Fish [f/]	Not limited					
PINK SHRIMP EXEMPTED TRAWL GEAR ***(not subject to RCAs)***						
South	Effective April 1 - October 31, 2004: 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.					
PRAWN AND, SOUTH OF 38°57'30" N LATITUDE, CALIFORNIA HALIBUT AND SEA CUCUMBER EXEMPTED TRAWL						
EXEMPTED TRAWL Rockfish Conservation Area g/ (RCA):						
40°10' - 38° N. lat.	75 fm - 150 fm		100 fm - 150 fm		75 fm - 150 fm	
South of 38° 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	
	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 38o57'30" N latitude 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 25).					

a/ "South" means 40°10' N latitude to the U.S.-Mexico border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.
b/ Yellowtail rockfish is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.
c/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
d/ The size limit for lingcod is 24 inches (61 cm) total length.
e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
f/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
g/ 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 that may vary seasonally.

2.2.4 The High OY Alternative

The *High OY* alternative represents the most liberal harvest specifications and management measures analyzed in this EIS for the 2004 West Coast groundfish fishery. These specifications and management measures were generally decided by the Council at its June 2003 meeting and subsequently refined by the GMT. The estimated mortality of overfished groundfish species under the *High OY* alternative are shown in Table 2.2.4-1. A description of the *High OY* alternative by fishery sector follows.

2.2.4.1 Limited Entry Trawl

Trip limits, cumulative landing limits, and the depth lines describing the trawl RCA by two-month period under the *High OY* alternative for 2004 are shown in Tables 2.2.4-2 and 2.2.4-3 for the limited entry trawl fishery north and south of 40°10' N latitude, respectively.

Non-Whiting Trawl

The limited entry trawl fishery would be constrained under the *High OY* alternative to waters deeper than a line specified by latitude/longitude waypoints approximating 150 fm coastwide. Shallow water opportunities north of 40°10' N latitude inside 75 fm, except periods 2 and 3 when the RCA is extended inshore to 60 fm, would be available to trawlers using small footropes to access shelf flatfish species. The 75 fm to 150 fm depth zone would be closed year-round to trawling to protect overfished shelf and slope rockfish species.

The limited entry trawl RCA south of 40°10' N latitude would be extended offshore to a specified line approximating 150 fm to protect bocaccio, canary rockfish, cowcod, and other overfished groundfish species inhabiting the shelf off California. Inshore opportunities to target shelf flatfish would be provided by allowing trawl vessels to fish from the bounds of the California state jurisdiction at three miles offshore to a line approximating 100 fm year round.

As in 2003, the *High OY* alternative specifies smaller trip limits north of 40°10' N latitude for DTS species for trawlers forced to use small footropes when fishing inshore of the trawl RCA. The larger limits allowed for trawlers fishing offshore of the RCA using large footropes are designed to provide an incentive for trawlers to fish deeper and avoid overfished groundfish species (particularly canary rockfish) residing on the shelf. The smaller DTS limits would apply for the entire two-month cumulative limit period if DTS species were landed using small footrope gear.

Whiting Trawl

The U.S. portion of the total catch Pacific whiting OY under the *High OY* alternative is 222,300 mt. This OY was apportioned among commercial sectors according to the allocations in federal regulations (50 CFR 660.306 and 550 CFR 660.323(a)(4). The tribal allocation was based on the sliding scale methodology that has been in use since 1999, which specifies tribal allocation relative to incremental changes to the U.S. whiting OY. The *High OY* tribal whiting allocation is 30,000 mt based on this methodology, which was taken off the top of the U.S. OY. An additional 2,000 mt of whiting was set-aside to accommodate bycatch in non-whiting fisheries and 1,000 mt to accommodate a cap for a WDFW-sponsored pollock EFP to derive the non-tribal commercial OY of 189,300 mt. This commercial OY was allocated 34% (64,362 mt) to the catcher-processor sector, 24% (45,432 mt) to the mothership sector, and 42% (79,506 mt) to the shoreside sector.

2.2.4.2 *Limited Entry Fixed Gear*

Trip limits, cumulative landing limits, and the depth lines describing the nontrawl RCA by two-month period under the *High OY* alternative for 2004 are shown in Tables 2.2.4-4 and 2.2.4-5 for the limited entry fixed gear fishery north and south of 40°10' N latitude, respectively.

All the nearshore commercial seasons and depth restrictions by region would be the same as for the recreational fishery (see Section 2.2.4.7). A 150-pound bocaccio trip limit is specified under the *High OY* alternative for nearshore commercial fisheries south of Cape Mendocino. There would be a specified cabezon slot limit of 15 inches to 22 inches and the greenling minimum size limit would be 12 inches.

2.2.4.3 *Open Access*

Trip limits, cumulative landing limits, and the depth lines describing the nontrawl RCA by two-month period under the *High OY* alternative for 2004 are shown in Tables 2.2.4-6 and 2.2.4-7 for open access gears north and south of 40°10' N latitude, respectively.

2.2.4.4 *Tribal Fisheries*

Tribal groundfish allocations and harvest guidelines under the *High OY* alternative are the same as described for the other alternatives, except for Pacific whiting which is based on a sliding scale proportioned to the U.S. whiting OY, and sablefish which is 10% of the proportion of the coastwide OY north of 36° N latitude. The tribal Pacific whiting harvest guideline is 30,000 mt under the *High OY* alternative. The sablefish harvest guideline is 781 mt, which assumes a 3.79% average discard mortality rate for tribal trawl and fixed gear fisheries.

2.2.4.5 *Washington Recreational*

The Washington recreational groundfish fishery regulations under the *High OY* alternative would be the same as status quo except for the following changes:

- The lingcod season changes from March 16 through October 15 to the Saturday closest to March 16 through the Sunday closest to October 15.
- The nearshore line of 25 fm (used in inseason management to restrict depths where the recreational fishery would operate if the canary or yelloweye rockfish harvest guideline is projected to be attained early) would change to a 30 fm line; an inseason depth restriction would apply only in specific high bycatch areas.

2.2.4.6 *Oregon Recreational*

The Oregon recreational groundfish fishery regulations under the *High OY* alternative would be the same as status quo except for the following changes:

- Groundfish open year round with no depth restrictions except during July when the fishery is open only inside 50 fm.
- A 10-inch minimum size limit is established for greenling species.

2.2.4.7 California Recreational

U.S./Mexico Border to Pt. Conception

The California recreational groundfish fishery regulations south of Pt. Conception under the *High OY* alternative would be the same as status quo except for the following changes:

- Groundfish open year round without depth restrictions.
- The bocaccio sublimit is increased from no retention to two fish per day.
- The canary rockfish sublimit is increased from no retention to one fish per day.
- A cabezon slot limit of 15 inches to 22 inches is established.

Pt. Conception to Pt. San Pedro

The California recreational groundfish fishery regulations for the area between Pt. Conception and Pt. San Pedro under the *High OY* alternative would be the same as status quo except for the following changes:

- Groundfish open March through December inside 30 fm.
- The bocaccio sublimit is increased from no retention to two fish per day.
- The canary rockfish sublimit is increased from no retention to one fish per day.
- A cabezon slot limit of 15 inches to 22 inches is established.

Pt. San Pedro to Cape Mendocino

The California recreational groundfish fishery regulations for the area between Pt. San Pedro and Cape Mendocino under the *High OY* alternative would be the same as described for the area between Pt. Conception and Pt. San Pedro.

Cape Mendocino to the California/Oregon Border

The California recreational groundfish fishery regulations for the area between Cape Mendocino and the California/Oregon border under the *High OY* alternative would be the same as status quo except for the following changes:

- Groundfish open year round inside 30 fm.
- The canary rockfish sublimit is increased from no retention to one fish per day.
- The yelloweye sublimit is increased from no retention to one fish per day.
- A cabezon slot limit of 15 inches to 22 inches is established.

TABLE 2.2.4-1. Estimated mortality (mt) of overfished West Coast groundfish species by fishery in 2004 under the *High OY* alternative. (Page 1 of 2)

Fishery	Bocaccio [a/]	Canary	Cowcod	Darkblotched [b/]	Lingcod [c/]	POP	Whiting [d/]	Widow	Yelloweye
Limited Entry Groundfish									
Trawl- Non-whiting [e/]	45.5	10.4	1.2	166.1	90.2	119.1	[k/]	2.1	0.5
Fixed Gear	13.4	0.5	0.1	1.5	12.7	0.2	[k/]	30.0	0.1
Whiting									
At-sea whiting motherships	[k/]	1.1	[k/]	4.2	0.3	3.2	51,120	78.9	0.0
At-sea whiting cat-proc	[k/]	1.1	[k/]	7.6	0.3	11.6	72,420	122.0	0.0
Shoreside whiting	[k/]	0.5	[k/]	1.2	0.7	6.1	88,460	121.4	0.0
Tribal whiting	[k/]	5.8	[k/]	0.0	0.6	1.5	35,000	29.8	0.0
Open Access									
Groundfish directed	10.6	0.3	0.1	[k/]	62.5	[k/]	[k/]	[k/]	0.6
CA Halibut	0.1	[k/]	[k/]	0.0	2.0	0.0	[k/]	[k/]	[k/]
CA Gillnet [f/]	0.5	[k/]	[k/]	0.0	[k/]	0.0	0.0	0.0	[k/]
CA Sheephead [f/]	[k/]	[k/]	[k/]	0.0	[k/]	0.0	0.0	0.0	0.0
Coastal pelagic species- wetfish [f/]	0.3	[k/]	[k/]	[k/]	[k/]	[k/]	[k/]	[k/]	[k/]
Coastal pelagic species- squid [g/]	[k/]	[k/]	[k/]	[k/]	[k/]	[k/]	[k/]	[k/]	[k/]
Dungeness crab [f/]	0.0	[k/]	0.0	0.0	[k/]	0.0	[k/]	[k/]	[k/]
Highly migratory species [f/]	[k/]	0.0	0.0	0.0	[k/]	[k/]	[k/]	[k/]	[k/]
Pacific Halibut [f/]	0.0	[k/]	0.0	0.0	[k/]	0.0	[k/]	0.0	0.5
Pink shrimp	0.1	0.5	0.0	0.0	0.5	0.0	1.0	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	1.6	0.0	0.0	0.3	0.0	[k/]	0.0	0.2
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)	[k/]	[k/]	[k/]	[k/]	[k/]	[k/]	[k/]	[k/]	[k/]
Tribal									
Midwater Trawl	[k/]	2.3	[k/]	0.0	0.1	0.0	[k/]	40.0	0.0
Bottom Trawl	[k/]	0.5	[k/]	0.0	9.0	0.0	[k/]	0.0	0.0
Troll	[k/]	0.5	[k/]	0.0	1.0	0.0	[k/]	[k/]	0.0
Fixed gear	[k/]	0.3	[k/]	0.0	15.0	0.0	[k/]	0.0	2.3
Recreational Groundfish									
WA	[k/]	1.5	[k/]	[k/]	35.0	[k/]	[k/]	[k/]	3.5
OR	[k/]	9.2	[k/]	[k/]	96.0	[k/]	[k/]	2.4	3.8
CA (N)	[k/]	0.5	[k/]	[k/]	195.0	[k/]	[k/]	1.0	0.1
CA (S)	125.9	16.2	4.6	[k/]	161.5	[k/]	[k/]	0.4	1.2
Research: Based on 2 most recent NMFS trawl shelf and slope surveys, the IPHC halibut survey, and LOAs with expanded estimates for south of Pt. Conception.									
	2.0	1.0	[k/]	1.6	3.0	3.0	200	1.5	1.1
Non-EFP Total	198.7	53.7	6.0	182.2	685.6	144.7	[k/]	429.7	14.1

TABLE 2.2.4-1. Estimated mortality (mt) of overfished West Coast groundfish species by fishery in 2004 under the *High OY* alternative. (Page 2 of 2)

Fishery	Bocaccio [a/]	Canary	Cowcod	Darkblotched [b/]	Lingcod [c/]	POP	Whiting [d/]	Widow	Yelloweye
EFPs [h/]									
CA: Nearshore flatfish trawl [i/]	0.5	0.5	0.2	k/	20.0	k/	k/	k/	0.5
CA: Commercial passenger fishing vessel	3.1	2.5	0.3	k/	2.4	k/	k/	k/	1.4
OR: Selective flatfish trawl [i/] j/	k/	4.0	k/	3.1	24.0	k/	k/	1.0	1.7
WA: Arrowtooth flounder trawl [i/]	k/	2.5	k/	3.0	2.0	18.0	k/	3.0	0.5
WA: Dogfish longline	k/	0.1	k/	0.5	2.0	0.5	k/	0.5	1.0
WA: Pollock	k/	0.1	k/	k/	k/	k/	1,000	3.0	0.1
WA: Nearshore flatfish trawl [i/]	k/	1.0	k/	3.0	2.0	k/	k/	1.0	0.1
EFP Subtotal	3.6	10.7	0.5	9.6	52.4	18.5	1,000	8.5	5.3
TOTAL [l/]	202.3	**64.4**	**6.5**	191.8	**738.0**	163.2	250,000	438.2	19.4
2004 OY	526	46	4.8	247	735	555	250,000	501	22

a/ South of 40/10' N latitude

b/ Darkblotched harvest limit ("2004 OY" in this table) is the ABC of 247 mt, which is lower than the projected OY of 364 mt under the *High OY* alternative.

c/ Lingcod total reflects total catch, not mortality.

d/ Catch estimates of overfished non-whiting groundfish species based on average annual bycatch rates during 1998-2003. 2003 bycatch rates calculated for the at-sea sector based on observed catch rates through September 25, 2003. These data incomplete since all at-sea sectors still fishing after this date. Shoreside catches of overfished groundfish species are actual estimates through the entire 1998-2003 period. Estimated whiting mortality in non-whiting fisheries assumes a cumulative 2,000 mt impact in 2004. Tribal catch based on OY sliding scale. Non-tribal whiting fishery catch based on set allocations applied after tribal and non-whiting fishery impacts subtracted from the OY.

e/ Using observer data, all estimates from the Hastie trawl bycatch model.

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

g/ 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.

h/ 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.

i/ This EFP could be converted into regulations in 2004.

j/ Based on participation of 12 vessels for 8 months.

k/ Either not applicable; trace amount (<0.01 mt); or not reported in available data sources.

l/ Bold values exceed the OY for the species under this alternative.

TABLE 2.2.4-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] analyzed under the High OY alternative. (Page 1 of 3)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area [j/] (RCA):						
North of 40°10' N latitude	75 fm - 150 fm	60 fm - 150 fm		75 fm - 150 fm		
Small footrope [g/] or midwater trawl gear is required shoreward of the RCA; all trawl gear (large footrope, midwater trawl, and small footrope gear) is permitted seaward of the RCA.						
A vessel may have more than one type of limited entry bottom trawl gear on board, but the most restrictive trip limit associated with the gear on board applies for that trip and will count toward the cumulative trip limit for that gear. A vessel may not have limited entry bottom trawl gear on board if that vessel also has trawl gear on board that is permitted for use within a RCA, including limited entry midwater trawl gear, regardless of whether the vessel is intending to fish within a RCA on that fishing trip.						
Minor slope rockfish [c/]	1,800 lb/2 months					
Pacific ocean perch	3,000 lb/2 months					
DTS complex						
Sablefish	8,200 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 4,000 lb/2 months					
Longspine thornyhead	10,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the longspine thornyhead limit is 3,000 lb/2 months.					
Shortspine thornyhead	2,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the shortspoine thornyheads limit is 1,000 lb/2 months.					
Dover sole	26,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the Dover sole limit is 15,000 lb/2 months.					

TABLE 2.2.4-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] analyzed under the High OY alternative. (Page 2 of 3)

<table>
<tr><th></th><th>JAN-FEB</th><th>MAR-APR</th><th>MAY-JUN</th><th>JUL-AUG</th><th>SEP-OCT</th><th>NOV-DEC</th></tr>
<tr><td colspan="7">Flatfish</td></tr>
<tr><td>All other flatfish [d/]</td><td>All other flatfish plus rex sole: 100,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 50,000 lb/2 months.</td><td colspan="4" rowspan="2">All other flatfish plus petrale & rex sole: 100,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 50,000 lb/2 months, no more than 20,000 lb/2 months of which may be petrale sole.</td><td>All other flatfish plus rex sole: 100,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 50,000 lb/2 months.</td></tr>
<tr><td>Petrale sole</td><td>Not limited</td><td>Not limited</td></tr>
<tr><td>Rex sole</td><td colspan="6">Included in all other flatfish</td></tr>
<tr><td>Arrowtooth flounder</td><td colspan="2">Not limited providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 5,000 lb/2 months</td><td colspan="3">150,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 5,000 lb/2 months</td><td>Not limited providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 5,000 lb/2 months</td></tr>
<tr><td>Whiting [e/]</td><td colspan="2">20,000 lb/trip</td><td colspan="2">Primary Season (only mid-water trawl permitted in the RCA)</td><td colspan="2">10,000 lb/trip</td></tr>
<tr><td>Other Fish [i/]</td><td colspan="6">Not limited</td></tr>
<tr><td colspan="7">Use of small footrope bottom trawl [g/] or mid-water trawl is required for landing all of the following species:</td></tr>
<tr><td>Minor shelf rockfish and widow rockfish [c/]</td><td colspan="2">300 lb/month</td><td colspan="3">1,000 lb/month, no more than 200 lb/month of which may be yelloweye rockfish</td><td>300 lb/month</td></tr>
</table>

TABLE 2.2.4-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] analyzed under the High OY alternative. (Page 3 of 3)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Widow rockfish						
mid-water trawl - permitted within the RCA	CLOSED [f/]		During primary whiting season, in trips of at least 10,000 lb of whiting: combined widow and yellowtail limit of 500 lb/trip, cumulative widow limit of 1,500 lb/month		CLOSED [f/]	12,000 lb/2 months
Canary rockfish	100 lb/month		300 lb/month		100 lb/month	
Yellowtail						
mid-water trawl - permitted within the RCA	CLOSED [f/]		During primary whiting season, in trips of at least 10,000 lb of whiting: combined widow and yellowtail limit of 500 lb/trip, cumulative yellowtail limit of 2,000 lb/month			18,000 lb/2 months
small footrope trawl [g/]	In landings without flatfish, 1,000 lb/month. As flatfish bycatch, per trip limit is the sum of 33% (by weight) of all flatfish except arrowtooth flounder, plus 10% (by weight) of arrowtooth flounder. Total yellowtail landings not to exceed 10,000 lb/2 months, no more than 1,000 lb of which may be landed without flatfish.					
Minor nearshore rockfish	300 lb/month					
Lingcod [h/]	800 lb/2 months		1,000 lb/2 months		800 lb/2 months	

a/ Gear requirements and prohibitions are explained above.
b/ "North" means 40°10' N latitude to the U.S.-Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

c/ Bocaccio and chilipepper are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.
d/ "Other" flatfish means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
e/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.
f/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
g/ Small footrope trawl means a bottom trawl net with a footrope no larger than 8 inches (20 cm) in diameter.
h/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
i/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
j/ 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 that may vary seasonally.

TABLE 2.2.4-3. Trip limits and gear requirements[a/] for limited entry trawl gear south of 40°10' N latitude[b/] analyzed under the *High OY* alternative. (Page 1 of 2)

<table>
<tr><th></th><th>JAN-FEB</th><th>MAR-APR</th><th>MAY-JUN</th><th>JUL-AUG</th><th>SEP-OCT</th><th>NOV-DEC</th></tr>
<tr><td colspan="7">Rockfish Conservation Area j/ (RCA):</td></tr>
<tr><td>40°10' - 38° N latitude</td><td colspan="6" rowspan="2">100 fm - 150 fm</td></tr>
<tr><td>South of 38° N latitude</td></tr>
<tr><td colspan="7">Small footrope or midwater trawl gear is required shoreward of the RCA; all trawl gear (large footrope, midwater trawl, and small footrope gear) is permitted seaward of the RCA.</td></tr>
<tr><td colspan="7">A vessel may have more than one type of limited entry bottom trawl gear on board, but the most restrictive trip limit associated with the gear on board applies for that trip and will count toward the cumulative trip limit for that gear. A vessel may not have limited entry bottom trawl gear on board if that vessel also has trawl gear on board that is permitted for use within a RCA, including limited entry midwater trawl gear, regardless of whether the vessel is intending to fish within a RCA on that fishing trip.</td></tr>
<tr><td colspan="7">Minor slope rockfish [c/]</td></tr>
<tr><td>40°10' - 38° N latitude</td><td colspan="6">1,800 lb/2 months</td></tr>
<tr><td>South of 38° N latitude</td><td colspan="6">30,000 lb/2 months</td></tr>
<tr><td colspan="7">Splitnose</td></tr>
<tr><td>40°10' - 38° N latitude</td><td colspan="6">1,800 lb/2 months</td></tr>
<tr><td>South of 38° N latitude</td><td colspan="6">30,000 lb/2 months</td></tr>
<tr><td colspan="7">DTS complex</td></tr>
<tr><td>Sablefish</td><td colspan="6">8,200 lb/2 months</td></tr>
<tr><td>Longspine thornyhead</td><td colspan="6">10,000 lb /2 months</td></tr>
<tr><td>Shortspine thornyhead</td><td colspan="6">2,000 lb/2 months</td></tr>
<tr><td>Dover sole</td><td colspan="6">26,000 lb/2 months</td></tr>
<tr><td colspan="7">Flatfish</td></tr>
<tr><td>All other flatfish [d/]</td><td>100,000 lb/2 months</td><td colspan="4" rowspan="2">All other flatfish plus petrale & rex sole: 100,000 lb/2 months, no more than 20,000 lb/2 months of which may be petrale sole.</td><td>100,000 lb/2 months</td></tr>
<tr><td>Petrale sole</td><td>No limit</td><td>No limit</td></tr>
<tr><td>Rex sole</td><td colspan="6">Included in all other flatfish</td></tr>
<tr><td>Arrowtooth flounder</td><td>No limit</td><td colspan="4">10,000 lb/2 months</td><td>No limit</td></tr>
<tr><td>Whiting [e/]</td><td colspan="2">20,000 lb/trip</td><td colspan="2">Primary Season (only mid-water trawl permitted within the RCA)</td><td colspan="2">10,000 lb/trip</td></tr>
<tr><td>Other Fish [i/]</td><td colspan="6">Not limited</td></tr>
</table>

TABLE 2.2.4-3. Trip limits and gear requirements[a/] for limited entry trawl gear south of 40°10' N latitude[b/] analyzed under the *High OY* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Use of small footrope bottom trawl [g/] or mid-water trawl is required for landing all of the following species:						
Minor shelf rockfish, widow, and chilipepper rockfish [c/]	300 lb/month					
Widow rockfish						
mid-water trawl - permitted within the RCA	CLOSED [f/]					12, 000 lb/2 months
Canary rockfish	100 lb/month		300 lb/month		100 lb/month	
Bocaccio	CLOSED [f/]					
Cowcod	CLOSED [f/]					
Minor nearshore rockfish	300 lb/month					
Lingcod [h/]	800 lb/2 months		1,000 lb/2 months		800 lb/2 months	

a/ Gear requirements and prohibitions are explained above.
b/ "South" means 40°10' N latitude to the U.S.-Mexico border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.
c/ Yellowtail is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.
d/ "Other" flatfish means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
e/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.
f/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
g/ Small footrope trawl means a bottom trawl net with a footrope no larger than 8 inches (20 cm) in diameter.
h/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
i/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
j/ 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 that may vary seasonally.

TABLE 2.2.4-4. Trip limits for limited entry fixed gear north of 40°10' N latitude[a/] analyzed under the *High OY* alternative. (Page 1 of 1)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area [h/] (RCA):						
North of 46°16' N. lat.	shoreline - 100 fm					
46°16' N. lat. - 40°10' N. lat.	30 fm - 100 fm					
Minor slope rockfish [d/]	4,000 lb/2 months					
Pacific ocean perch	1,800 lb/2 months					
Sablefish	300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months.					
Longspine thornyhead	10,000 lb/2 months					
Shortspine thornyhead	2,100 lb/2 months					
Dover sole	5,000 lb/month					
Arrowtooth flounder						
Petrale sole						
Rex sole						
All other flatfish [b/]						
Whiting [c/]	10,000 lb/trip					
Minor shelf rockfish, widow, and yellowtail rockfish [d/]	200 lb/month					
Canary rockfish	CLOSED [e/]					
Yelloweye rockfish	CLOSED [e/]					
Cowcod	CLOSED [e/]					
Minor nearshore rockfish	5,000 lb/2 months, no more than 1,200 lb of which may be species other than black or blue rockfish f/					
Lingcod [g/]	CLOSED [e/]		400 lb/month			CLOSED [e/]
Other fish [i/]	Not limited					

a/ "North" means 40°10' N latitude to the U.S.-Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.

c/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.

d/ Bocaccio and chilipepper are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.

e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.

f/ For black rockfish north of Cape Alava (48°09'30" N latitude), and between Destruction Island (47°40'00" N latitude) and Leadbetter Point (46°38'10" N latitude), there is an additional limit of 100 lb or 30% by weight of all fish on board, whichever is greater, per vessel, per fishing trip.

g/ The minimum size limit for lingcod is 24 inches (61 cm) total length.

h/ 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 that may vary seasonally.

i/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.

TABLE 2.2.4-5. Trip limits for limited entry fixed gear south of 40°10' N latitude[a/] analyzed under the *High OY* alternative. (Page 1 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area g/ (RCA):						
40°10' N. lat. - 34°27' N. lat.	Shoreline - 150 fm	30 fm - 150 fm				
South of 34°27' N. lat.	No depth restrictions					
Minor slope rockfish [d/]						
40°10' - 38° N. lat.	7,000 lb/2 months					
South of 38° N. lat.	40,000 lb/2 months					
Splitnose						
40°10' - 38° N. lat.	7,000 lb/2 months					
South of 38° N. lat.	40,000 lb/2 months					
Sablefish						
40°10' - 36° N. lat.	300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months					
South of 36° N. lat.	350 lb/day, or 1 landing per week of up to 1,050 lb					
Longspine thornyhead	10,000 lb/2 months					
Shortspine thornyhead	2,000 lb/2 months					
Dover sole **Arrowtooth flounder** **Petrale sole** **Rex sole** **All other flatfish** [b/]	5,000 lb/month When fishing for Pacific sanddabs, vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to 1 lb (0.45 kg) of weight per line are not subject to the RCAs.					
Whiting [c/]	10,000 lb/trip					
Minor shelf rockfish, widow, and yellowtail rockfish [d/]						
40°10' - 34°27' N. lat.	300 lb/2 months	CLOSED e/	200 lb/2 months		300 lb/2 months	
South of 34°27' N. lat.	CLOSED [e/]	2,000 lb/2 months				
Chilipepper rockfish	2,000 lb/2 months, this opportunity only available seaward of the nontrawl RCA					
Canary rockfish	CLOSED [e/]					
Yelloweye rockfish	CLOSED [e/]					
Cowcod	CLOSED [e/]					
Bocaccio						
40°10' - 34°27' N. lat.	200 lb/2 months	CLOSED [e/]	100 lb/2 months		200 lb/2 months	
South of 34°27' N. lat.	CLOSED [e/]	300 lb/2 months				

TABLE 2.2.4-5. Trip limits for limited entry fixed gear south of 40°10' N latitude[a/] analyzed under the *High OY* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Minor nearshore rockfish						
Shallow nearshore						
40°10' - 3°427' N. lat.	300 lb/2 months	CLOSED [e/]	500 lb/2 months	600 lb/2 months	500 lb/2 months	300 lb/2 months
South of 34°27' N. lat.	CLOSED [e/]	300 lb/2 months				
Deep nearshore						
40°10' - 3°427' N. lat.	500 lb/2 months	CLOSED [e/]	500 lb/2 months		400 lb/month	500 lb/2 months
South of 34°27' N. lat.	CLOSED [e/]	500 lb/2 months	600 lb/2 months			400 lb/2 months
California scorpionfish	CLOSED [e/]	300 lb/2 months		400 lb/2 months		300 lb/2 months
Lingcod [f/]	CLOSED [e/]		400 lb/month, when nearshore open			CLOSED [e/]
Other fish [h/]	Not limited					

a/ "South" means 40°10' N latitude to the U.S.-Mexico border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.

c/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.

d/ Chilipepper rockfish is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.

e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.

f/ The minimum size limit for lingcod is 24 inches (61 cm) total length.

g/ 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 that may vary seasonally.

h/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.

TABLE 2.2.4-6. Trip limits for open access gears north of 40°10' N latitude[a/] analyzed under the *High OY* alternative. (Page 1 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area [h/] (RCA):						
North of 46°16' N. lat.	0 fm - 100 fm					
46°16' N. lat. - 40°10' N. lat.	30 fm - 100 fm					
Minor slope rockfish [b/]	Per trip, no more than 25% of weight of the sablefish landed					
Pacific ocean perch	100 lb/month					
Sablefish	300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months					
Thornyheads	CLOSED [e/]					
Dover sole	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs.					
Arrowtooth flounder						
Petrale sole						
Rex sole						
All other flatfish [c/]						
Whiting	300 lb/month					
Minor shelf rockfish, widow and yellowtail rockfish [b/]	200 lb/month					
Canary rockfish	CLOSED [e/]					
Yelloweye rockfish	CLOSED [e/]					
Cowcod	CLOSED [e/]					
Minor nearshore rockfish	5,000 lb/2 months, no more than 1,200 lb of which may be species other than black or blue rockfish d/					
Lingcod [f/]	CLOSED [e/]		300 lb/month			CLOSED [e/]
Other Fish [g/]	Not limited					

TABLE 2.2.4-6. Trip limits for open access gears north of 40°10' N latitude[a/] analyzed under the *High OY* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
PINK SHRIMP EXEMPTED TRAWL ***(not subject to RCAs)***						
North	Effective April 1 - October 31, 2004: 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.					
SALMON TROLL						
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.					

a/ "North" means 40°10' N latitude to the U.S.-Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ Bocaccio and chilipepper rockfishes are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.

c/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.

d/ For black rockfish north of Cape Alava (48°09'30" N latitude), and between Destruction Island (47°40' N latitude) and Leadbetter Point (46°38'10" N latitude), there is an additional limit of 100 lbs or 30% by weight of all fish on board, whichever is greater, per vessel, per fishing trip.

e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.

f/ The size limit for lingcod is 24 inches (61 cm) total length.

g/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.

h/ 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 that may vary seasonally.

TABLE 2.2.4-7. Trip limits for open access gears south of 40°10' N latitude[a/] analyzed under the *High OY* alternative. (Page 1 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area [g/] (RCA):						
40°10' N. lat. - 34°27' N. lat.		Shoreline - 150 fm	30 fm - 150 fm			
South of 34°27' N. lat.	No depth restrictions					
Minor slope rockfish [b/]						
40°10' - 38° N. lat.	Per trip, no more than 25% of weight of the sablefish landed					
South of 38° N. lat.	10,000 lb/2 months					
Splitnose	200 lb/month					
Sablefish						
40°10' - 36° N. lat.	300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months					
South of 36° N. lat.	350 lb/day, or 1 landing per week of up to 1,050 lb					
Thornyheads						
40°10' - 34°27' N. lat.	CLOSED [e/]					
South of 34°27' N. lat.	50 lb/day, no more than 1,000 lb/2 months					
Dover sole **Arrowtooth flounder** **Petrale sole** **Rex sole** **All other flatfish [c/]**	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs. When fishing for Pacific sanddabs, vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to 1 lb of weight per line are not subject to the RCAs.					
Whiting	300 lb/month					
Minor shelf rockfish, widow and chilipepper rockfish [b/]						
40°10' - 34°27' N. lat.	300 lb/2 months	CLOSED [e/]	200 lb/2 months		300 lb/2 months	
South of 34°27' N. lat.	CLOSED [e/]	500 lb/2 months				
Canary rockfish	CLOSED [e/]					
Yelloweye rockfish	CLOSED [e/]					
Cowcod	CLOSED [e/]					
Bocaccio						
40°10' - 34°27' N. lat.	200 lb/2 months	CLOSED [e/]	100 lb/2 months		200 lb/2 months	
South of 34°27' N. lat.	CLOSED [e/]	100 lb/2 months				
Minor nearshore rockfish						
Shallow nearshore						
40°10' - 34°27' N. lat.	300 lb/2 months	CLOSED [e/]	500 lb/2 months	600 lb/2 months	500 lb/2 months	300 lb/2 months
South of 34°27' N. lat.	CLOSED [e/]	300 lb/2 months				

TABLE 2.2.4-7. Trip limits for open access gears south of 40°10' N latitude[a/] analyzed under the *High OY* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Deep nearshore						
40°10' - 34°27' N. lat.	500 lb/2 months	CLOSED e/	500 lb/2 months		400 lb/month	500 lb/2 months
South of 34°27' N. lat.	CLOSED [e/]	500 lb/2 months	600 lb/2 months			400 lb/2 months
California scorpionfish	CLOSED [e/]	300 lb/2 months		400 lb/2 months		300 lb/2 months
Lingcod [d/]	CLOSED [e/]		300 lb/month, when nearshore open			CLOSED [e/]
Other Fish [f/]	Not limited					
PINK SHRIMP EXEMPTED TRAWL GEAR *(not subject to RCAs)*						
South	Effective April 1 - October 31, 2004: 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.					
PRAWN AND, SOUTH OF 38°57'30" N LATITUDE, CALIFORNIA HALIBUT AND SEA CUCUMBER EXEMPTED TRAWL						
EXEMPTED TRAWL Rockfish Conservation Area g/ (RCA):						
40°10' - 38° N latitude	75 fm - 150 fm		100 fm - 150 fm		75 fm - 150 fm	
South of 38° N latitude	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	
	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 latitude 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 25).					

a/ "South" means 40°10' N latitude to the U.S.-Mexico border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ Yellowtail rockfish is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.
c/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
d/ The size limit for lingcod is 24 inches (61 cm) total length.
e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
f/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
g/ 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 that may vary seasonally.

2.2.5 The Council OY Alternative

The *Council OY* alternative is the **Preferred Alternative** in this EIS and represents the Council-adopted groundfish harvest specifications and management measures recommended to NMFS and the Secretary for 2004. Final adoption of the 2004 groundfish harvest specifications and implementation of the management measures for West Coast fisheries described and analyzed under the *Council OY* alterative in this EIS represent the **Proposed Action**. These decisions were made during the September 8-12, 2003 Council meeting in Seattle, Washington. The estimated mortality of overfished groundfish species under the *Council OY* alternative are shown in Table 2.2.5-1. A description of the *Council OY* alternative by fishery sector follows.

2.2.5.1 Limited Entry Trawl

Trip limits, cumulative landing limits, and the depth lines describing the trawl RCA by two-month period under the *Council OY* alternative for 2004 are shown in Tables 2.2.5-2 and 2.2.5-3 for the limited entry trawl fishery north and south of 40°10' N latitude, respectively.

Non-Whiting Trawl

The limited entry trawl fishery would be constrained under the *Council OY* alternative to waters deeper than a line specified by latitude/longitude waypoints approximating 200 fm north of 40°10' N latitude, except for period 4 when the line moves in to 150 fm. This allows greater access to sablefish and Dover sole that move closer inshore during the summer months. The 200 fm line is also modified during periods 1 and 6 to incorporate specific petrale sole fishing grounds that are inside 200 fm, but no shallower than 150 fm. Shallow water opportunities north of 40°10' N latitude inside 75 fm, except periods 2 and 3 when the RCA is extended inshore to 60 fm, would be available to trawlers using small footropes to access shelf flatfish species. The 75 fm to 150 fm depth zone would be closed year round to trawling to protect overfished shelf and slope rockfish species.

The limited entry trawl RCA south of 40°10' N latitude would be extended offshore to a specified line approximating 150 fm to protect bocaccio, canary rockfish, cowcod, and other overfished groundfish species inhabiting the shelf off California. Inshore opportunities to target shelf flatfish would be provided by allowing trawl vessels to fish from the bounds of the California state jurisdiction at three miles offshore to a line approximating 75 fm during periods 1, 2, 5, and 6; and to a line approximating 100 fm during periods 3 and 4. This allows greater access to target flatfish species that move onshore during the summer months.

As in 2003, the *Council OY* alternative specifies smaller trip limits north of 40°10' N latitude for DTS species for trawlers forced to use small footropes when fishing inshore of the trawl RCA. The larger limits allowed for trawlers fishing offshore of the RCA using large footropes are designed to provide an incentive for trawlers to fish deeper and avoid overfished groundfish species (particularly canary rockfish) residing on the shelf. The smaller DTS limits would apply for the entire two-month cumulative limit period if DTS species were landed using small footrope gear.

Whiting Trawl

The U.S. portion of the total catch Pacific whiting OY and the sector allocations under the *Council OY* alternative are the same as described in Section 2.2.1.1 under the *No Action* alternative, with the exception of an additional 1,000 mt of whiting set-aside from the shoreside sector to accommodate a cap for a WDFW-sponsored pollock EFP. While the sector allocations are set under the *Council OY* alternative, there is no harvest specification, since the Council decided not to set a 2004 whiting OY until after a new assessment and rebuilding analysis are completed. The Council decision for setting the whiting ABC and OY is scheduled for March 2004.

2.2.5.2 Limited Entry Fixed Gear

Trip limits, cumulative landing limits, and the depth lines describing the nontrawl RCA by two-month period under the *Council OY* alternative for 2004 are shown in Tables 2.2.5-4 and 2.2.5-5 for the limited entry fixed gear fishery north and south of 40°10' N latitude, respectively. In general, trip limits for nearshore species south of 40°10' N latitude were increased from 2003 due to a more optimistic outlook for bocaccio rebuilding, under-attainment of shallow nearshore rockfish and deeper nearshore rockfish limits in 2003 and an increased black rockfish OY under the *Council OY* alternative. The RCA boundaries were also slightly liberalized with the greatest change occurring south of Point Conception, where canary rockfish impacts are minimal. Lastly, the California Fish and Game Commission action in 2003 to limit commercial nearshore landings under the state nearshore permitting system to one trip limit per vessel reduced expected impacts to the point where liberalizing depth and season restrictions could be better accommodated.

Under the *Council OY* alternative for 2004, the nontrawl RCA is defined by management lines specified with waypoints at roughly 30 fm to 100 fm in waters off northern California (north of 40°10' N latitude) and Oregon; and zero fm to 100 fm (status quo or same as *No Action*) in waters off Washington.

The nontrawl RCA south of 40°10' N latitude and north of Pt. Conception at 34°27' N latitude is defined by management lines specified with waypoints at roughly 30 fm to 150 fm during periods 1, 2, 5, and 6 and 20 fm to 150 fm during periods 3 and 4. There is an additional closure between zero fm and 10 fm around the Farallon Islands to reduce impacts on shallow nearshore rockfish in that area. The nontrawl RCA south of Pt. Conception is defined by management lines specified with waypoints at roughly 60 fm to 150 fm. This more liberal RCA can be accommodated by the minimal occurrence of canary rockfish in the Southern California Bight.

Those limited entry permit holders who also have either a shallow nearshore fishery or deeper nearshore fishery permit administered by CDFG can land minor nearshore rockfish from either the shallow nearshore or deeper nearshore complexes. Trip limits for shallow nearshore rockfish, deeper nearshore rockfish, and California scorpionfish vary by period (see Tables 2.2.5-4 and 2.2.5-5). However, period 2 is closed for these species north of Pt. Conception, and period 1 is closed south of Pt. Conception. There is also a small and variable trip limit for bocaccio during the open nearshore periods to allow some incidental bycatch to be landed rather than discarded dead at sea. The same California nearshore management regions described in Section 2.2.5.7 would apply for the limited entry fixed gear sector under the *Council OY* alternative.

The Council noted the uncertain total catch impacts for fixed gears (both limited entry and open access) reduced their flexibility to modify the existing nontrawl RCA. The Council expects the availability of the first two years of observer data early in 2004 could modify this decision inseason next year. If impacts are greater than assumed (i.e., if discard rates for overfished species are greater than assumed), the Council wants the flexibility to extend the RCA out to 125 fm (as in the *Low OY* alternative).

Transit Requirements for Limited Entry Fixed Gear Vessels

On November 4, 2003 (68 FR 62374,) NMFS published a final rule for a West Coast vessel monitoring system (VMS) program. This program is intended to aid enforcement agencies in monitoring fishing activities in relationship to the RCAs. Beginning January 1, 2004, vessels registered to Pacific Coast groundfish fishery limited entry permits will be required to carry and use mobile VMS transceiver units while fishing in state or federal waters off the coasts of Washington, Oregon, and California. As part of the VMS program, limited entry vessels with trawl endorsements will be prohibited from any activity other than to be under continuous transit when in a trawl RCA with all trawl gear stowed, unless otherwise announced in the *Federal Register*. A proposed rule for VMS was published on May 22, 2003 (FR 86 27972) and public comment on the rule was accepted through July 21, 2003. During the comment period, NMFS received a letter in which the commentor indicated that prohibiting limited entry trawl vessels from any activity other than transiting a trawl RCA, while having no requirements for the limited entry fixed gear fleet, was discriminatory. This comment resulted in the Council's Enforcement Consultants (EC) reconsideration of the issue and their determination that there was a need to implement transiting provisions for the limited entry fixed gear vessels because VMS track lines cannot be distinguished from fishing, making it difficult to maintain the integrity of the VMS program and its effectiveness as an enforcement tool.

At the Council's September 2003 meeting, the EC raised a concern that the VMS final rule (November 4, 2003 68 FR 62374) does not prohibit fixed gear vessels from drifting within the nontrawl RCAs and requested that such a prohibition be added to the 2004 annual specifications and management measures. The EC was concerned that allowing vessels to drift in the RCA would compromise the integrity of both the VMS program and the RCAs because it would not be possible for the VMS system operators to tell the difference between position reports from vessels that are drifting in the RCA from those that are fishing or underway. Therefore, the EC asked the Council to recommend that NMFS restrict the activities of limited entry fixed gear vessels in nontrawl RCAs to transiting only. The Council asked the Ad Hoc VMS Committee (VMSC) to discuss this issue at its October 7, 2003 meeting and scheduled further discussion for the November 2003 Council meeting.

At its October meeting, the VMSC discussed transiting requirements for the limited entry fixed gear vessels, but failed to reach consensus. At the Council's November 2003 meeting, transiting requirements for the limited entry fixed gear vessels were reconsidered under agenda item D.10. After public testimony and discussion, the Council asked that NMFS implement, with the publication of the 2004 specifications and management measures, a requirement that limited entry vessels with fixed gear endorsements be prohibited from activities other than continuous transit when in a non-trawl conservation area. Such a requirement would allow limited entry fixed gear vessels to transit through the non-trawl RCA with or without groundfish on board. This requirement will be set out in the proposed rule and final rule for the annual specifications and management measures with a proposed effective date of March 1, 2004. Because this was not included within the scope of the Draft EIS, the analysis of the recommended regulatory revisions are being included within the final EIS (see Section 4.4.2.2).

2.2.5.3 Open Access

Trip limits, cumulative landing limits, and the depth lines describing the nontrawl RCA by two-month period under the *Council OY* alternative for 2004 are shown in Tables 2.2.5-6 and 2.2.5-7 for open access gears north and south of 40°10' N latitude, respectively.

The same nontrawl RCA described for limited entry fixed gears under the *Council OY* alternative (Section 2.2.5.2) would also apply for those open access fisheries not exempt from the RCA restrictions. The same minor nearshore species trip limits, seasonal restrictions, and permitting requirements described for limited entry fixed gears under the *Council OY* alternative (Section 2.2.5.2) apply for the open access sector. The same California nearshore management regions described in Section 2.2.5.7 for would apply for the open access sector under the *Council OY* alternative.

2.2.5.4 Tribal Fisheries

Tribal groundfish allocations and harvest guidelines under the *Council OY* alternative are the same as described for the other alternatives, except for Pacific whiting which is based on a sliding scale proportioned to the U.S. whiting OY, and sablefish which is 10% of the proportion of the coastwide OY north of 36° N latitude. Under the *Council OY* alternative, the tribal Pacific whiting harvest guideline is unknown until the U.S. whiting OY is specified in March 2004. The sablefish harvest guideline is 722 mt, which assumes a 3.85% average discard mortality rate for tribal trawl and fixed gear fisheries.

2.2.5.5 Washington Recreational

The Washington recreational groundfish fishery regulations under the *Council OY* alternative would be the same as status quo except for the following changes:

- The canary rockfish sublimit is reduced from one per day to no retention.
- The lingcod season changes from March 16 through October 15 to the Saturday closest to March 16 (March 13) through the Sunday closest to October 15 (October 17).
- The nearshore line of 25 fm (used in inseason management to restrict depths where the recreational fishery would operate if the canary or yelloweye rockfish harvest guideline is projected to be attained early) would change to a 30 fm line; an inseason depth restriction would apply only in specific high bycatch areas.

2.2.5.6 Oregon Recreational

The Oregon recreational groundfish fishery regulations under the *Council OY* alternative would be the same as status quo except for the following changes:

- Groundfish open year round with no depth restrictions except during June through September when the fishery is open only inside 40 fm.
- The canary rockfish sublimit is reduced from one per day to no retention.
- The yelloweye rockfish sublimit is reduced from one per day to no retention.
- The minimum size limit for cabezon increases from 15 inches to 16 inches
- A 10-inch minimum size limit is established for greenling species.
- The nearshore line of 27 fm (used in inseason management to restrict depths where the recreational fishery would operate if the canary or yelloweye rockfish harvest guideline is projected to be attained early) would change to a 30 fm line; an inseason depth restriction would apply only in specific high bycatch areas.

2.2.5.7 California Recreational

U.S./Mexico Border to Pt. Conception

The California recreational groundfish fishery regulations south of Pt. Conception under the *Council OY* alternative would be the same as status quo except for the following changes:

- Groundfish open March through December inside 60 fm (closed January through February).
- The bocaccio sublimit is increased from no retention to one fish per day.
- A 10-inch minimum size limit is established for bocaccio.
- California scorpionfish can only be retained during March, April, November, and December.

Pt. Conception to Pt. San Pedro

The California recreational groundfish fishery regulations for the area between Pt. Conception and Pt. San Pedro under the *Council OY* alternative would be the same as status quo except for the following changes:

- Groundfish open January, February, and September through December inside 30 fm; and May through August inside 20 fm (closed March through April).
- The bocaccio sublimit is increased from no retention to one fish per day.
- A 10-inch minimum size limit is established for bocaccio.

Pt. San Pedro to Cape Mendocino

The California recreational groundfish fishery regulations for the area between Pt. San Pedro and Cape Mendocino under the *Council OY* alternative would be the same as described for the area between Pt. Conception and Pt. San Pedro except for the following change:

- A zero fm to 10 fm closure around the Farallon Islands is proposed to reduce the estimated take of shallow nearshore rockfish.

Cape Mendocino to the California/Oregon Border

The California recreational groundfish fishery regulations for the area between Cape Mendocino and the California/Oregon border under the *Council OY* alternative would be the same as status quo except for the following changes:

- Regulations will not be structured to match those adopted for the Oregon recreational fishery.
- The canary rockfish sublimit is reduced from one per day to no retention.
- The yelloweye rockfish sublimit is reduced from one per day to no retention
- The nearshore line of 27 fm (used in inseason management to restrict depths where the recreational fishery would operate if the canary or yelloweye rockfish harvest guideline is projected to be attained early) would change to a 30 fm line; an inseason depth restriction would apply only in specific high bycatch areas.

TABLE 2.2.5-1. Estimated mortality (mt) of overfished West Coast groundfish species by fishery in 2004 under the *Council OY* alternative. (Page 1 of 2)

Fishery	Bocaccio [a]	Canary	Cowcod	Darkblotched [b]	Lingcod [c]	POP	Whiting [d]	Widow	Yelloweye
Limited Entry Groundfish									
Trawl- Non-whiting [e]	45.0	9.8	0.6	100.7	78.4	68.1	[k]	1.5	0.4
Fixed Gear	13.4	0.5	0.1	1.5	12.7	0.2	[k]	30.0	0.1
Whiting									
At-sea whiting motherships	[k]	0.6	[k]	2.4	0.2	1.8	Whiting OY decision deferred to March 2004		0.0
At-sea whiting cat-proc	[k]	0.6	[k]	4.3	0.1	6.6			0.0
Shoreside whiting	[k]	0.3	[k]	0.7	0.4	3.4		201.1	0.0
Tribal whiting	[k]	4.2	[k]	0.0	0.4	1.1			0.0
Open Access									
Groundfish directed	10.6	0.3	0.1	[k]	62.5	[k]	[k]	[k]	0.6
CA Halibut	0.1	[k]	[k]	0.0	2.0	0.0	[k]	[k]	[k]
CA Gillnet [f]	0.5	[k]	[k]	0.0	[k]	0.0	0.0	0.0	[k]
CA Sheephead [f]	[k]	[k]	[k]	0.0	[k]	0.0	0.0	0.0	0.0
Coastal pelagic species- wetfish [f]	0.3	[k]	[k]	[k]	[k]	[k]	[k]	[k]	[k]
Coastal pelagic species- squid [g]	[k]	[k]	[k]	[k]	[k]	[k]	[k]	[k]	[k]
Dungeness crab [f]	0.0	[k]	0.0	0.0	[k]	0.0	[k]	[k]	[k]
Highly migratory species [f]	[k]	0.0	0.0	0.0	[k]	[k]	[k]	[k]	[k]
Pacific Halibut [f]	0.0	[k]	0.0	0.0	[k]	0.0	[k]	0.0	0.5
Pink shrimp	0.1	0.5	0.0	0.0	0.5	0.0	1.0	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	1.6	0.0	0.0	0.3	0.0	[k]	0.0	0.2
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)	[k]	[k]	[k]	[k]	[k]	[k]	[k]	[k]	[k]
Tribal									
Midwater Trawl	[k]	2.3	[k]	0.0	0.1	0.0	[k]	40.0	0.0
Bottom Trawl	[k]	0.5	[k]	0.0	9.0	0.0	[k]	0.0	0.0
Troll	[k]	0.5	[k]	0.0	1.0	0.0	[k]	[k]	0.0
Fixed gear	[k]	0.3	[k]	0.0	15.0	0.0	[k]	0.0	2.3
Recreational Groundfish									
WA	[k]	1.5	[k]	[k]	35.0	[k]	[k]	[k]	3.5
OR	[k]	5.9	[k]	[k]	91.8	[k]	[k]	0.9	2.8
CA (N)	[k]	0.5	[k]	[k]	195.0	[k]	[k]	1.0	0.1
CA (S)	62.8	7.6	1.8	[k]	151.8	[k]	[k]	0.4	1.3
Research: Based on 2 most recent NMFS trawl shelf and slope surveys, the IPHC halibut survey, and LOAs with expanded estimates for south of Pt. Conception.									
	2.0	1.0	[k]	1.6	3.0	3.0	200	1.5	1.1
Non-EFP Total	135.1	38.4	2.6	111.2	659.2	84.2	[k]	276.5	13.1

TABLE 2.2.5-1. Estimated mortality (mt) of overfished West Coast groundfish species by fishery in 2004 under the *Council OY* alternative. (Page 2 of 2)

Fishery	Bocaccio a/	Canary	Cowcod	Darkblotched b/	Lingcod c/	POP	Whiting d/	Widow	Yelloweye
EFPs h/									
CA: Nearshore flatfish trawl	0.5	0.5	0.2	k/	20.0	k/	k/	k/	0.5
OR: DTS i/	k/	0.1	k/	6.0	k/	18.0	k/	k/	0.1
WA: Arrowtooth flounder trawl	k/	2.5	k/	3.0	2.0	18.0	k/	3.0	0.5
WA: Dogfish longline	k/	0.1	k/	0.5	2.0	0.5	k/	0.5	1.0
WA: Pollock j/	k/	0.1	k/	k/	k/	k/	1,000	3.0	0.1
WA: Nearshore flatfish trawl	k/	1.0	k/	3.0	2.0	k/	k/	1.0	0.1
EFP Subtotal	0.5	4.3	0.2	12.5	26.0	36.5	1,000	7.5	2.3
TOTAL	135.6	42.7	2.8	123.7	685.2	120.7	5,004	284.0	15.4
2004 OY	250	47.3	4.8	240	735	444	N/A	284	22

a/ South of 40/10' N latitude

b/ Darkblotched harvest limit ("2004 OY" in this table) is the ABC of 240 mt, which is lower than the projected OY of 272 mt under the *Medium OY* alternative.

c/ Lingcod total reflects total catch, not mortality.

d/ Catch estimates of overfished non-whiting groundfish species based on average annual bycatch rates during 1998-2003. 2003 bycatch rates calculated for the at-sea sector based on observed catch rates through September 25, 2003. These data incomplete since all at-sea sectors still fishing after this date. Shoreside catches of overfished groundfish species are actual estimates through the entire 1998-2003 period. Estimated whiting mortality in non-whiting fisheries assumes a cumulative 2,000 mt impact in 2004. Tribal catch based on OY sliding scale. Non-tribal whiting fishery catch based on set allocations applied after tribal and non-whiting fishery impacts subtracted from the OY. Although the whiting OY is not decided, the bycatch impacts in the whiting fisheries are determined based on the Medium OY of 148,200 mt as a placeholder for all the stocks except widow rockfish. The widow rockfish impacts in this table represent the difference between the OY and the estimated cumulative impacts in non-whiting fisheries.

e/ Using observer data, all estimates from the Hastie trawl bycatch model.

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

g/ 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.

h/ 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.

I/ The darkblotched rockfish and Pacific ocean perch caps are not defined yet for this EFP but are expected to be lower than the placeholders in this scorecard.

j/ Whiting impacts are deducted from the shoreside sector only.

k/ Either not applicable; trace amount (<0.01 mt); or not reported in available data sources.

TABLE 2.2.5-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] analyzed under the *Council OY* alternative. (Page 1 of 4)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area [j/] (RCA):						
North of 40°10' N latitude	75 fm - 200 fm (line modified to incorporate petrale sole fishing grounds)	60 fm - 200 fm		75 fm - 150 fm	75 fm - 200 fm	75 fm - 200 fm (line modified to incorporate petrale sole fishing grounds)
Small footrope [g/] or midwater trawl gear is required shoreward of the RCA; all trawl gear (large footrope, midwater trawl, and small footrope gear) is permitted seaward of the RCA.						
A vessel may have more than one type of limited entry bottom trawl gear on board, but the most restrictive trip limit associated with the gear on board applies for that trip and will count toward the cumulative trip limit for that gear. A vessel may not have limited entry bottom trawl gear on board if that vessel also has trawl gear on board that is permitted for use within a RCA, including limited entry midwater trawl gear, regardless of whether the vessel is intending to fish within a RCA on that fishing trip.						
Minor slope rockfish [c/]	4,000 lb/2 months					
Pacific ocean perch	3,000 lb/2 months					
DTS complex						
Sablefish	6,200 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the sablefish limit is 2,000 lb/2 months.		8,700 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the sablefish limit is 5,000 lb/2 months.			6,200 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the sablefish limit is 2,000 lb/2 months.
Longspine thornyhead	10,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the longspine thornyhead limit is 1,000 lb/2 months.					
Shortspine thornyhead	2,100 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the shortspoine thornyheads limit is 1,000 lb/2 months.					

TABLE 2.2.5-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] analyzed under the *Council OY* alternative. (Page 2 of 4)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Dover sole	45,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the Dover sole limit is 10,000 lb/2 months.		21,000 lb/2 months			45,000 lb/2 months, providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, shoreward or seaward of RCA) during the entire limit period, then the Dover sole limit is 10,000 lb/2 months.
Flatfish						
All other flatfish [d/]						
large footrope trawl	100,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period.					
small footrope trawl [g/]	All other flatfish plus petrale & rex sole: If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 30,000 lb/2 months, no more than 10,000 lb/2 months of which may be petrale sole.		All other flatfish plus petrale & rex sole: If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 60,000 lb/2 months, no more than 25,000 lb/2 months of which may be petrale sole.			All other flatfish plus petrale & rex sole: If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 30,000 lb/2 months, no more than 10,000 lb/2 months of which may be petrale sole.

TABLE 2.2.5-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] analyzed under the *Council OY* alternative. (Page 3 of 4)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Petrale sole						
large footrope trawl	Not limited providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period.	100,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period.				Not limited providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period.
small footrope trawl [g/]	Included in all other flatfish (small footrope trawl)					
Rex sole	Included in all other flatfish (large and small footrope trawl)					
Arrowtooth flounder	Not limited providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 4,000 lb/2 months	150,000 lb/2 months providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 6,000 lb/2 months				Not limited providing that only large footrope or midwater trawl gear is used to land any groundfish species during the entire limit period. If small footrope gear is used at any time in any area (North or South, inshore or offshore of RCA) during the entire limit period, then 4,000 lb/2 months
Whiting [e/]	20,000 lb/trip		Primary Season (only mid-water trawl permitted in the RCA)		10,000 lb/trip	
Other Fish [i/]	Not limited					

TABLE 2.2.5-2. Trip limits and gear requirements[a/] for limited entry trawl gear north of 40°10' N latitude[b/] analyzed under the *Council OY* alternative. (Page 4 of 4)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Use of small footrope bottom trawl [g/] or mid-water trawl is required for landing all of the following species:						
Minor shelf rockfish and widow rockfish [c/]	300 lb/month		1,000 lb/month, no more than 200 lb/month of which may be yelloweye rockfish			300 lb/month
Widow rockfish						
mid-water trawl - permitted within the RCA	CLOSED [f/]		During primary whiting season, in trips of at least 10,000 lb of whiting: combined widow and yellowtail limit of 500 lb/trip, cumulative widow limit of 1,500 lb/month		CLOSED [f/]	12,000 lb/2 months
Canary rockfish	100 lb/month		300 lb/month		100 lb/month	
Yellowtail						
mid-water trawl - permitted within the RCA	CLOSED [f/]		During primary whiting season, in trips of at least 10,000 lb of whiting: combined widow and yellowtail limit of 500 lb/trip, cumulative yellowtail limit of 2,000 lb/month			18,000 lb/2 months
small footrope trawl [g/]	In landings without flatfish, 1,000 lb/month. As flatfish bycatch, per trip limit is the sum of 33% (by weight) of all flatfish except arrowtooth flounder, plus 10% (by weight) of arrowtooth flounder. Total yellowtail landings not to exceed 10,000 lb/2 months, no more than 1,000 lb of which may be landed without flatfish.					
Minor nearshore rockfish	300 lb/month					
Lingcod [h/]	800 lb/2 months		1,000 lb/2 months		800 lb/2 months	

a/ Gear requirements and prohibitions are explained above.
b/ "North" means 40°10' N latitude to the U.S.-Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

c/ Bocaccio and chilipepper are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.
d/ "Other" flatfish means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
e/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.
f/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
g/ Small footrope trawl means a bottom trawl net with a footrope no larger than 8 inches (20 cm) in diameter.
h/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
i/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
j/ 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 that may vary seasonally.

TABLE 2.2.5-3. Trip limits and gear requirements[a/] for limited entry trawl gear south of 40°10' N latitude[b/] analyzed under the *Council OY* alternative. (Page 1 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area [j/] (RCA):						
40°10' - 38° N. lat.	75 fm - 150 fm		100 fm - 150 fm		75 fm - 150 fm	
South of 38° N. lat.	75 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands		100 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands		75 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands	
Small footrope [g/] or midwater trawl gear is required shoreward of the RCA; all trawl gear (large footrope, midwater trawl, and small footrope gear) is permitted seaward of the RCA.						
A vessel may have more than one type of limited entry bottom trawl gear on board, but the most restrictive trip limit associated with the gear on board applies for that trip and will count toward the cumulative trip limit for that gear. A vessel may not have limited entry bottom trawl gear on board if that vessel also has trawl gear on board that is permitted for use within a RCA, including limited entry midwater trawl gear, regardless of whether the vessel is intending to fish within a RCA on that fishing trip.						
Minor slope rockfish [c/]						
40°10' - 38° N. lat.	7,000 lb/2 months					
South of 38° N. lat.	40,000 lb/2 months					
Splitnose						
40°10' - 38° N. lat.	7,000 lb/2 months					
South of 38° N. lat.	40,000 lb/2 months					
DTS complex						
Sablefish	7,500 lb/2 months					
Longspine thornyhead	10,000 lb /2 months					
Shortspine thornyhead	2,000 lb/2 months					
Dover sole	26,000 lb/2 months					
Flatfish						
All other flatfish [d/]	100,000 lb/2 months	All other flatfish plus petrale & rex sole: 100,000 lb/2 months, no more than 20,000 lb/2 months of which may be petrale sole				100,000 lb/2 months
Petrale sole	No limit					No limit
Rex sole	Included in all other flatfish					
Arrowtooth flounder	No limit	10,000 lb/2 months				No limit
Whiting [e/]	20,000 lb/trip		Primary Season (only mid-water trawl permitted within the RCA)		10,000 lb/trip	
Minor shelf rockfish [c/]	300 lb/month, providing that only large footrope trawl gear is used to land any groundfish species during the entire limit period.					
Chilipepper rockfish	2,000 lb/2 months, providing that only large footrope trawl gear is used to land any groundfish species during the entire limit period.					
Bocaccio	100 lb/month, providing that only large footrope trawl gear is used to land any groundfish species during the entire limit period.					
Other Fish [i/]	Not limited					
Use of small footrope bottom trawl [g/] or mid-water trawl is required for landing all of the following species:						
Minor shelf rockfish, widow, and chilipepper rockfish [c/]	300 lb/month					
Widow rockfish						
mid-water trawl - permitted within the RCA	CLOSED [f/]					

TABLE 2.2.5-3. Trip limits and gear requirements[a/] for limited entry trawl gear south of 40°10' N latitude[b/] analyzed under the *Council OY* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Canary rockfish	100 lb/month		300 lb/month		100 lb/month	
Bocaccio	CLOSED [f/]					
Cowcod	CLOSED [f/]					
Minor nearshore rockfish	300 lb/month					
Lingcod [h/]	800 lb/2 months		1,000 lb/2 months		800 lb/2 months	

a/ Gear requirements and prohibitions are explained above.
b/ "North" means 40°10' N latitude to the U.S.-Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

c/ Bocaccio and chilipepper are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.
d/ "Other" flatfish means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
e/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.
f/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
g/ Small footrope trawl means a bottom trawl net with a footrope no larger than 8 inches (20 cm) in diameter.
h/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
i/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
j/ 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 that may vary seasonally.

TABLE 2.2.5-4. Trip limits for limited entry fixed gear north of 40°10' N latitude[a/] analyzed under the *Council OY* alternative. (Page 1 of 1)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area [h/] (RCA):						
North of 46°16' N. lat.	shoreline - 100 fm					
46°16' N. lat. - 40°10' N. lat.	30 fm - 100 fm					
Minor slope rockfish [d/]	4,000 lb/2 months					
Pacific ocean perch	1,800 lb/2 months					
Sablefish	300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months					
Longspine thornyhead	10,000 lb/2 months					
Shortspine thornyhead	2,100 lb/2 months					
Dover sole	5,000 lb/month					
Arrowtooth flounder						
Petrale sole						
Rex sole						
All other flatfish [b/]						
Whiting [c/]	10,000 lb/trip					
Minor shelf rockfish, widow, and yellowtail rockfish [d/]	200 lb/month					
Canary rockfish	CLOSED [e/]					
Yelloweye rockfish	CLOSED [e/]					
Cowcod	CLOSED [e/]					
Minor nearshore rockfish	5,000 lb/2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [f/]					
Lingcod [g/]	CLOSED [e/]		400 lb/month			CLOSED [e/]
Other fish [i/]	Not limited					

a/ "North" means 40°10' N latitude to the U.S.-Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.

c/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.

d/ Bocaccio and chilipepper are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.

e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.

f/ For black rockfish north of Cape Alava (48°09'30" N latitude), and between Destruction Island (47°40'00" N latitude) and Leadbetter Point (46°38'10" N latitude), there is an additional limit of 100 lb or 30% by weight of all fish on board, whichever is greater, per vessel, per fishing trip.

g/ The minimum size limit for lingcod is 24 inches (61 cm) total length.

h/ 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 that may vary seasonally.

i/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.

TABLE 2.2.5-5. Trip limits for limited entry fixed gear south of 40°10' N latitude[a/] analyzed under the *Council OY* alternative. (Page 1 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area [g/] (RCA):						
40°10' - 34°27' N. lat.	30 fm - 150 fm (also applies around islands, there is an additional closure between the shoreline and 10 fm around the Farallone Islands)		20 fm - 150 fm (also applies around islands, there is an additional closure between the shoreline and 10 fm around the Farallone Islands)		30 fm - 150 fm (also applies around islands, there is an additional closure between the shoreline and 10 fm around the Farallone Islands)	
South of 34°27' N. lat.	60 fm - 150 fm (also applies around islands)					
Minor slope rockfish [d/]						
40°10' - 38° N. lat.	7,000 lb/2 months					
South of 38° N. lat.	40,000 lb/2 months					
Splitnose						
40°10' - 38° N. lat.	7,000 lb/2 months					
South of 38° N. lat.	40,000 lb/2 months					
Sablefish						
40°10' - 36° N. lat.	300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months					
South of 36° N. lat.	350 lb/day, or 1 landing per week of up to 1,050 lb					
Longspine thornyhead	10,000 lb/2 months					
Shortspine thornyhead	2,000 lb/2 months					
Dover sole	5,000 lb/month					
Arrowtooth flounder						
Petrale sole	When fishing for Pacific sanddabs, vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to 1 lb (0.45 kg) of weight per line are not subject to the RCAs.					
Rex sole						
All other flatfish [b/]						
Whiting [c/]	10,000 lb/trip					
Minor shelf rockfish, widow, and yellowtail rockfish [d/]						
40°10' - 3°427' N. lat.	300 lb/2 months	CLOSED [e/]	200 lb/2 months		300 lb/2 months	
South of 34°27' N. lat.	CLOSED [e/]	2,000 lb/2 months				
Chilipepper rockfish	2,000 lb/2 months, this opportunity only available seaward of the nontrawl RCA					
Canary rockfish	CLOSED [e/]					
Yelloweye rockfish	CLOSED [e/]					
Cowcod	CLOSED [e/]					
Bocaccio						
40°10' - 34°27' N. lat.	200 lb/2 months	CLOSED [e/]	100 lb/2 months		200 lb/2 months	
South of 34°27' N. lat.	CLOSED [e/]	300 lb/2 months				

TABLE 2.2.5-5. Trip limits for limited entry fixed gear south of 40°10' N latitude[a/] analyzed under the *Council OY* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Minor nearshore rockfish						
Shallow nearshore						
40°10' - 34°27' N. lat.	300 lb/2 months	CLOSED [e/]	500 lb/2 months	600 lb/2 months	500 lb/2 months	300 lb/2 months
South of 34°27' N. lat.	CLOSED [e/]	300 lb/2 months				
Deep nearshore						
40°10' - 34°27' N. lat.	500 lb/2 months	CLOSED [e/]	500 lb/2 months		400 lb/month	500 lb/2 months
South of 34°27' N. lat.	CLOSED [e/]	500 lb/2 months	600 lb/2 months			400 lb/2 months
California scorpionfish	CLOSED [e/]	300 lb/2 months		400 lb/2 months		300 lb/2 months
Lingcod [f/]	CLOSED [e/]		400 lb/month, when nearshore open			CLOSED [e/]
Other fish [h/]	Not limited					

a/ "South" means 40°10' N latitude to the U.S.-Mexico border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.

c/ The whiting "per trip" limit in the Eureka area shoreward of 100 fm is 10,000 lb/trip throughout the year. Outside Eureka area, the 20,000 lb/trip limit applies.

d/ Chilipepper rockfish is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.

e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.

f/ The minimum size limit for lingcod is 24 inches (61 cm) total length.

g/ 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 that may vary seasonally.

h/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.

TABLE 2.2.5-6. Trip limits for open access gears north of 40°10' N latitude[a/] analyzed under the *Council OY* alternative. (Page 1 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
Rockfish Conservation Area [h/] (RCA):						
North of 46°16' N. lat.	shoreline - 100 fm					
46°16' N. lat. - 40°10' N. lat.	30 fm - 100 fm					
Minor slope rockfish [b/]	Per trip, no more than 25% of weight of the sablefish landed					
Pacific ocean perch	100 lb/month					
Sablefish	300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months					
Thornyheads	CLOSED [e/]					
Dover sole **Arrowtooth flounder** **Petrale sole** **Rex sole** **All other flatfish [c/]**	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs.					
Whiting	300 lb/month					
Minor shelf rockfish, widow and yellowtail rockfish [b/]	200 lb/month					
Canary rockfish	CLOSED [e/]					
Yelloweye rockfish	CLOSED [e/]					
Cowcod	CLOSED [e/]					
Minor nearshore rockfish	5,000 lb/2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [d/]					
Lingcod [f/]	CLOSED [e/]		300 lb/month			CLOSED [e/]
Other Fish [g/]	Not limited					
PINK SHRIMP EXEMPTED TRAWL ***(not subject to RCAs)***						
North	Effective April 1 - October 31, 2004: 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.					

TABLE 2.2.5-6. Trip limits for open access gears north of 40°10' N latitude[a/] analyzed under the *Council OY* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
SALMON TROLL						
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.					

a/ "North" means 40°10' N latitude to the U.S.-Canada border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ Bocaccio and chilipepper rockfishes are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.

c/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.

d/ For black rockfish north of Cape Alava (48°09'30" N latitude), and between Destruction Island (47°40' N latitude) and Leadbetter Point (46°38'10" N latitude), there is an additional limit of 100 lbs or 30% by weight of all fish on board, whichever is greater, per vessel, per fishing trip.

e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.

f/ The size limit for lingcod is 24 inches (61 cm) total length.

g/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.

h/ 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 that may vary seasonally.

TABLE 2.2.5-7. Trip limits for open access gears south of 40°10' N latitude[a] analyzed under the *Council OY* alternative.
(Page 1 of 2)

<table>
<tr><th></th><th>JAN-FEB</th><th>MAR-APR</th><th>MAY-JUN</th><th>JUL-AUG</th><th>SEP-OCT</th><th>NOV-DEC</th></tr>
<tr><td colspan="7">Rockfish Conservation Area [g] (RCA):</td></tr>
<tr><td>40°10' - 34°27' N latitude</td><td colspan="2">30 fm - 150 fm (also applies around islands, there is an additional closure between the shoreline and 10 fm around the Farallon Islands)</td><td colspan="2">20 fm - 150 fm (also applies around islands, there is an additional closure between the shoreline and 10 fm around the Farallon Islands)</td><td colspan="2">30 fm - 150 fm (also applies around islands, there is an additional closure between the shoreline and 10 fm around the Farallon Islands)</td></tr>
<tr><td>South of 34°27' N latitude</td><td colspan="6">60 fm - 150 fm (also applies around islands)</td></tr>
<tr><td colspan="7">Minor slope rockfish [b]</td></tr>
<tr><td>40°10' - 38° N latitude</td><td colspan="6">Per trip, no more than 25% of weight of the sablefish landed</td></tr>
<tr><td>South of 38° N latitude</td><td colspan="6">10,000 lb/2 months</td></tr>
<tr><td>Splitnose</td><td colspan="6">200 lb/month</td></tr>
<tr><td colspan="7">Sablefish</td></tr>
<tr><td>40°10' - 36° N latitude</td><td colspan="6">300 lb/day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/2 months</td></tr>
<tr><td>South of 36° N latitude</td><td colspan="6">350 lb/day, or 1 landing per week of up to 1,050 lb</td></tr>
<tr><td colspan="7">Thornyheads</td></tr>
<tr><td></td><td colspan="6">CLOSED [e]</td></tr>
<tr><td></td><td colspan="6">50 lb/day, no more than 1,000 lb/2 months</td></tr>
<tr><td>Dover sole</td><td colspan="6" rowspan="5">3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs. When fishing for Pacific sanddabs, vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to 1 lb of weight per line are not subject to the RCAs.</td></tr>
<tr><td>Arrowtooth flounder</td></tr>
<tr><td>Petrale sole</td></tr>
<tr><td>Rex sole</td></tr>
<tr><td>All other flatfish [c]</td></tr>
<tr><td>Whiting</td><td colspan="6">300 lb/month</td></tr>
<tr><td colspan="7">Minor shelf rockfish, widow and chilipepper rockfish [b]</td></tr>
<tr><td>40°10' - 34°27' N latitude</td><td>300 lb/2 months</td><td>CLOSED [e]</td><td colspan="2">200 lb/2 months</td><td colspan="2">300 lb/2 months</td></tr>
<tr><td>South of 34°27' N latitude</td><td>CLOSED [e]</td><td colspan="5">500 lb/2 months</td></tr>
<tr><td>Canary rockfish</td><td colspan="6">CLOSED [e]</td></tr>
<tr><td>Yelloweye rockfish</td><td colspan="6">CLOSED [e]</td></tr>
<tr><td>Cowcod</td><td colspan="6">CLOSED [e]</td></tr>
<tr><td colspan="7">Bocaccio</td></tr>
<tr><td>40°10' - 34°27' N latitude</td><td>200 lb/2 months</td><td>CLOSED [e]</td><td colspan="2">100 lb/2 months</td><td colspan="2">200 lb/2 months</td></tr>
<tr><td>South of 34°27' N latitude</td><td>CLOSED [e]</td><td colspan="5">100 lb/2 months</td></tr>
<tr><td colspan="7">Minor nearshore rockfish</td></tr>
<tr><td colspan="7">Shallow nearshore</td></tr>
<tr><td>40°10' - 34°27' N latitude</td><td>300 lb/2 months</td><td>CLOSED [e]</td><td rowspan="2">500 lb/2 months</td><td rowspan="2">600 lb/2 months</td><td rowspan="2">500 lb/2 months</td><td rowspan="2">300 lb/2 months</td></tr>
<tr><td>South of 34°27' N latitude</td><td>CLOSED [e]</td><td>300 lb/2 months</td></tr>
<tr><td colspan="7">Deep nearshore</td></tr>
<tr><td>40°10' - 34°27' N latitude</td><td>500 lb/2 months</td><td>CLOSED [e]</td><td colspan="2">500 lb/2 months</td><td>400 lb/month</td><td>500 lb/2 months</td></tr>
<tr><td>South of 34°27' N latitude</td><td>CLOSED [e]</td><td>500 lb/2 months</td><td colspan="3">600 lb/2 months</td><td>400 lb/2 months</td></tr>
<tr><td>California scorpionfish</td><td>CLOSED [e]</td><td colspan="2">300 lb/2 months</td><td colspan="2">400 lb/2 months</td><td>300 lb/2 months</td></tr>
<tr><td>Lingcod [d]</td><td colspan="2">CLOSED [e]</td><td colspan="3">300 lb/month, when nearshore open</td><td>CLOSED [e]</td></tr>
<tr><td>Other Fish [f]</td><td colspan="6">Not limited</td></tr>
</table>

TABLE 2.2.5-7. Trip limits for open access gears south of 40°10' N latitude[a/] analyzed under the *Council OY* alternative. (Page 2 of 2)

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
PINK SHRIMP EXEMPTED TRAWL GEAR ***(not subject to RCAs)***						
South	Effective April 1 - October 31, 2004: 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.					
PRAWN AND, SOUTH OF 38°57'30" N LATITUDE, CALIFORNIA HALIBUT AND SEA CUCUMBER EXEMPTED TRAWL						
EXEMPTED TRAWL Rockfish Conservation Area [g/] (RCA):						
40°10' - 38° N latitude	75 fm - 150 fm		100 fm - 150 fm		75 fm - 150 fm	
South of 38° N latitude	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	
	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 38o57'30" N latitude 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 25).					

a/ "South" means 40°10' N latitude to the U.S.-Mexico border. 40°10' N latitude is about 20 nm south of Cape Mendocino, California.

b/ Yellowtail rockfish is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.
c/ "Other flatfish" means all flatfish at 50 CFR 660.302 except those in this table with species specific management measures, including trip limits.
d/ The size limit for lingcod is 24 inches (61 cm) total length.
e/ Closed means that it is prohibited to take and retain, possess, or land the designated species in the time or area indicated.
f/ Other fish are defined at 50 CFR 660.302, as those groundfish species or species groups for which there is no trip limit, size limit, quota, or harvest guideline.
g/ 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 that may vary seasonally.

2.2.6 Alternatives Considered, But Eliminated From Detailed Study

Any alternative total catch OYs with less than a 50% probability of rebuilding to B_{MSY} within T_{MAX} are not compliant with the MSA as interpreted in a 2000 Federal Court ruling (*Natural Resources Defense Council* v. *Daley, April 25, 2000, U.S. Court of Appeals for the District of Columbia Circuit*). Such alternatives do not meet the purpose and need for action and thus are not analyzed in this EIS.

One public comment received by The Ocean Conservancy, an environmental non-governmental organization (NGO) involved in the Council groundfish management process, was to analyze OYs with rebuilding probabilities (P_{MAX}) of 90% for each of the overfished species analyzed in this EIS. While no detailed analysis of a 90% P_{MAX} was done for these species (except for darkblotched rockfish where P_{MAX} is >90% under the *Council OY* alternative), it is noted the new rebuilding analyses done in 2003 (i.e., those for bocaccio, darkblotched rockfish, Pacific ocean perch, and widow rockfish) do project OYs under a 90% P_{MAX}. Rebuilding analyses for the other overfished species do not project 90% P_{MAX} results, since the rebuilding simulation program (Punt 2002) was only recently modified to produce such results. However, the conceptual result was explored in discussions with Dr. Andre Punt from the University of Washington and author of the rebuilding simulation program used in the rebuilding analyses cited in this EIS. Dr. Punt states that the 90% P_{MAX} result would be closest to that under a P_{MAX} = 100% solution (i.e., assumes F = 0) and not a simple interpolation between the 80% P_{MAX} and the 100% P_{MAX} results. Since the Council did not explicitly choose harvest alternatives with a P_{MAX} of 90%, there is no detailed analysis of this alternative for all the overfished species. However, the Council's choice of a darkblotched rockfish OY (240 mt) without formally changing the target rebuilding year specified in Amendment 16-2, did implicitly result in a detailed analysis of a P_{MAX} > 90% for that species. Also, the Council's choice of a bocaccio OY (250 mt) would result in a P_{MAX} > 90% for that species under the STARb1 model analyzed in the most recent rebuilding analysis (MacCall 2003a).

The Ocean Conservancy and the NRDC recommended a detailed analysis of managing the 2004 groundfish fishery using bycatch caps. While all harvest specifications (OYs) are in terms of total catch including bycatch, which could be considered fleetwide bycatch caps, this EIS does not include an analysis of individual vessel-based bycatch caps. However, a more detailed analysis of this concept is anticipated in the programmatic bycatch EIS being prepared by NMFS.

Another recommendation from the NRDC was to consider a season structure with closed periods and higher landing limits during open periods for the 2004 West Coast groundfish fishery. This type of management approach was considered and rejected in the *Environmental Assessment of 2002 West Coast Harvest Specifications and Management Measures*. One problem with closing the groundfish fishery is that nongroundfish fisheries would then continue and groundfish would be prohibited from retention, forcing discard. Therefore, some retention needs to be allowed in order to prevent such discard. Once some retention is allowed, the potential for targeting on groundfish is created and the fishery is in fact "open." Another problem is that complete closures could force some segments of the fishery into times of the year when bycatch rates for a particular overfished species are highest. Bycatch rates vary by season, since some target species and overfished species have discrete movement patterns that vary seasonally. For some segments of the fishery bycatch rates for overfished species are lowest in the winter, and for other segments the impacts of harvest on overfished species are highest in the winter (e.g., nesting lingcod males). Thus, there is not one optimal time when all mixed stock fisheries could be closed and achieve the lowest bycatch rates. For 2004, using area closures, gear restrictions, and target species' cumulative limits, the Council has structured for consideration seasonal fishery alternatives that seek to minimize bycatch while providing as much harvest opportunity as possible. This approach is also consistent with community and industry desires for a year-round fishery to keep product available to processors and the affected markets year round. A complete closure of the commercial fishery would have significant socioeconomic consequences. Therefore, an analysis of complete seasonal closures for the 2004 fishery is eliminated from further study in this EIS and significant attention and effort was placed on the development of seasonal management alternatives based on area closures, gear restrictions, and cumulative limits for target harvest species.

The Council initially requested consideration and analysis of incorporating two ongoing exempted fishing permits (EFPs) into regulations in 2004 to provide increased fleetwide fishing opportunities for the limited entry trawl sector. EFPs allow fishing activities that would otherwise be prohibited. As an example, EFPs provide a process for testing innovative fishing gears and strategies to substantiate methods for prosecuting sustainable and risk-averse fishing opportunities. These ongoing EFPs are the Washington-sponsored arrowtooth trawl EFP and selective flatfish trawl EFPs sponsored by Oregon and California. While these EFPs are anticipated for next year (the Oregon-sponsored selective flatfish trawl EFP will not be done next year, but similar EFP studies are expected to be conducted in waters off California and Washington), the Council decided against implementing these two EFPs in regulations in 2004. The Council noted that the selective flatfish trawl is legal gear and endorses its deployment in 2004 trawl fisheries. However, the Council believes it is premature to recommend higher trip limits using this gear or fishing access to the trawl RCA without 100% observer coverage pending further study. This issue is anticipated to be further explored during the process to set 2005-2006 harvest specifications and management measures, but is eliminated from further detailed study in this EIS.

2.3 Comparison of the Environmental Consequences

Table 2.3.0-1 summarizes the analysis of physical, biological, and socioeconomic effects of the alternatives presented in Chapter 4. These effects are qualitatively assessed in Table 2.3.0-1 based on the best professional judgement of resource experts that contributed to this EIS. The *Council OY* alternative is expected to allow the stocks to rebuild to MSY biomass levels. Until stocks are rebuilt, there will likely be significant adverse impacts on the groundfish fishery and groundfish-dependent economies on the West Coast.

TABLE 2.3.0-1. Summary of the effects of the alternatives for 2004 West Coast groundfish fisheries. (Page 1 of 7)

Resource or Issue Category	No Action Alternative (continue 2003 harvest specifications and management measures)	Low OY Alternative	High OY Alternative
Habitat and Ecosystem: *Trawl and other gear contacting the bottom damage benthic organisms and physical structure; change in trophic structure.*			
Direct/Indirect	Reduction in closed areas, possible intensification in open areas	Least impacts of alternatives	Indistinguishable from No Action
Cumulative	Undetermined impact on EFH	Least impacts of alternatives	Fewer impacts than No Action
Overfished Species: *Harvest level above rebuilding threshold.*			
Direct/Indirect	If harvest levels in 2004 are the same as 2003, OYs under the Council OY alternative (representing precautionary 2004 OYs) would not be exceeded.	Projected canary, darkblotched, and widow rockfish total catches exceed OY under this alternative. However, OYs based on most risk-averse model assumptions.	Projected canary rockfish, lingcod, and cowcod total catches exceed OYs. OYs based on least risk-averse model assumptions.
Cumulative	Projected harvests lower than under action alternatives. Compared to most precautionary OYs under Low OY alternative, likely contribute to faster rebuilding if defacto constant harvest policy adopted over long term.	Calculated rebuilding probabilities depend on model assumptions. Lower OYs under this alternative likely to result in a higher rebuilding probability.	Calculated rebuilding probabilities depend on model assumptions. Higher OYs under this alternative likely to result in a lower rebuilding probability, although still risk averse.
Other Managed Species: *Harvest level above rebuilding threshold for precautionary stocks, overfishing threshold for healthy stocks.*			
Direct/Indirect	Harvest levels based on best estimates for MSY, with precautionary reductions for stocks below target. Three non-overfished stock OYs differ from action alternatives, and are lower (also no separate black rockfish OY). Defacto precautionary policy.	Harvest levels based on best estimates for MSY, with precautionary reductions for stocks below target. Most risk-averse interpretation of stock assessment results.	Harvest levels based on best estimates for MSY, with precautionary reductions for stocks below target. Least risk-averse interpretation of stock assessment results.
Cumulative	Stocks believed to be at, above, or approaching MSY stock size	Stocks believed to be at, above, or approaching MSY stock size	Stocks believed to be at, above, or approaching MSY stock size
Protected Species: *Activities harm protected species.*			
Direct/Indirect	Fishing activity and therefore likely impacts near baseline level	Fishing activity reduced and therefore likely impacts reduced from No Action	Indistinguishable from No Action
Cumulative	No detectable difference from external effects	Undetectable reduction	Indistinguishable from No Action
Public Sector: *Increased regulatory complexity, enforcement cost.*			
Direct/Indirect		No Change	No Change
Cumulative	Increased complexity in 2003 due to imposition of depth based management.	VMS used for management of the RCA Likely to be required for nontrawl vessels.	VMS used for management of the RCA Likely to be required for nontrawl vessels.
Commercial Fisheries: *Fishing revenue decline from baseline.*			

TABLE 2.3.0-1. Summary of the effects of the alternatives for 2004 West Coast groundfish fisheries. (Page 2 of 7)

Resource or Issue Category	No Action Alternative (continue 2003 harvest specifications and management measures)	Low OY Alternative	High OY Alternative
Direct/Indirect (includes all whiting and tribal harvest)	No Change (Base = $229.2 million all ocean fisheries, $55.8 million all groundfish)	-$11.5. million Smaller RCAs may reduce costs for some segments of the fishery.	$12.5 million Smaller RCAs may reduce costs for some segments of the fishery.
Cumulative	Cost of VMS as the program is extended to include nontrawl vessels. Possible imposition of a per pound landings fee and increase in trip limits if a buyback program is implements.	Large economic impact when added to revenue declines since late 1990s; revenue level should increase in the future as ovefished stocks recover towards MSY; coverage of VMS program extended. Possible imposition of a per pound landings fee and increase in trip limits if a buyback program is implements.	Some mitigation for past revenue declines; higher than *Low OY* alternative revenues mean slower rate of growth in revenues but higher than *Low OY* revenues until the stock approaches rebuilt levels, at which time revenues related to the *Low OY* alternative harvest policies would exceed those of the *High OY* alternative harvest policy; greater probability of recover and MSY objectives not being met, coverage of VMS program extended. Possible imposition of a per pound landings fee and increase in trip limits if a buyback program is implements.
Buyers and Processors: *Change in gross value of purchases of primary raw product.*			
Direct/Indirect (includes all whiting and tribal harvest)	No Change (Base = $229.2 million all ocean fisheries, $55.8 million all groundfish)	-$11.5. million	$12.5 million
Cumulative	-	Similar to effect for commercial fisheries.	Similar to effect for commercial fisheries.
Recreational Fisheries: *Change in number of angler trips.*			
Direct/Indirect	Estimated number of angler 2003 trips: 3,430,000	1.6 million gain in angler trips over No Action	1.9 million gain in angler trips over No Action
Cumulative	Decline in angler trips over historic levels.	Severe economic impact when added to past revenue decline; trips should increase in future as stocks recover towards MSY; potential loss of recreational infrastructure, amenities in coastal communities.	Moderate economic impact; locally more significant (e.g. S. Cal.) ; trips should increase in future as stocks recover towards MSY; harvest policy dynamics similar to those described for commercial fishery.
Communities: *Change in fisheries-dependent income from baseline, employment, social amenities.*			
Direct/Indirect (excludes all whiting, includes tribal harvest)	No Change (commercial base = $523.6 million for all ocean fisheries) $74.5 million all groundfish (recreational base = $215 million)	-$16.4 million decline from No Action (income from commercial fisheries) -$95 million decline from No Action(income from recreational fisheries)	$14.1 million gain from No Action (commercial) $122 million gain from No Action (recreational)

TABLE 2.3.0-1. Summary of the effects of the alternatives for 2004 West Coast groundfish fisheries. (Page 3 of 7)

Resource or Issue Category	No Action Alternative (continue 2003 harvest specifications and management measures)	Low OY Alternative	High OY Alternative
Cumulative	Communities affected by economic factors external to the fishery– effects on natural resource based segments often negative	Communities affected by economic factors external to the fishery–effects on natural resource based segments often negative; future recovery as overfished stocks recover towards MSY, see recovery dynamics described for commercial fishery high OY.	Communities affected by economic factors external to the fishery–effects on natural resource based segments often negative; future recovery as overfished stocks recover towards MSY, see recovery dynamics described for commercial fishery high OY.
General Public: *Change in nonuse values.*			
Direct/Indirect	81.8 thousand metric tons of removals authorized by OY, excluding whiting.	81.0 thousand metric tons of removals authorized by OY, excluding whiting.	85.8 thousand metric tons of removals authorized by OY
Cumulative		Greatest rate of biomass increase over time.	Lowest rate of biomass increase over time.

TABLE 2.3.0-1. Summary of the effects of the alternatives for 2004 West Coast groundfish fisheries. (Page 4 of 7)

Resource or Issue Category	Medium OY Alternative	Council-preferred Alternative
Habitat: *Trawl and other gear contacting the bottom damage benthic organisms and physical structure; change in trophic structure.*		
Direct/Indirect	Indistinguishable from No Action	Indistinguishable from No Action
Cumulative	Fewer impacts than No Action	Fewer impacts than No Action
Overfished Species: *Harvest level above rebuilding threshold.*		
Direct/Indirect	Projected canary and widow rockfish total catches exceed OYs for this alternative. OYs are based on model assumptions with intermediate risk level.	OYs same as Medium OY alternative except for precautionary reductions for bocaccio and darkblotched, deferral of whiting decision, and allocation-related difference in canary rockfish.
Cumulative	Calculated rebuilding probabilities do not differ among the action alternatives and are risk averse.	Calculated rebuilding probabilities do not differ among the action alternatives and are risk averse.
Other Managed Species: *Harvest level above rebuilding threshold for precautionary stocks, overfishing threshold for healthy stocks.*		
Direct/Indirect	Harvest levels based on best estimates for MSY, with precautionary reductions for stocks below target.	OYs do not differ from Medium OY alternative.
Cumulative	Stocks believed to be at, above, or approaching MSY stock size	Stocks believed to be at, above, or approaching MSY stock size
Protected Species: *Activities harm protected species.*		
Direct/Indirect	Indistinguishable from No Action	Indistinguishable from No Action
Cumulative	Indistinguishable from No Action	Indistinguishable from No Action
Public Sector: *Increased complexity, uncertainty, enforcement cost.*		
Direct/Indirect	Reduced complexity with elimination of the “B” Platoon fishing option	Reduced complexity with elimination of the “B” Platoon fishing option
Cumulative	VMS used for management of the RCA Likely to be required for nontrawl vessels.	VMS used for management of the RCA Likely to be required for nontrawl vessels.
Commercial Fisheries: *Fishing revenue decline from baseline.*		
Direct/Indirect (includes all whiting and tribal harvest)	$3.3 million Smaller RCAs may reduce costs for some segments of the fishery.	$2.8 million Smaller RCAs may reduce costs for some segments of the fishery.
Cumulative	Moderate increase relative to status quo; revenue level should increase somewhat in future as overfished stocks recover towards MSY see recovery dynamics described for high OY; coverage of VMS program extended. Possible imposition of a per pound landings fee and increase in trip limits if a buyback program is implements.	Moderate increase relative to status quo; revenue level should increase somewhat in future as overfished stocks recover towards MSY, see recovery dynamics described for high OY; coverage of VMS program extended. Possible imposition of a per pound landings fee and increase in trip limits if a buyback program is implements.

TABLE 2.3.0-1. Summary of the effects of the alternatives for 2004 West Coast groundfish fisheries. (Page 5 of 7)

Resource or Issue Category	Medium OY Alternative	Council-preferred Alternative
Buyers and Processors: *Change in gross value of purchases of primary raw product.*		
Direct/Indirect (includes all whiting and tribal harvest)	$3.3 million	$2.8 million
Cumulative	Similar to effect for commercial fisheries.	Similar to effect for commercial fisheries.
Recreational Fisheries: *Change in angler trips.*		
Direct/Indirect	1.7 million gain in number of angler trips over No Action	873,00 gain in number of angler trips over No Action
Cumulative	Moderate economic impact; locally more significant (e.g. S. Cal.) ; trips should increase somewhat in future as overfished stocks recover towards MSY, see recovery dynamics described for commercial fishery high OY.	Substantial economic impact when added to past revenue decline; trips should increase somewhat in future as overfished stocks recover towards MSY see recovery dynamics described for commercial fishery high OY; potential loss of recreational infrastructure, amenities in coastal communities
Communities: *Change in fisheries-dependent income from baseline, employment, social amenities.*		
Direct/Indirect (excludes all whiting, includes tribal harvest)	$3.0 million gain in commercial income over No Action $113 million gain in recreational income over No Action	$2.5 million gain in commercial income over No Action $55.3 million gain in recreational income over No Action
Cumulative	Communities affected by economic factors external to the fishery–effects on natural resource based segments often negative; future recovery as overfished stocks recover towards MSY, see recovery dynamics described for commercial fishery high OY.	Communities affected by economic factors external to the fishery– effects on natural resource based segments often negative; future recovery as overfished stocks recover towards MSY, see recovery dynamics described for commercial fishery high OY.
General Public: *Change in nonuse values.*		
Direct/Indirect	84.5 thousand metric tons of removals authorized by OY, excluding whiting.	84.4 thousand metric tons of removals authorized by OY, excluding whiting.
Cumulative	Middle level rate of biomass increase over time.	Middle level rate of biomass increase over time.

TABLE 2.3.0-1. Summary of the effects of the alternatives for 2004 West Coast groundfish fisheries. (Page 6 of 7)

Resource or Issue Category	Medium OY Alternative	Council-preferred Alternative
Habitat: *Trawl and other gear contacting the bottom damage benthic organisms and physical structure; change in trophic structure.*		
Direct/Indirect	Indistinguishable from No Action	Indistinguishable from No Action
Cumulative	Indistinguishable from No Action	Indistinguishable from No Action
Overfished Species: *Harvest level above rebuilding threshold.*		
Direct/Indirect	Projected canary and widow rockfish total catches exceed OYs for this alternative. OYs are based on model assumptions with intermediate risk level.	OYs same as Medium OY alternative except for precautionary reductions for bocaccio and darkblotched, deferral of whiting decision, and allocation-related difference in canary rockfish.
Cumulative	Calculated rebuilding probabilities do not differ among the action alternatives and are risk averse.	Calculated rebuilding probabilities do not differ among the action alternatives and are risk averse.
Other Managed Species: *Harvest level above rebuilding threshold for precautionary stocks, overfishing threshold for healthy stocks.*		
Direct/Indirect	Harvest levels based on best estimates for MSY, with precautionary reductions for stocks below target.	OYs do not differ from Medium OY alternative.
Cumulative	Stocks believed to be at, above, or approaching MSY stock size	Stocks believed to be at, above, or approaching MSY stock size
Protected Species: *Activities harm protected species.*		
Direct/Indirect	Indistinguishable from No Action	Indistinguishable from No Action
Cumulative	Indistinguishable from No Action	Indistinguishable from No Action
Public Sector: *Increased complexity, uncertainty, enforcement cost.*		
Direct/Indirect	Reduced complexity with elimination of the “B” Platoon fishing option	Reduced complexity with elimination of the “B” Platoon fishing option
Cumulative	VMS used for management of the RCA Likely to be required for nontrawl vessels.	VMS used for management of the RCA Likely to be required for nontrawl vessels.
Commercial Fisheries: *Fishing revenue decline from baseline.*		
Direct/Indirect (includes all whiting and tribal harvest)	$3.3 million Smaller RCAs may reduce costs for some segments of the fishery.	$2.8 million Smaller RCAs may reduce costs for some segments of the fishery.
Cumulative	Moderate increase relative to status quo; revenue level should increase somewhat in future as overfished stocks recover towards MSY see recovery dynamics described for high OY; coverage of VMS program extended. Possible imposition of a per pound landings fee and increase in trip limits if a buyback program is implements.	Moderate increase relative to status quo; revenue level should increase somewhat in future as overfished stocks recover towards MSY, see recovery dynamics described for high OY; coverage of VMS program extended. Possible imposition of a per pound landings fee and increase in trip limits if a buyback program is implements.

TABLE 2.3.0-1. Summary of the effects of the alternatives for 2004 West Coast groundfish fisheries. (Page 7 of 7)

Resource or Issue Category	Medium OY Alternative	Council-preferred Alternative
Buyers and Processors: *Change in gross value of purchases of primary raw product.*		
Direct/Indirect (includes all whiting and tribal harvest)	$3.3 million	$2.8 million
Cumulative	Similar to effect for commercial fisheries.	Similar to effect for commercial fisheries.
Recreational Fisheries: *Change in angler trips.*		
Direct/Indirect	1.7 million gain in number of angler trips over No Action	873,00 gain in number of angler trips over No Action
Cumulative	Moderate economic impact; locally more significant (e.g. S. Cal.) ; trips should increase somewhat in future as overfished stocks recover towards MSY, see recovery dynamics described for commercial fishery high OY.	Substantial economic impact when added to past revenue decline; trips should increase somewhat in future as overfished stocks recover towards MSY see recovery dynamics described for commercial fishery high OY; potential loss of recreational infrastructure, amenities in coastal communities
Communities: *Change in fisheries-dependent income from baseline, employment, social amenities.*		
Direct/Indirect (excludes all whiting, includes tribal harvest)	$3.0 million gain in commercial income over No Action $113 million gain in recreational income over No Action	$2.5 million gain in commercial income over No Action $55.3 million gain in recreational income over No Action
Cumulative	Communities affected by economic factors external to the fishery–effects on natural resource based segments often negative; future recovery as overfished stocks recover towards MSY, see recovery dynamics described for commercial fishery high OY.	Communities affected by economic factors external to the fishery– effects on natural resource based segments often negative; future recovery as overfished stocks recover towards MSY, see recovery dynamics described for commercial fishery high OY.
General Public: *Change in nonuse values.*		
Direct/Indirect	84.5 thousand metric tons of removals authorized by OY, excluding whiting.	84.4 thousand metric tons of removals authorized by OY, excluding whiting.
Cumulative	Middle level rate of biomass increase over time.	Middle level rate of biomass increase over time.

2.4 Social Net Benefit Analysis

Net benefit analysis takes costs and benefits into account from a national perspective. Net benefit analysis uses measures of real costs and benefits to all entities affected by an action in order to assess the net effect on the nation. The minimum standard for a cost-benefit analysis is a qualitative listing of positive and negative impacts. From there, an attempt is made to quantify or provide some indicators of the scale of the impacts and, if possible, to assign a monetary value to those changes.

The choice of harvest levels for 2004 involves a tradeoff between levels of risk to the resources and economic impacts to the users. On one side is the need to control human impacts (harvest) in order to achieve a timely recovery of overfished stocks (to ensure long-term benefits related to production, ecosystem services, and existence values). On the other side, short term needs for commercial and recreational fisheries, along with the businesses and communities that depend on those fisheries, must be considered. The risks of overfishing and the consequent reduction of long-term benefits from the fishery are greatest under the *High OY* alternative. The risk would be lowest under the *Low OY* alternative. The *Medium OY* alternative and *Council OY* alternative entail intermediate levels of risk. Overfished stocks of particular concern in establishing 2003 harvest regulations are widow rockfish, canary rockfish, bocaccio, yelloweye rockfish, and darkblotched rockfish.

Table 2.4.0-1 summarizes the costs and benefits associated with the proposed actions. More detailed discussion of the impacts of the proposed action is provided in Chapter 4. The *Council OY* alternative will allow a slight increase in harvest as compared to the *No Action* alternative.

TABLE 2.4.0-1. Social net benefit summary. (Page 1 of 4)

Status Quo (2003)	Low OY	Med OY	High OY	Council OY
Long Term Benefits from Resource Use				
In general, harvest in 2004 (or any year) will increase the chance that future harvest might have to be at lower levels than would be the case if there were no harvest in 2004. However, some harvest is necessary to derive benefits from use of the resource and harvest policies are developed according to national standards which require the use of best available information and prohibit harvest in excess of the amount which will result in long-term MSY. There is always some uncertainty about assessments of stock biomass, stock productivity and fishing effects such that it is difficult to know the harvest level that will achieve MSY in any given year. In general, best estimates of MSY are used. In some cases the best estimates vary depending on underlying assumptions and there is limited information allowing decision makers to determine the best assumptions. After a best estimate of MSY is made, OY is sometimes set lower than MSY, reducing the probability that an overestimate of the MSY harvest level for the current year will result in biomass declines and a future cut-back in harvest. While for many stocks, OYs are set at MSY levels, there are a number of stocks that are at depressed or overfished biomass levels. OYs for those stocks with depressed biomass are set at below MSY levels in accordance with a precautionary policy. For overfished species, harvest levels are set to achieve rebuilding objectives, with lower harvest levels increasing the probability that rebuilding objectives will be achieved. The need to rebuild overfished species often constrains harvest of healthy stocks. As stocks recover, economic benefits from use of the resource will increase. Given that any harvest represents some risk, the following is an overall assessment of the level of risk to future biomass and production entailed by the alternatives as compared to status quo. Overall level of risk:				
	Lower than Status Quo	Similar to Status Quo	Higher than Status Quo	Similar to Status Quo
Seafood Harvest and Processing (Short Term)				
The best information available to reflect effects on the commercial seafood sector is exvessel revenue. Exvessel revenue reflects total income for harvesting vessels and the value of the primary input constraining production for buyers and processors. To derive net benefits for harvesters estimates of properly measured costs would have to be subtracted. Opportunity cost would be the proper measurement of cost for this type of analysis. Net benefit estimates for processors would require exprocessor revenues and processor cost information. Harvester and processor cost information is very limited and so at this time exvessel revenue is used to provide some sense of the magnitude of economic effect on the harvesting and processing sectors. The following values are for all ocean area harvest landed on the West Coast (including nongroundfish species, shoreside and at-sea whiting, tribal and nontribal harvest). Exvessel revenue (all):				
$229.2 mil	$217.7 mil	$232.5 mil	$241.7 mil	$231.9 mil
The effect on the groundfish segment of the industry is also indicated by the projected changes in groundfish revenue. The following data are the same as for the previous line except that nongroundfish species have been excluded. Exvessel revenue (nonwhiting groundfish):				
$55.8 mil	$44.4 mil	$59.2 mil	$68.3 mil	$58.6 mil

TABLE 2.4.0-1. Social net benefit summary. (Page 2 of 4)

Status Quo (2003)	Low OY	Med OY	High OY	Council OY

Related notes:

"Opportunity Costs" are deducted from revenues to determine net social benefits. For example, expenditures on harvest, such as the cost of labor, do not count as an economic opportunity cost if the labor would otherwise be unemployed. Additionally, if the labor would have been employed but at a lower earnings rate, then the difference between the earnings in the fishery and next best alternative employment would not be counted as a cost (i.e., only the next best wage rate would be counted as a cost). The cost of an existing vessel is another cost to the firm that would not be considered a cost from the national viewpoint. If firms cannot make a profit given the capital costs of an existing vessel, the vessel will tend to be resold at lower prices until the vessel price is low enough to make its operation economically viable. The vessel is likely to stay active so long as revenue is sufficient to cover the operation and maintenance costs of the vessel.). If profits in the fishery are such that a vessel is likely to be replaced if lost, the cost of the vessels would become a consideration in a long-term analysis.

Exvessel prices do not reflect any other compensations the fishers may receive such as financing, food, fuel, boat storage, or any other non-price benefits. The extent of these non-price benefits for West Coast fisheries are unknown.

In general, under all alternatives other than *No Action*, the RCA will be narrower during most periods in more areas and fleets than in 2003, particularly south of Cape Mendocino. The primary exceptions for the trawl fishery are under the *Low* and *Council OY* alternative in the north for January through April; the inside boundary would move from 100 to 60-75 fathoms, while the outside line would come in from 250 to 200 fathoms (to 150 fathoms under the *Low OY* alternative). The primary exceptions for the nontrawl fisheries are under the *Low OY* alternative in the north; the outside boundary would move from 100 to 125 fathoms. The additional fishing flexibility provided by a smaller RCA for other areas and periods and other alternatives should reduce operation costs for some vessels.

Under the Council OY and the medium OY alternatives, the “B” platoon would be eliminated. In 2003, 29 trawl vessels participated in the “B” platoon fleet. Elimination of this fleet will also affect product flow for processors, primarily in March when vessels most regularly exercised the opportunities afforded by participation in the “B” platoon fleet. The monitoring and enforcement effort required for the RCA was substantially greater with the “B” platoon fleet in place that without. The costs and complexities of concern were associated with depth lines that changed for different vessels at different times depending on the platoon in which they participated.

In additions to the effects of this years management decisions, trawl vessels will also be impacted by the decision to require them to carry VMS units. These VMS units are expected to run less than $1,000. The requirement to carry VMS units is related to the need to enforce the RCA first created for the 2003 fishery. A committee will be meeting this fall and the coming year to consider extending this requirement to other sectors of the fleet.

In the coming year there will be a referendum sent to the industry on whether or not to have a groundfish limited entry trawl buyback program. If the referendum passes there will be up to $40 million available to buyback trawl permits ($10 million in the form of a grant and $30 million in the form of a loan to industry). The effect on individual firms will be two fold, first trip limits could be increased in season as a result of a reduction in the number of vessels in the industry. Second, the industry will need to pay back the $30 million loan through a landings fee. This landings fee will increase fishing businesses’ per pound costs of landing.

When groundfish harvest opportunities are reduced pressure is created to increase harvest in other fisheries. Conversely, increasing groundfish harvest opportunities may, over the short-term relieve some pressure in other fisheries. This relief is only temporary if capacity expands in response to any expansion of harvest opportunity. Because of the major contraction this industry has gone through over the last 4 to 5 years, and the likelihood that a full adjustment has not yet been made to reduced fishing opportunities, it is not expected that an expansion of harvest opportunity will lead to an expansion in capacity in the near future..

TABLE 2.4.0-1. Social net benefit summary. (Page 3 of 4)

Status Quo (2003)	Low OY	Med OY	High OY	Council OY
Seafood Consumers				
Estimates of "net" value to consumers involve measuring "consumer surplus", the amount consumers would be willing to pay over and above what they had to pay for the same product. The degree of consumer surplus for any particular consumer good is affected by the availability of close substitutes for the consumer good. There are a wide variety of substitute protein products available to consumers. This mitigates the importance of any particular protein source to consumers thereby diminishing the likely affect on consumer surplus. The result of changes in West Coast groundfish production is likely to be very small price changes in national markets. However, even very small price changes can amount to more substantial effects when aggregated across all related protein sales. Good estimates of consumer surplus for West Coast groundfish species are not available. The value of the harvest to consumers varies both by the amount of harvest and characteristic of the species harvested. The exvessel value information provided above also provides an indicator of the relative differences among the alternatives in terms of total consumer surplus generated. The all species exvessel revenue shown above is provided in the following row expressed as a percent change in exvessel revenue, as compared to status quo. Percent change in exvessel revenue (all):				
	-5%	1%	5%	1%
Recreational Harvest (Short Term)				
Charter Vessels: Increased recreational fishing opportunities under the alternatives should translate into increased demand for charter fishing trips, especially in Southern California. Compared with 2003 (No Action), bag limits are generally no more restrictive under any of the other alternatives. No estimates are available for net benefits from the charter vessel operation. Projected numbers of charter-angler trips under the alternatives are shown below:				
843,000 charter trips	1,244,000 charter trips	1,387,000 charter trips	1,434,000 charter trips	1,101,000 charter trips
Recreational Anglers: There is no difference between the alternatives in estimated effort for Washington, and little difference for Oregon. The greatest variation occurs in Southern California, where estimated private recreational effort under the *High OY* alternative is nearly 1.8 times greater than under *No Action*. In the North and Central California region, estimated private recreational effort is nearly 30% greater under the *High OY* alternative than under the *No Action* alternative. No estimates are available for net benefits from private recreational fishing trips. Projected numbers of private recreational-angler trips under the alternatives are shown below:				
2,587,000 private trips	3,494,000 private trips	3,796,000 private trips	3,896,000 private trips	3,202,000 private trips
Quality of Recreational Fishing Experience: No estimates are available for net benefits from recreational fishing activity. But in general, compared with the No Action alternative, the quality of recreational trips increases under all of the 2004 management alternatives. There is an expansion of fishing opportunities into areas and seasons that were closed in 2003. In California, bag limits for bocaccio are also increased from the No Action scenario. The configuration of seasons and areas open for fishing under the alternatives coincides with summer vacation schedules and favorable weather and so should increase demand for recreational fishing experience.				

TABLE 2.4.0-1. Social net benefit summary. (Page 4 of 4)

Status Quo (2003)	Low OY	Med OY	High OY	Council OY

Existence, Bequeathal, Option Values

Those who are not currently using the fish resource may experience one or more of the following benefits from a more conservative approach to management 1) existence value derived from knowing a fish population or ecosystem is protected without intent to harvest, observe, or otherwise derive direct benefits from the resource; 2) bequeathal value placed on knowing a fish population, habitat, or ecosystem is protected for the benefit of future generations; and 3) options value placed on knowing a fish population, habitat, or ecosystem has been protected and is available for use, regardless of whether the resources are actually used. These values may be closely related and overlap with values the general public places on wildlife and natural parks. Participants in the fishery may hold similar values and derive some nonuse type benefits from more conservative approaches to management in addition to use benefits. The following are the total metric tons covered by the groundfish ABCs and OYs, including whiting. For the Council OY alternative the medium whiting OY was assumed. Metric tons:

ABC	OY	ABC	OY	ABC	OY	ABC	OY	ABC	OY
280,885	230,038	188,613	155,096	283,066	232,656	377,607	308,119	282,880	232,600
Change Relative to Status Quo		-92,272	-74,942	2,181	2,618	96,722	78,081	1,995	2,562

The following rows contain similar information but with whiting excluded.

92,885	81,838	94,613	80,996	95,066	84,456	95,607	85,819	94,880	84,400
Change Relative to Status Quo		1,728	-842	2,181	2,618	2,722	3,981	1,995	2,562

Public Sector - Government Costs (Short Term)

The need to enforce depth restrictions substantially increased enforcement costs in 2003. For the 2004 fishery the VMS system will be in place for trawl vessels helping reduce costs. Additionally, the enforcement of depth restrictions will be simplified to some degree by the elimination of the “B” platoon fleet.

3.0 AFFECTED ENVIRONMENT

The affected environment description is subdivided into five main sections, describing different components of the human environment. Section 3.1 describes, in general terms, the habitats of and ecological relationships between the marine species potentially affected by the proposed action. Section 3.2 describes potentially affected groundfish and non-fish species. Section 3.3 describes species protected under other legal mandates such as the Endangered Species Act and the Marine Mammal Protection Act. Section 3.4 describes the management regime, including the various sources of risk and uncertainty that affect groundfish management. Section 3.5 covers socioeconomic components of the human environment, including descriptions of the different fisheries and support industries exploiting groundfish and coastal communities dependent on or substantially engaged in fishing.

3.1 Ecosystem, Habitat, and Biodiversity

Ecosystem and habitat, discussed below, are closely related concepts. Ecosystems embody both the relationships between species, represented by the flow of material and energy through a network of relationships, and the sum total of the species comprising the system within a given physical setting. This overlaps with habitat as the physical and biological attributes to the space occupied by a particular species. The ecosystem concept is reflected in groundfish management through the use of biogeographic zones and species complexes to distinguish the application of management measures. These ecological divisions have both a north south component, with Cape Mendocino representing an important break in the distribution of many groundfish species (particularly rockfish), hence the use of the 40°10' N. line of latitude (or alternatively, 40°30' N latitude). Point Conception represents another important biogeographic boundary considered when crafting management measures. A second, and perhaps more influential, ecological demarcation depends on distance from shore, or depth. Groundfish are managed based on distinction between nearshore, continental shelf, and continental slope species. Distinct species assemblages characterize these zones; in addition, there are differences between the zones based on possible vertical distribution of species. Finally, particular species may exhibit seasonal migrations, producing some annual variation in the characteristics of these different ecological zones. The nearshore, shelf, and slope ecosystems can be characterized by combinations of the habitat composites described below, the species assemblages particular to these ecosystems, and the trophic relationships between these species. More specific information on trophic relationships may be found in the managed species descriptions in Section 3.2.

Bathymetry and physical topography helps determine habitat, by influencing its physical structure, and also the co-occurrence of species. The U.S. West Coast is characterized by a relatively narrow continental shelf. The 200 m depth contour shows a shelf break closest to the shoreline off Cape Mendocino, Point Sur, and in the Southern California Bight; and widest from Central Oregon north to the Canadian border, as well as off Monterey Bay. Deep submarine canyons pocket the EEZ, with depths greater than 4,000 m south of Cape Mendocino (Figure 3.1.1-1).

As on land, climate is another important ecological determinant. However, in the ocean's fluid medium, currents are the predominant expression of this broad environmental influence. Not only do currents influence water temperature, vertical mixing and movement can bring nutrient-rich, deep-bottom water into the photic zone, strongly influencing biological productivity. In the North Pacific Ocean, the large, clockwise-moving North Pacific Gyre circulates cold, subarctic surface water eastward across the North Pacific, splitting at the North American continent into the northward-moving Alaska Current and the southward-moving California Current (Figure 3.1.1-2). Along the U.S. West Coast, the surface California Current flows southward through the U.S. West Coast EEZ. The California Current is known as an eastern boundary current, meaning it draws ocean water along the eastern edge of an oceanic current gyre. The northward-moving California Undercurrent flows along the continental margin and beneath the California Current. Influenced by the California Current system and coastal winds, waters off the U.S. West Coast are subject to major nutrient upwelling, particularly off Cape Mendocino (Bakun 1996). Shoreline topographic features such as Cape Blanco and Point Conception, and bathymetric features such as banks, canyons, and other submerged features, often create large-scale current patterns such as eddies, jets, and squirts. For example, a current jet off Cape Blanco drives surface water offshore, which is replaced by upwelling sub-surface water (Barth *et al.* 2000). One of the better known current eddies off the West Coast occurs in the Southern California Bight between Point Conception and Baja, California (Longhurst 1998), wherein the current circles back on itself by moving in a northward and counterclockwise motion just within the Bight.

While the seasonal environmental effects of the California Current and related lesser current patterns are easily observable (Lynn and Simpson 1987), the influence of longer period cycles has only been appreciated recently. The effect of El Niño-Southern Oscillation (ENSO) events on climate and ocean productivity in the northeast Pacific is relatively well-known. In the past decade a still longer period cycle, termed the Pacific Decadal Oscillation or PDO, has been identified. Although similar in effect, instead of the one-year to two-year periodicity of ENSO, PDO events affect ocean conditions for 15 years to 25 years (Mantua in press). The PDO shifts between warm and cool phases. The warm phase is characterized by warmer temperatures in the northeast Pacific (including the West Coast) and cooler-than-average sea surface temperatures and lower-than-average sea level air pressure in the central North Pacific; opposite conditions prevail during cool phases. Because the effects are similar, "in-phase" ENSO events (e.g., an El Niño during a PDO warm phase) can be intensified. (However, aside from these phase effects, PDO conditions, although of much longer duration than ENSO events, are milder. It is also important to note that—while the fundamental causes of PDO are not fully understood—they are known to be different from those driving ENSO events. And while ENSO has its primary effect on the tropical Pacific, with secondary effects in colder regions, the opposite is true of PDO; its primary effects occur in the northeast Pacific.) The ecosystem effects of PDO conditions are pervasive. Climate conditions directly affect primary production (phytoplankton abundance), but ecosystem linkages ensure these changes influence the abundance of higher trophic level organisms, including fish populations targeted by fishers (Francis *et al.* 1998). Scientists have identified four regime shifts during the twentieth century, with the most recent occurring in 1976/1977, when a warm phase began. This has produced less productive ocean conditions off the West Coast and more favorable conditions around Alaska. For example, Hare *et al.* (1999) document the inverse relationship between salmon production in Alaska and the Pacific Northwest and relate this to PDO-influenced ocean conditions. Researchers have identified similar relationships between meso-scale climate regimes and the productivity of other fish populations, including groundfish (see Francis *et al.* 1998 for a review). Researchers have recently identified a second regime shift, occurring in 1989 (Hare and Mantua 2000), which apparently resulted in a further decline in the productivity of some fish populations in the northeast Pacific, including some groundfish species (McFarlane *et al.* 2000). (Pacific hake and sardine populations, in contrast, showed increases.) Hare and Mantua (2000) hypothesize that a still longer, 50 year to 70 year oscillation may combine with the 15 year to 25 year PDO to produce shifts that vary in their characteristics, as do the 1977 and 1989 phenomena. However, a shift to a more favorable PDO cold phase may have occurred in the late 1990s, as evidenced in recent measurements of sea surface temperature (Bernton 2000).

The influence of ocean conditions, and in particular meso-scale climate regimes that can rapidly shift phases, is an important issue for annual management. As Hare and Mantua (2000) point out, current assessment models do not account for these changes in environmental conditions, which may lead to under- or over-estimation of population productivity. In turn, the range of OY values in the harvest level alternatives are derived from these assessments. Unfortunately, the inability to predict regime shifts and determine the precise correlation between environmental conditions and population productivity, preclude the incorporation of such measurements into assessment models. In contrast, fishers' direct empirical evidence (albeit unquantified) of recent increases in productivity (visible, for example, in the abundance of juvenile bocaccio due to a strong year class) causes some to distrust scientific assessments that lead to further reductions in harvest specifications. (These issues are closely related to the nature of scientific uncertainty in the management process, discussed in Section 3.4.7.)

In summary, harvest level alternatives can be evaluated for their effects on several ecosystem-related issues. By specifying the maximum amount of fish that may be removed through fishing, these alternatives affect abundance, which in turn can contribute to changes in trophic relationships (target species as either predators or prey) and community structure (relative abundance of species within an assemblage). As just discussed, climate variation at various time scales (e.g., ENSO, PDO) complicates accurate determination of OY harvests through medium- to long-term shifts in population productivity. These effects are indirect and cumulative, especially since ecosystem effects are more likely to affect population changes that are the result of harvests over several years.

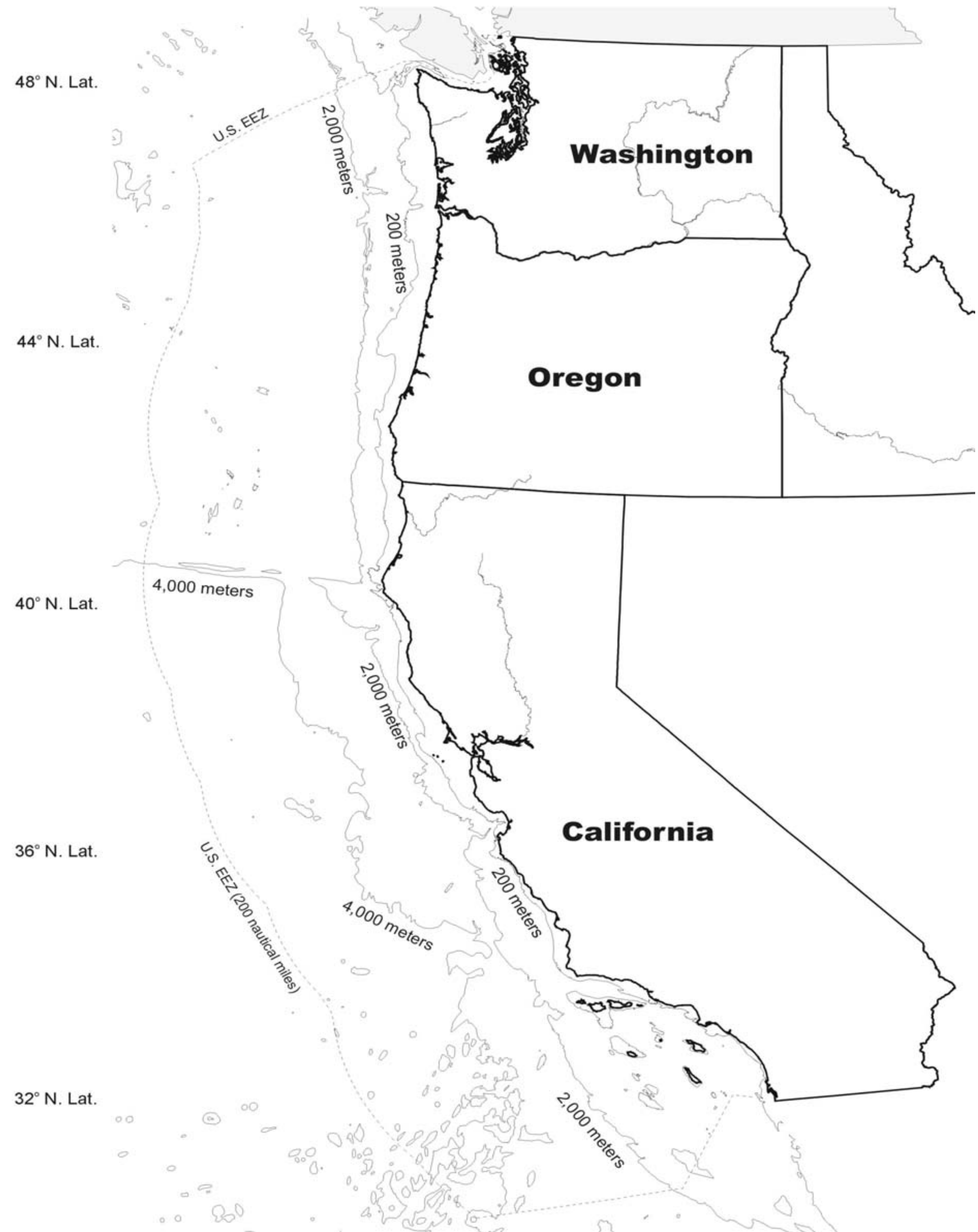

FIGURE 3.1.1-1. Bathymetry of the U.S. West Coast.

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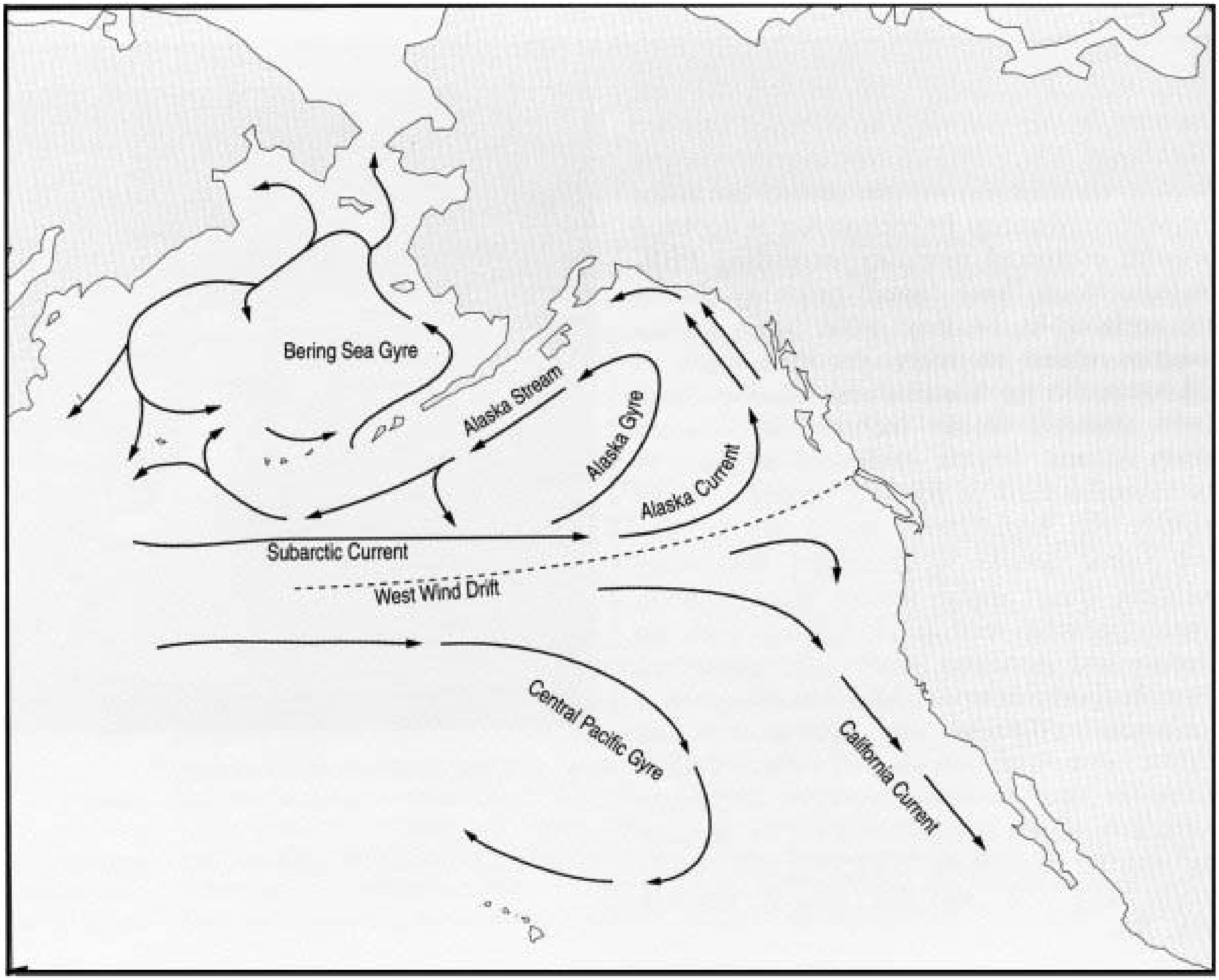

FIGURE 3.1.1-2. Surface current systems of the northeast Pacific Ocean.

3.1.2 Essential Fish Habitat

The 1996 Sustainable Fisheries Act re-authorizing and amending the Magnuson-Stevens Act obligates the Councils and NMFS to identify and characterize EFH, which for West Coast groundfish is defined as the aquatic habitat necessary to allow for groundfish production to support long-term sustainable fisheries for groundfish and for groundfish contributions to a healthy ecosystem. To satisfy this description, EFH must be described for all life history stages of managed species. EFH descriptions have been incorporated into the groundfish FMP in a detailed appendix (available online at: http://www.nwr.noaa.gov/1sustfsh/efhappendix/page1.html). West Coast groundfish species managed by the groundfish FMP occur throughout the EEZ and occupy diverse habitats at all stages in their life histories. EFH may be large because a species' pelagic eggs and larvae are widely dispersed, for example, or comparatively small as is the case with the adults of many nearshore rockfishes which show strong affinities to a particular location or type of substrate.

This section summarizes the more than 400 EFH areas identified in the groundfish FMP for all the different life history stages of West Coast groundfish species. This EFH collectively includes all waters from the mean high water line and the upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon, and California seaward to the boundary of the U.S. EEZ.

The groundfish FMP groups the various EFH descriptions into seven major habitat types called "composite" EFHs. This approach focuses on ecological relationships among species and between the species and their habitat, reflecting an ecosystem approach in defining EFH. The seven composite EFH identifications are as follows:

1. Estuarine - Those waters, substrates and associated biological communities within bays and estuaries of the EEZ, from mean higher high water level (MHHW, which is the high tide line) or extent of upriver saltwater intrusion to the respective outer boundaries for each bay or estuary as defined in 33 CFR 80.1 (Coast Guard lines of demarcation).

2. Rocky Shelf - Those waters, substrates, and associated biological communities living on or within ten meters (5.5 fm) overlying rocky areas, including reefs, pinnacles, boulders and cobble, along the continental shelf, excluding canyons, from the high tide line MHHW to the shelf break (~200 meters or 109 fm).

3. Non-rocky Shelf - Those waters, substrates, and associated biological communities living on or within ten meters (5.5 fm) overlying the substrates of the continental shelf, excluding the rocky shelf and canyon composites, from the high tide line MHHW to the shelf break (~200 meters or 109 fm).

4. Canyon - Those waters, substrates, and associated biological communities living within submarine canyons, including the walls, beds, seafloor, and any outcrops or landslide morphology, such as slump scarps and debris fields.

5. Continental Slope/Basin - Those waters, substrates, and biological communities living on or within 20 meters (11 fm) overlying the substrates of the continental slope and basin below the shelf break (~200 meters or 109 fm) and extending to the westward boundary of the EEZ.

6. Neritic Zone - Those waters and biological communities living in the water column more than ten meters (5.5 fm) above the continental shelf.

7. Oceanic Zone - Those waters and biological communities living in the water column more than 20 meters (11 fm) above the continental slope and abyssal plain, extending to the westward boundary of the EEZ.

Management measure alternatives that affect fishing activities having potential adverse effects on EFH must be evaluated. Evaluation of fishery effects on EFH is done through a consultation process with NMFS Office of Habitat Conservation. One method of evaluating fishery effects is based on fishing effects on habitat types. As discussed in the groundfish FMP, fishing gear can damage benthic habitat, which may contribute to the kinds of ecological effects described in the previous section. Altered habitat may favor some species, contributing to a change in community structure, and more broadly, to the population productivity of fish populations caught in fisheries.

3.2 Groundfish Resources

There are over 80 species of groundfish managed under the groundfish FMP. These species include over 60 species of rockfish in the family *Scorpaenidae*, 7 roundfish species, 12 flatfish species, assorted shark, skate, and a few miscellaneous bottom-dwelling marine fish species. Management of these groundfish species is based on principles outlined in the Magnuson-Stevens Act, groundfish FMP, and NSG, which interpret the tenets of the Magnuson-Stevens Act. Stock assessments are based on resource surveys, catch trends in West Coast fisheries, and other sources of informative data. Section 3.4.2 describes, in general terms, how stock assessments are conducted and reviewed before they are applied in West Coast groundfish management. Table 3.2.0-1 depicts the latitudinal and depth distributions of groundfish species managed under the groundfish FMP.

The passage of the Sustainable Fisheries Act in 1996 incorporated current conservation and rebuilding mandates into the Magnuson-Stevens Act. These mandates—including abundance-based standards for declaring a stock overfished, in a “precautionary” status, or at levels that can support MSY (healthy or “rebuilt”)—were subsequently incorporated in the groundfish FMP with adoption of Amendments 11 and 12. The abundance-based reference points for managing West Coast groundfish species are relative to an estimate of “virgin” or unexploited biomass of the stock, which is denoted as B_0 and is defined as the average equilibrium abundance of a stock's spawning biomass before it is affected by fishing-related mortality. The Magnuson-Stevens Act and NSG employ the MSY concept to frame management objectives. MSY represents a theoretical maximum surplus production from a population of constant size; NSG define it as “the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions.” Thus, for a given population, and set of ecological conditions, there is a biomass that produces MSY (denoted as B_{MSY}), which is less than the equilibrium size in the absence of fishing (B_0). (Generally, population sizes above B_{MSY} are less productive, because of competition for resources.) The harvest rate used to specify harvest levels designed to achieve or sustain B_{MSY} is referred to as the Maximum Fishing Mortality Threshold (MFMT, denoted as F_{MSY}). There are two harvest specification reference points defined in the groundfish FMP, a total catch OY and an ABC. The OY is typically the management target and is usually less than the ABC, based on the need to rebuild stocks to B_{MSY} (see the following discussion). The ABC, which is the maximum allowable harvest, is calculated by applying an estimated or proxy F_{MSY} harvest rate to the estimated abundance of the exploitable stock.

The Council-specified proxy MSY abundance for most West Coast groundfish species is 40% of B_0 (denoted as $B_{40\%}$). The Council-specified threshold for declaring a stock overfished is when the stock's spawning biomass declines to less than 25% of B_0 (denoted as $B_{25\%}$). The Magnuson-Stevens Act and NSG refer to this threshold as the Minimum Stock Size Threshold or MSST. A rebuilding plan that specifies how total fishing-related mortality is constrained to achieve an MSY abundance level within the legally allowed time is required by the Magnuson-Stevens Act and groundfish FMP when a stock is declared overfished. The harvest levels considered for overfished groundfish stocks in 2003 are based on a range of harvest rates estimated to rebuild these stocks within the requisite time at different probabilities.

Stocks estimated to be above the overfishing threshold yet below an abundance level that supports MSY are considered to be in the "precautionary zone". The Council has specified precautionary reductions in harvest rate for such stocks to increase abundance to $B_{40\%}$. The methodology for determining this precautionary reduction is described in the groundfish FMP and is referred to as the 40-10 adjustment. As the stock declines below $B_{40\%}$, the total catch OY is reduced from the ABC until, at 10% of B_0, the OY is set to zero. However, in practice the 40-10 adjustment only applies to stocks above $B_{25\%}$ (the MSST) because once a stock falls below this level, an adopted rebuilding plan supplants it. Most stocks with an estimated abundance greater than $B_{40\%}$ are managed by setting harvest to the ABC. Figure 3.2.0-1 presents this framework graphically.

Section 3.2.1 through Section 3.2.3 describe groundfish stocks according to the categories just described: overfished, precautionary zone, and healthy. However, it is important to realize that of the more than 80 species in the management unit only a portion are individually managed. Thus, Section 3.2.3, covering stocks at or above target stock size, describes five species managed under separate harvest specifications. The remaining species are managed and accounted for in groupings or stock complexes because individually they comprise a small part of the landed catch and insufficient information exists to develop the stock assessments necessary to set an OY based on yield estimates. (The groundfish FMP identifies the OY for these species as an average of historical catch, based on the assumption that this is below MSY.)

Section 3.2.4 describes stocks that may be affected, because they are caught incidentally in groundfish fisheries, or conversely because the fisheries targeting them catch groundfish incidentally, and therefore, may be regulated to reduce or eliminate this incidental catch (thus, indirectly affecting the catch of these nongroundfish species).

TABLE 3.2.0-1. Latitudinal and depth distributions of groundfish species (adults) managed under the Pacific Coast Groundfish Fishery Management Plan.[a/] (Page 1 of 3)

		Latitudinal Distribution		Depth Distribution (fm)	
Common name	**Scientific name**	**Overall**	**Highest Density**	**Overall**	**Highest Density Highest Density**
		Flatfish Species			
Arrowtooth flounder	*Atheresthes stomias*	N. 34°N. lat.	N. 40°N. lat.	10-400	27-270
Butter sole	*Isopsetta isolepis*	N. 34°N. lat.	N. 34°N. lat.	0-200	0-100
Curlfin sole	*Pleuronichthys decurrens*	Coastwide	Coastwide	4-291	4-50
Dover sole	*Microstomus pacificus*	Coastwide	Coastwide	10-500	110-270
English sole	*Parophrys vetulus*	Coastwide	Coastwide	0-300	40-200
Flathead sole	*Hippoglossoides elassodon*	N. 38°N. lat.	N. 40°N. lat.	3-300	100-200
Pacific sanddab	*Citharichthys sordidus*	Coastwide	Coastwide	0-300	0-82
Petrale sole	*Eopsetta jordani*	Coastwide	Coastwide	10-250	160-250
Rex sole	*Glyptocephalus zachirus*	Coastwide	Coastwide	10-350	27-250
Rock sole	*Lepidopsetta bilineata*	Coastwide	N. 32°30'N. lat.	0-200	summer 10-44 winter 70-150
Sand sole	*Psettichthys melanostictus*	Coastwide	N. 33°50'N. lat.	0-100	0-44
Starry flounder	*Platichthys stellatus*	Coastwide	N. 34°20'N. lat.	0-150	0-82
		Rockfish Species			
Aurora rockfish	*Sebastes aurora*	Coastwide	Coastwide	100-420	82-270
Bank rockfish	*Sebastes rufus*	S. 39°30'N. lat.	S. 39°30'N. lat.	17-135	115-140
Black rockfish	*Sebastes melanops*	N. 34°N. lat.	N. 34°N. lat.	0-200	0-30
Black-and-yellow rockfish	*Sebastes chrysomelas*	S. 40°N. lat.	S. 40°N. lat.	0-20	0-10
Blackgill rockfish	*Sebastes melanostomus*	Coastwide	S. 40°N. lat.	48-420	125-300
Blue rockfish	*Sebastes mystinus*	Coastwide	Coastwide	0-300	13-21
Bocaccio[b/]	*Sebastes paucispinis*	Coastwide	S. 40° N. lat., N. 48° N. lat.	15-180	54-82
Bronzespotted rockfish	*Sebastes gilli*	S. 37°N. lat.	S. 37°N. lat.	41-205	110-160
Brown rockfish	*Sebastes auriculatus*	Coastwide	S. 40°N. lat.	0-70	0-50
Calico rockfish	*Sebastes dallii*	S. 38°N. lat.	S. 33°N. lat.	10-140	33-50
California scorpionfish rockfish	*Scorpaena gutatta*	S. 37°N. lat.	S. 34°27'N. lat.	0-100	0-100
Canary rockfish	*Sebastes pinniger*	Coastwide	Coastwide	50-150	50-100
Chameleon rockfish	*Sebastes phillipsi*	37°- 33°N. lat.	37°- 33°N. lat.	95-150	95-150
Chilipepper	*Sebastes goodei*	Coastwide	34°- 40°N. lat.	27-190	27-190
China rockfish	*Sebastes nebulosus*	N. 34°N. lat.	N. 35°N. lat.	0-70	2-50
Copper rockfish	*Sebastes caurinus*	Coastwide	S. 40°N. lat.	0-100	0-100
Cowcod	*Sebastes levis*	S. 40°N. lat.	S. 34°27'N. lat.	22-203	100-130
Darkblotched rockfish	*Sebastes crameri*	N. 33°N. lat.	N. 38°N. lat.	16-300	96-220
Dusky rockfish[c/]	*Sebastes ciliatus*	N. 55°N. lat.	N. 55°N. lat.	0-150	0-150
Dwarf-Red rockfish[d/]	*Sebastes rufinanus*	33° N. lat.	33°N. lat.	>100	>100
Flag rockfish	*Sebastes rubrivinctus*	S. 38° N. lat.	S. 37°N. lat.	17-100	shallow
Freckled rockfish	*Sebastes lentignosus*	S. 33° N.l at.	S. 33° N. lat.	22-92	22-92
Gopher rockfish	*Sebastes carnatus*	S. 40° N. lat.	S. 40°N. lat.	0-30	0-16
Grass rockfish	*Sebastes rastrelliger*	S. 44°40' N. lat.	S. 40°N. lat.	0-25	0-8
Greenblotched rockfish	*Sebastes rosenblatti*	S. 38°N. lat.	S. 38° N. lat.	33-217	115-130
Greenspotted rockfish	*Sebastes chlorostictus*	S. 47° N. lat.	S. 40° N. lat.	27-110	50-100
Greenstriped rockfish	*Sebastes elongatus*	Coastwide	Coastwide	33-220	27-136
Halfbanded rockfish	*Sebastes semicinctus*	S. 36°40' N. lat.	S. 36°40' N. lat.	32-220	32-220
Harlequin rockfish[e/]	*Sebastes variegatus*	N. 40° N. lat.	N. 51° N. lat.	38-167	38-167
Honeycomb rockfish	*Sebastes umbrosus*	S. 36°40' N. lat.	S. 34°27' N. lat.	16-65	16-38

TABLE 3.2.0-1. Latitudinal and depth distributions of groundfish species (adults) managed under the Pacific Coast Groundfish Fishery Management Plan.[a/] (Page 2 of 3)

		Latitudinal Distribution		Depth Distribution (fm)	
Common name	Scientific name	Overall	Highest Density	Overall	Highest Density Highest Density
Kelp rockfish	*Sebastes atrovirens*	S. 39° N. lat.	S. 37° N. lat.	0-25	3-4
Longspine thornyhead	*Sebastolobus altivelis*	Coastwide	Coastwide	167->833	320-550
Mexican rockfish	*Sebastes macdonaldi*	S. 36°20' N. lat.	S. 36°20' N. lat.	50-140	50-140
Olive rockfish	*Sebastes serranoides*	S. 41°20' N. lat.	S. 40° N. lat.	0-80	0-16
Pacific ocean perch	*Sebastes alutus*	Coastwide	N. 42° N. lat.	30-350	110-220
Pink rockfish	*Sebastes eos*	S. 37° N. lat.	S. 35° N. lat.	40-200	40-200
Pinkrose rockfish	*Sebastes simulator*	S. 34° N. lat.	S. 34° N. lat.	54-160	108
Puget Sound rockfish	*Sebastes emphaeus*	N. 40° N. lat.	N. 40° N. lat.	6-200	6-200
Pygmy rockfish	*Sebastes wilsoni*	N. 32°30' N.l at.	N. 32°30' N. lat.	17-150	17-150
Quillback rockfish	*Sebastes maliger*	N. 36°20' N. lat.	N. 40° N. lat.	0-150	22-33
Redbanded rockfish	*Sebastes babcocki*	Coastwide	N. 37° N. lat.	50-260	82-245
Redstripe rockfish	*Sebastes proriger*	N. 37° N. lat.	N. 37° N. lat.	7-190	55-190
Rosethorn rockfish	*Sebastes helvomaculatus*	Coastwide	N. 38° N. lat.	65-300	55-190
Rosy rockfish	*Sebastes rosaceus*	S. 42° N. lat.	S. 40° N. lat.	8-70	30-58
Rougheye rockfish	*Sebastes aleutianus*	Coastwide	N. 40° N. lat.	27-400	27-250
Semaphore rockfish	*Sebastes melanosema*	S. 34°27' N. lat.	S. 34°27' N. lat.	75-100	75-100
Sharpchin rockfish	*Sebastes zacentrus*	Coastwide	Coastwide	50-175	50-175
Shortbelly rockfish	*Sebastes jordani*	Coastwide	S. 46°N. lat.	50-175	50-155
Shortraker rockfish	*Sebastes borealis*	N. 39°30' N. lat.	N. 44° N. lat.	110-220	110-220
Shortspine thornyhead	*Sebastolobus alascanus*	Coastwide	Coastwide	14->833	55-550
Silvergray rockfish	*Sebastes brevispinis*	Coastwide	N. 40° N. lat.	17-200	55-160
Speckled rockfish	*Sebastes ovalis*	S. 38° N. lat.	S. 37° N. lat.	17-200	41-83
Splitnose rockfish	*Sebastes diploproa*	Coastwide	Coastwide	50-317	55-250
Squarespot rockfish	*Sebastes hopkinsi*	S. 38° N. lat.	S. 36° N. lat.	10-100	10-100
Starry rockfish	*Sebastes constellatus*	S. 38° N. lat.	S. 37° N. lat.	13-150	13-150
Stripetail rockfish	*Sebastes saxicola*	Coastwide	Coastwide	5-230	5-190
Swordspine rockfish	*Sebastes ensifer*	S. 38° N. lat.	S. 38° N. lat.	38-237	38-237
Tiger rockfish	*Sebastes nigrocinctus*	N. 35° N. lat.	N. 35° N. lat.	30-170	35-170
Treefish	*Sebastes serriceps*	S. 38° N. lat.	S. 34°27' N. lat.	0-25	3-16
Vermillion rockfish	*Sebastes miniatus*	Coastwide	Coastwide	0-150	4-130
Widow rockfish	*Sebastes entomelas*	Coastwide	N. 37° N. lat.	13-200	55-160
Yelloweye rockfish	*Sebastes ruberrimus*	Coastwide	N. 36° N. lat.	25-300	27-220
Yellowmouth rockfish	*Sebastes reedi*	N. 40° N. lat.	N. 40° N. lat.	77-200	150-200
Yellowtail rockfish	*Sebastes flavidus*	Coastwide	N. 37° N. lat.	27-300	27-160
Roundfish Species					
Cabezon	*Scorpaenichthys marmoratus*	Coastwide	Coastwide	0-42	0-27
Kelp greenling	*Hexagrammos decagrammus*	Coastwide	N. 40° N. lat.	0-25	0-10
Lingcod	*Ophiodon elongatus*	Coastwide	Coastwide	0-233	0-40
Pacific cod	*Gadus macrocephalus*	N. 34° N. lat.	N. 40° N. lat.	7-300	27-160
Pacific whiting	*Merluccius productus*	Coastwide	Coastwide	20-500	27-270
Sablefish	*Anoplopoma fimbria*	Coastwide	Coastwide	27->1,000	110-550
Shark and Skate Species					
Big skate	*Raja binoculata*	Coastwide	S. 46° N. lat.	2-110	27-110
California skate	*Raja inornata*	Coastwide	S. 39° N. lat.	0-367	0-10

TABLE 3.2.0-1. Latitudinal and depth distributions of groundfish species (adults) managed under the Pacific Coast Groundfish Fishery Management Plan.[a/] (Page 3 of 3)

		Latitudinal Distribution		Depth Distribution (fm)	
Common name	Scientific name	Overall	Highest Density	Overall	Highest Density Highest Density
Leopard shark	*Triakis semifasciata*	S. 46°N. lat.	S. 46° N. lat.	0-50	0-2
Longnose skate	*Raja rhina*	Coastwide	N. 46° N. lat.	30-410	30-340
Soupfin shark	*Galeorhinus zyopterus*	Coastwide	Coastwide	0-225	0-225
Spiny dogfish	*Squalus acanthias*	Coastwide	Coastwide	0->640	0-190
Other Species					
Finescale codling	*Antimora microlepis*	Coastwide	N. 38° N. lat.	190-1,588	190-470
Pacific rattail	*Coryphaenoides acrolepis*	Coastwide	N. 38° N. lat. Coastwide	85-1,350	500-1,350
Ratfish	*Hydrolagus colliei*	Coastwide	Coastwide	0-499	55-82

a/ Data from Casillas *et al.* 1998, Eschmeyer *et al.* 1983, Hart 1973, Miller and Lea 1972, and NMFS survey data. Depth distributions refer to offshore distributions, not vertical distributions in the water column.

b/ Only the southern stock of bocaccio south of 40°10' N latitude is listed as overfished.

c/ Dusky rockfish do not occur on the U.S. West Coast south of 49° N latitude The species needs to be removed from the FMP.

d/ Dwarf-Red rockfish are a very rare species with only one occurrence listed in the literature (2 specimens from an underwater explosion off San Clemente Is., California in 1970; Eschmeyer *et al.* 1983). The species is not in the FMP.

e/ Only 2 occurrences of harlequin rockfish south of 51° N latitude (off Newport, Oregon and La Push, Washington; Casillas *et al.* 1998).

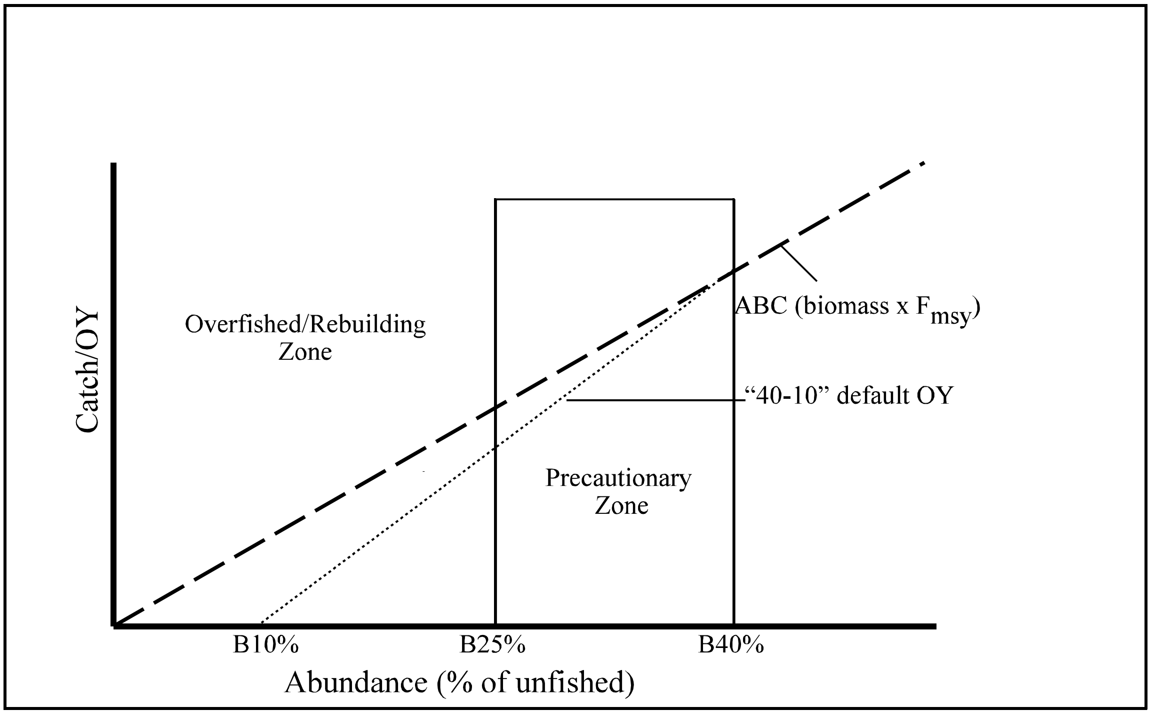

FIGURE 3.2.0-1. Illustration of default OY compared to ABC; the 40-10 rule.

3.2.1 Overfished Stocks

3.2.1.1 Bocaccio

Distribution and Life History

Bocaccio (*Sebastes paucispinis*) are found in the Gulf of Alaska off Krozoff and Kodiak Islands, south as far as Sacramento Reef, Baja, California (Hart 1988; Miller and Lea 1972b). In survey catches, Allen and Smith (1988) found bocaccio to be most common at 100 m to 150 m over the outer continental shelf. Casillas *et al.* (1998) determined the depth zone where the southern bocaccio stock is most prevalent is 54 fm to 82 fm. Sakuma and Ralston (1995) categorized bocaccio as both a nearshore and offshore species. Larvae and small juveniles are pelagic (Garrison and Miller 1982) and are commonly found in the upper 100 m of the water column, often far from shore (MBC 1987). Large juveniles and adults are semi-demersal and are most often found in shallow coastal waters over rocky bottoms associated with algae (Sakuma and Ralston 1995). Adults are commonly found in eelgrass beds, or congregated around floating kelp beds (Love *et al.* 1990; Sakuma and Ralston 1995). Young and adult bocaccio also occur around artificial structures, such as piers and oil platforms (MBC 1987). Although juveniles and adults are usually found around vertical relief, adult aggregations also occur over firm sand-mud bottoms (MBC 1987). Bocaccio move into shallow waters during their first year of life (Hart 1988), then move into deeper water with increased size and age (Garrison and Miller 1982).

Bocaccio are ovoviviparous (Garrison and Miller 1982; Hart 1988). Love *et al.* (1990) reported the spawning season to be protracted and last almost year-round (>10 months). Parturition occurs during January to April off Washington, November to March off Northern and Central California, and October to March off Southern California (MBC 1987). Two or more broods may be born in a year in California (Love *et al.* 1990). The spawning season is not well known in northern waters. Males mature at three years to seven years with 50% mature in four years to five years. Females mature at three years to eight years with 50% mature in four years to six years (MBC 1987).

Larval bocaccio often eat diatoms, dinoflagellates, tintinnids, and cladocerans (Sumida and Moser 1984). Copepods and euphausiids of all life stages (adults, nauplii and egg masses) are common prey for juveniles (Sumida and Moser 1984). Adults eat small fishes associated with kelp beds, including other species of rockfishes, and occasionally small amounts of shellfish (Sumida and Moser 1984). Bocaccio are eaten by sharks, salmon, other rockfishes, lingcod, albacore, sea lions, porpoises, and whales (MBC 1987). Bocaccio directly compete with chilipepper and widow rockfish, yellowtail, and shortbelly rockfishes for both food and habitat resources (Reilly *et al.* 1992).

Stock Status and Management History

There are two separate West Coast bocaccio populations. The southern stock exists south of Cape Mendocino and the northern stock north of 48° N latitude in northern Washington (off Cape Flattery). It is unclear whether the southern and northern stock separation implies stock structure. The disjoint distribution of the two populations and evidence of lack of genetic intermixing suggests stock structure, although MacCall (2002b), spoke to some recent evidence for limited genetic mixing between the two populations. Nonetheless, assessment scientists and managers have treated the two populations as independent stocks north and south of Cape Mendocino.

The northern stock has not been assessed. The southern stock has been assessed (Bence and Hightower 1990; Bence and Rogers 1992; MacCall 2002b; MacCall 2003b; MacCall *et al.* 1999; Ralston *et al.* 1996b) 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.* 1996b) indicated the stock was in severe decline and overfished. 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 MSY level.

While previous assessments only used data from Central and Northern California, an assessment in 2002 (MacCall and He 2002a) 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, the 1999 year class—though contributing a substantial quantity of fish to the population—did not contribute as much to rebuilding as was previously thought.

The latest assessment for bocaccio differs greatly from the 2002 assessment and 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 utilized larval abundance data from recent CalCOFI surveys as well as length and 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 effect 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 STAR Panel meeting, Dr. Alec MacCall presented a third “hybrid” model that incorporated the data from all of the indices. The SSC recommended and the Council approved the use of this third modeling approach which 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 metric tons 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 B_{MSY} within 25 years while sustaining an OY of approximately 300 metric tons in 2004.

3.2.1.2 Canary Rockfish

Distribution and Life History

Canary rockfish (*Sebastes pinniger*) are found between Cape Colnett, Baja, California, and southeastern Alaska (Boehlert 1980; Boehlert and Kappenman 1980; Hart 1988; Love 1991; Miller and Lea 1972b; Richardson and Laroche 1979). There is a major population concentration of canary rockfish off Oregon (Richardson and Laroche 1979). Canary rockfish primarily inhabit waters 91 m to 183 m (50 fm to 100 fm) deep (Boehlert and Kappenman 1980). In general, canary rockfish inhabit shallow water when they are young, and deep water as adults (Mason 1995). Adult canary rockfish are associated with pinnacles and sharp drop-offs (Love 1991) and are most abundant above hard bottoms (Boehlert and Kappenman 1980). Canary rockfish appear to be a reef-associated species in the southern part of its range (Boehlert 1980). In Central California, newly settled canary rockfish are first observed at the seaward sand-rock interface and farther seaward in deeper water (18 m to 24 m).

Canary rockfish off the West Coast exhibit a protracted spawning period from September through March, probably peaking in December and January off Washington and Oregon (Hart 1988; Johnson *et al.* 1982). Female canary rockfish reach sexual maturity at roughly eight years of age. Like many members of Sebastes, canary rockfish are ovoviviparous, whereby eggs are internally fertilized within females, and hatched eggs are released as live young (Bond 1979; Golden and Demory 1984; Kendall and Lenarz 1986). Canary rockfish are a relatively fecund species, with egg production being correlated with size, (e.g., a 49-cm female can produce roughly 0.8 million eggs, and a female that has realized maximum length (approximately 60 cm) produces approximately 1.5 million eggs (Gunderson 1971). Very little is known about the early life history strategies of canary rockfish, but limited research indicates larvae which are strictly pelagic (near ocean surface) for a short period of time, begin to migrate to demersal waters during the summer of their first year of life and develop into juveniles around nearshore rocky reefs, where they may congregate for up to three years (Boehlert 1980; Sampson 1996). Evaluations of length distributions by depth developed from NMFS shelf trawl survey data generally supported other research that suggests this species is characterized by an increasing trend in mean size of fish with depth (Archibald *et al.* 1981; Boehlert 1980). Female canary rockfish generally grow faster and reach slightly larger sizes than males, but do not appear to live longer than males. Adult canary rockfish feed primarily on small fishes, as well as planktonic creatures, such as krill and euphausiids (Love 1991; Phillips 1964).

Stock Status and Management History

From 1983 through 1994, canary rockfish were managed as part of the Sebastes complex, with various trip limits imposed over this period. In 1995, a limit specific to canary rockfish (cumulative monthly landing limit of 6,000 pounds) was imposed, and commercial vessels were expected to sort the canary rockfish from the mixed species categories such as the Sebastes complex. For 1998, catches of canary rockfish were regulated using a two-month cumulative landing limit of 40,000 pounds for the Sebastes complex, of which, no more than 15,000 pounds (38%) could be composed of canary rockfish. From 1998 to present, commercial groundfish fishing for canary rockfish has been drastically reduced, and the only significant take is that from incidental bycatch. Canary rockfish has become a limiting factor for other nongroundfish fisheries on the West Coast shelf.

The 1999 stock assessment documented the stock had declined below the overfished level ($B_{25\%}$)

in the northern area (Columbia and U.S. Vancouver INPFC areas Crone *et al.* 1999) and in the southern area (Conception, Monterey, and Eureka areas Williams *et al.* 1999) and 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. Rates of recovery were highly dependent upon the level of recent recruitment, which could not be estimated with high certainty. The initial rebuilding OY for 2001 and 2002 was set at 93 mt based upon a 50% probability of rebuilding by the year 2057, a medium level for these recent recruitments, and maintaining a constant annual catch of 93 mt through 2002 (see Table 3.2.1-1).

In 2002, an assessment was done coastwide for canary rockfish, treating the stock as a single unit from the Monterey INPFC area north through the U.S. Vancouver INPFC area, and thus, departing from the methodologies of past assessments (Methot and Piner 2002c). Although there is some evidence of genetic separation of the northern and southern stocks (Boehlert and Kappenman 1980; Wishard *et al.* 1980), the observed variability in growth rate by sex and area was not significantly different at small versus large spatial scales. They also determined the areas of highest canary rockfish density were off headlands that separate INPFC areas, which would tend to bias results if the assessment were stratified by area. A critical uncertainty in canary rockfish assessments is the lack of older, mature females in surveys and other assessment indices. The are two competing explanations for this observation. Older females could have a higher natural mortality rate, resulting in their disproportionate disappearance from the population. Alternatively, survey and fishing gears may be less effective at catching them, because older females hide in places inaccessible to the gear, for example. If this is the case, then these fish (which, because of their higher spawning output may make an important contribution to future recruitment) are part of the population, but remain un-sampled. Methot and Piner (2002a) combined these two hypotheses in a single age-structured version of the SSC-endorsed stock synthesis assessment model (Methot 2000b) by allowing female natural mortality to increase with the maturity function, but also allowing selectivity to be domed-shaped (the model determines the selectivity of survey and fishery gear as opposed to assuming a fixed selectivity). They estimated the current abundance of canary rockfish coastwide is about 8% of B_0 (Table 3.2.1-1). A canary rockfish rebuilding plan was adopted by the Council and submitted for incorporation in the groundfish FMP under Amendment 16-2.

3.2.1.3 Cowcod

Distribution and Life History

Cowcod (*Sebastes levis*) occur from Ranger Bank and Guadalupe Island, Baja, California to Usal, Mendocino County, California (Miller and Lea 1972b). Cowcod range from 21 m to 366 m in depth (Miller and Lea 1972b) and are considered to be parademersal (transitional between a midwater pelagic and benthic species). Adults are commonly found at depths of 180 m to 235 m and juveniles are most often found in 30 m to 149 m of water (Love *et al.* 1990). MacGregor (1986) found that larval cowcod are almost exclusively found in Southern California and may occur many miles offshore. Adult cowcod are primarily found over high relief rocky areas (Allen 1982). They are generally solitary, but occasionally aggregate (Love *et al.* 1990). Solitary subadult cowcod have been found in association with large white sea anemones on outfall pipes in Santa Monica Bay (Allen 1982). Juveniles occur over sandy bottom areas and solitary ones have been observed resting within a few centimeters of soft-bottom areas where gravel or other low relief was found (Allen 1982). Although cowcod are generally not migratory; they may move, to some extent, to follow food (Love 1991). Cowcod are ovoviviparous, and large females may produce up to three broods per season (Love *et al.* 1990). Spawning peaks in January in the Southern California Bight (MacGregor 1986). Cowcod grow to 94 cm (Allen 1982). Larvae emerge at about 5.0 mm (MacGregor 1986). Juveniles eat shrimp and crabs, and adults eat fish, octopus, and squid (Allen 1982).

Stock Status and Management History

The cowcod stock south of Cape Mendocino has experienced a long-term decline. Abundance indices decreased approximately ten-fold 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.

The cowcod stock in the Conception INPFC area was assessed in 1998 (Butler *et al.* 1999). Unfished spawning biomass (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. The stock's low productivity and declined spawning biomass necessitates an extended rebuilding period, estimated at 62 years with no fishing-related mortality (T_{MIN}) , to achieve a 1,350 mt B_{MSY} for the Conception management area (see Table 3.2.1-1).

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.

3.2.1.4 Darkblotched Rockfish

Distribution and Life History

Darkblotched rockfish (*Sebastes crameri*) are found from Santa Catalina Island off Southern California to the Bering Sea (Miller and Lea 1972a; Richardson and Laroche 1979). Off Oregon, Washington, and British Columbia it is primarily an outer shelf/upper slope species (Richardson and Laroche 1979). Distinct population groups have been found off the Oregon coast between 44°30' N latitude and 45°20' N latitude (Richardson and Laroche 1979). Adults occur in depths of 25 m to 600 m, and 95% are between 50 m and 400 m (Allen and Smith 1988). Off Central California, young darkblotched rockfish recruit to soft substrate and low (<1 m) relief reefs (Love *et al.* 1991). Darkblotched rockfish make limited migrations after they have recruited to the adult stock (Gunderson 1977).

Darkblotched rockfish are ovoviviparous (Nichol and Pikitch 1994). Insemination of female darkblotched rockfish occurs from August to December, fertilization and parturition occurs from December to March off Oregon and California, primarily in February off Oregon and Washington (Hart 1988; Nichol and Pikitch 1994; Richardson and Laroche 1979). Females attain 50% maturity at a greater size (36.5 cm) and age (8.4 years) than males (29.6 cm and 5.1 years) (Nichol and Pikitch 1994). Adults can grow to 57 cm (Hart 1988). Pelagic young are food for albacore (Hart 1988).

Stock Status and Management History

Darkblotched rockfish were managed as part of the coastwide Sebastes complex, which was later segregated into north and south management units divided at $40^{o}30'$ N latitude. The first assessment of darkblotched rockfish estimated the proxy MSY harvest rate and overfishing rate for the stock (Lenarz 1993). Lenarz (1993) estimated a range of likely natural mortalities (M = 0.025-0.05) for darkblotched rockfish based on a range of maximum ages (60 years to 105 years). He also estimated fishery selectivity from length compositions from the California fishery, which he converted to an age-based selectivity function. He then plotted the relative fecundity per recruit as a function of fishing-related and natural mortality to estimate an F_{MSY} of $F_{35\%}$ (the target MSY proxy harvest rate at that time) and $F_{20\%}$ (the overfishing harvest rate) relative to fecundity per recruit. He estimated the range of likely harvest rates (F) at the MSY target ($F_{35\%}$) was 0.04 to 0.06, and the overfishing harvest rate ($F_{20\%}$) ranged between 0.07 and 0.11. While Lenarz did not calculate an ABC for darkblotched rockfish, he did note the estimated harvest rates at MSY and overfishing were lower than expected. He also noted a trend of decreasing size of darkblotched rockfish from the length composition data he evaluated.

The next assessment that was informative for darkblotched rockfish addressed all West Coast Sebastes without individual ABCs (Rogers *et al.* 1996). Two methodologies were explored for estimating an ABC for darkblotched rockfish (1) fishing-related mortality was assumed to equal natural mortality (F=M) to estimate an $F_{35\%}$ harvest rate, and (2) estimation of $F_{35\%}$ using a simple stock synthesis model. In the F=M approach, a catchability adjustment (Q) to triennial survey data was calculated to estimate relative biomass of generic Sebastes. It was determined that adjusting Q by 0.5 and then by M approximated $F_{35\%}$ estimates from stock synthesis models for most rockfish. A Q of 0.8 (instead of 0.5) was assumed for darkblotched rockfish, since the survey swept most of the depth range of darkblotched rockfish and caught smaller fish than the fishery. The other factors that influenced the magnitude of Q was a noted decreasing trend in estimated survey biomass over time, and the estimated size at 50% maturity was greater than estimated size at 50% selectivity (i.e., the survey caught darkblotched rockfish at sizes less than those estimated for most maturing and mature fish). The F=M method was compared to a stock synthesis modeling approach that incorporated triennial survey data and a Pacific ocean perch bycatch effort index.

Rogers *et al.* (Rogers *et al.* 2000) assessed darkblotched stock status in 2000 and determined the stock was at 14-31% of its unfished level, depending on assumptions regarding the historic catch of darkblotched rockfish in the foreign fishery from 1965-1978. They incorporated five relative abundance indices in a length based stock synthesis model (Methot 1990) to derive current estimates of abundance and productivity. The five indices included three NMFS surveys with different latitudinal and depth coverages, the Pacific ocean perch effort index developed in the generic Sebastes assessment (Rogers *et al.* 1996), and a logbook index derived from California trawl logbook and species composition data stratified by major California port (Ralston 1999). Major uncertainties in the assessment model included the uncertain foreign catch composition, which had a significant effect on estimated unfished biomass (B_0), and assumptions regarding maturity, discard rates, and unchanging selectivity over time. Of these, the foreign catch of darkblotched influences our understanding of stock status the most; larger assumed historical catches increase estimates of B_0. Four accepted model runs varied the assumed foreign catch proportion from 0%-20%, which resulted in significant differences in B_0 and the spawning index. Only one of those model runs (assuming 0% foreign catch of darkblotched) estimated the stock was not overfished. In all cases, the spawning biomass increased over the three-year time period with the reduced catch and the estimated very large 1994 year class reaching maturity. The STAR Panel (PFMC 2000) and the GMT were unable to resolve the uncertainty in foreign catch composition. While the GMT thought it implausible that no darkblotched were caught in the foreign fishery, they could not offer a definitive recommendation. Therefore, the Stock Assessment Team's (STAT) assumption that 10% of foreign catch was comprised of darkblotched (Rogers *et al.* 2000) was accepted, leading to the conclusion that the spawning stock biomass was 22% of its unfished level.

Methot and Rogers (2001) prepared a rebuilding analysis for darkblotched that was recommended by the SSC and adopted by the Council in 2001. On the earlier recommendation of the SSC (June 2001 Council meeting), they incorporated results of the 2000 triennial slope trawl survey conducted by the Alaska Fishery Science Center and modeled a more recent time series of recruitments. Incorporating these data resulted in a downward revision in the estimated recruitment and abundance throughout the time series in the Rogers *et al.* (2000) assessment. The mean recruitment in the 1983-1996 period was estimated to be about 67% of earlier estimates. This led to a revised estimate of spawning stock biomass at the beginning of 2002 of 14% of its unfished level. The minimum time to rebuild (T_{MIN}) in the absence of fishing was estimated to be 14 years with a median rebuilding year of 2014. The maximum time to rebuild (T_{MAX}) in accordance with the National Standard Guidelines was 47 years (2047).

An assessment update for darkblotched rockfish, completed in 2003, suggested that the stock has not changed significantly from the last assessment, but there is evidence of strong recent recruitment (Rogers 2003). These strong recruitments have not been validated by indices used in the assessment, resulting in the determination that the stock is at 11% of it unfished level ($B_{11\%}$) (Table 3.2.1-2). New information included in this update includes revised estimates of the darkblotched rockfish catch in foreign fisheries, new fishery length and age composition information, a new Triennial Survey data point, and new slope survey data. Unresolved data discrepancies between data sources in length and age composition limited the amount of new data utilized for this assessment update. Although the indices suggested improving stock status for darkblotched rockfish, the greatest uncertainty was associated with evidence of recent recruitment strength. The Scientific and Statistical Committee (SSC) STAR Lite Panel requested progressive inclusion of 1997-1999, 2000, and 2001 recruitment estimates (Ralston *et al.* 2003). Risk of error progressively increased from including those recruitment estimates because they were based on increasingly limited data. Rebuilding results were sensitive to the high 2000 and 2001 recruitment estimates and including them allowed much greater 2004 OYs because those recruits enter the fishery and help rebuild the stock before the maximum allowable year.

A darkblotched rockfish rebuilding plan was adopted by the Council and submitted for incorporation in the groundfish FMP under Amendment 16-2. The rebuilding plan established a target rebuilding year of 2030 and the harvest control rule of F = 0.027 (with a P_{MAX} of 80%).

3.2.1.5 Lingcod

Distribution and Life History

Lingcod (*Ophiodon elongatus*), a top order predator of the family Hexagrammidae, ranges from Baja, California to Kodiak Island in the Gulf of Alaska. Lingcod are demersal at all life stages (Allen and Smith 1988; NOAA 1990; Shaw and Hassler 1989). Adult lingcod prefer two main habitat types: slopes of submerged banks 10 m to 70 m below the surface with seaweed, kelp, and eelgrass beds and channels with swift currents that flow around rocky reefs (Emmett *et al.* 1991; Giorgi and Congleton 1984; NOAA 1990; Shaw and Hassler 1989). Juveniles prefer sandy substrates in estuaries and shallow subtidal zones (Emmett *et al.* 1991; Forrester and Thomson

1969; Hart 1988; NOAA 1990). As the juveniles grow they move to deeper waters. Adult lingcod are considered a relatively sedentary species, but there are reports of migrations of greater than 100 km by sexually immature fish (Jagielo 1990; Mathews and LaRiviere 1987; Matthews 1992; Smith *et al.* 1990).

Mature females live in deeper water than males and move from deep water to shallow water in the winter to spawn (Forrester 1969; Hart 1988; Jagielo 1990; LaRiviere *et al.* 1980; Mathews and LaRiviere 1987; Matthews 1992; Smith *et al.* 1990). Mature males may live their whole lives associated with a single rock reef, possibly out of fidelity to a prime spawning or feeding area (Allen and Smith 1988; Shaw and Hassler 1989). Spawning generally occurs over rocky reefs in areas of swift current (Adams 1986; Adams and Hardwick 1992; Giorgi 1981; Giorgi and Congleton 1984; LaRiviere *et al.* 1980). After the females leave the spawning grounds, the males remain in nearshore areas to guard the nests until the eggs hatch. Hatching occurs in April off Washington, but as early as January and as late as June at the geographic extremes of the lingcod range. Males begin maturing at about two years (50 cm), whereas females mature at three plus years (76 cm). In the northern extent of their range, fish mature at an older age and larger size (Emmett *et al.* 1991; Hart 1988; Mathews and LaRiviere 1987; Miller and Geibel 1973; Shaw and Hassler 1989). The maximum age for lingcod is about 20 years (Adams and Hardwick 1992).

Lingcod are a visual predator, feeding primarily by day. Larvae are zooplanktivores (NOAA 1990). Small demersal juveniles prey upon copepods, shrimps, and other small crustaceans. Larger juveniles shift to clupeids and other small fishes (Emmett *et al.* 1991; NOAA 1990). Adults feed primarily on demersal fishes (including smaller lingcod), squids, octopi, and crabs (Hart 1988; Miller and Geibel 1973; Shaw and Hassler 1989). Lingcod eggs are eaten by gastropods, crabs, echinoderms, spiny dogfish, and cabezon. Juveniles and adults are eaten by marine mammals, sharks, and larger lingcod (Miller and Geibel 1973; NOAA 1990).

Stock Status and Management History

In 1997, U.S. scientists assessed the size and condition of the portion of the stock in the Columbia and Vancouver areas (including the Canadian portion of the Vancouver management area), and concluded the stock had fallen to below 10% of its unfished size (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).

Jagielo (2000) conducted a coastwide lingcod assessment and determined the total biomass increased from 6,500 mt in the mid-1990s to about 8,900 mt in 2000. In the south, the population had also increased slightly from 5,600 mt in 1998 to 6,200 mt in 2000. In addition, the assessment concluded previous aging methods portrayed an older population; whereas new aging efforts showed the stock to be younger and more productive. Therefore, the ABC and OY were increased in 2001 on the basis of the new assessment. 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. This modification resulted in a slight decrease in the 2002 ABC and OY.

Lingcod are scheduled for a full coastwide assessment in 2003 for use in the first biennial management cycle for fisheries in 2005-2006. A lingcod rebuilding plan was adopted by the Council and submitted for incorporation in the groundfish FMP under Amendment 16-2. Rebuilding parameters based on the 2000 rebuilding analysis are presented in Table 3.2.1-1.

3.2.1.6 Pacific Ocean Perch

Distribution and Life History

Pacific ocean perch (POP, *Sebastes alutus*) are found from La Jolla (Southern California) to the western boundary of the Aleutian Archipelago (Eschmeyer *et al.* 1983; Gunderson 1971; Ito *et al.* 1986; Miller and Lea 1972b), but are common from Oregon northward (Eschmeyer *et al.* 1983). Pacific ocean perch primarily inhabit waters of the upper continental slope (Dark and Wilkins 1994) and are found along the edge of the continental shelf (Archibald *et al.* 1983). Pacific ocean perch occur as deep as 825 m, but usually are at 100 m to 450 m and along submarine canyons and depressions (NOAA 1990). Larvae and juveniles are pelagic; subadults and adults are benthopelagic. Adults form large schools 30 m wide, to 80 m deep, and as much as 1,300 m long (NOAA 1990). They also form spawning schools (Gunderson 1971). Juvenile Pacific ocean perch form ball-shaped schools near the surface or hide in rocks (NOAA 1990). Throughout its range, Pacific ocean perch are generally associated with gravel, rocky, or boulder type substrate found in and along gullies, canyons, and submarine depressions of the upper continental slope (Ito 1986).

Pacific ocean perch winter and spawn in deeper water (>275 m). In the summer (June through August) they move to feeding grounds in shallower water (180 m to 220 m) (June through August) to allow gonads to ripen (Archibald *et al.* 1983; Gunderson 1971; NOAA 1990). Pacific ocean perch are slow-growing and long-lived. The maximum age has been estimated at about 98 years (Heifetz *et al.* 2000). Largest size is about 54 cm and 2 kg (Archibald *et al.* 1983; Beamish 1979; Eschmeyer *et al.* 1983; Ito *et al.* 1986; Mulligan and Leaman 1992; NOAA 1990). Pacific ocean perch are carnivorous. Larvae eat small zooplankton. Small juveniles eat copepods, and larger juveniles feed on euphausiids. Adults eat euphausiids, shrimps, squids, and small fishes. Immature fish feed throughout the year, but adults feed only seasonally, mostly April through August (NOAA 1990). Predators of Pacific ocean perch include sablefish and Pacific halibut.

Stock Status and Management History

POP were harvested exclusively by U.S. and Canadian vessels in the Columbia and Vancouver INPFC areas prior to 1965. Large Soviet and Japanese factory trawlers began fishing for POP in 1965 in the Vancouver area and in the Columbia area a year later. Intense fishing pressure by these foreign fleets occurred during the 1966 through 1975 period. The foreign fishery ended in 1977 after passage of the Magnuson-Stevens Act and the transition to a domestic fishery.

The POP resource off the West Coast was overfished before implementation of the groundfish FMP. Large removals of POP in the foreign trawl fishery, followed by significant declines in catch and abundance led the Council to limit harvest beginning in 1979. A 20-year rebuilding plan for POP was adopted in 1981. Rebuilding under the original plan was largely influenced by a cohort analysis of 1966 through 1976 catch and age composition data (Gunderson 1979), updated with 1977 through 1980 data (Gunderson 1981), and an evaluation of trip limits as a management tool (Tagart *et al.* 1980). This was the first time trip limits were used by the Council to discourage targeting and overharvest of an overfished stock. This is a management strategy still in use today in the West Coast groundfish fishery. The OY for POP was also lowered significantly. After twenty years of rebuilding under the original plan, the stock stabilized at a lower equilibrium than estimated in the pre-fishing condition. While continuing stock decline was abated, rebuilding was not achieved as the stock failed to increase in abundance to B_{MSY}.

Ianelli (1998) estimated POP female spawning biomass in 1997 was 13% of its unfished level, thereby confirming the stock was overfished. NMFS formally declared POP overfished in March 1999 after the groundfish FMP was amended to incorporate the tenets of the Sustainable Fisheries Act. The Council adopted and NMFS enacted more conservative management measures in 1999 as part of a redoubled rebuilding effort.
An assessment for POP was done in 2000 which suggests the stock was more productive than originally thought (Ianelli *et al.* 2000). A revised POP rebuilding analysis was completed and adopted by the Council in 2001 (Punt and Ianelli 2001). This analysis estimated a T_{MIN} of 12 years and a T_{MAX} of 42 years. It was noted in the rebuilding analysis the ongoing retrospective analysis of historic foreign fleet catches (Rogers In prep) is likely to change projections of POP rebuilding.

A new assessment for POP was done in 2003 (Punt *et al.* 2003) incorporating updated survey and fishery data including the retrospective of foreign fleet catches (Rogers In prep). The assessment region covers areas from southern Oregon to the U.S. border with Canada, the southern extent of POP distribution. The overall conclusion is that the stock is relatively stable at approximately 28% of its unfished biomass ($B_{28\%}$). Many cases were presented in the rebuilding analysis and, based on SSC advice, the Council chose the one based on the full Bayesian posterior distribution where recruits were resampled to project future recruitment (Case C). Using the full Bayesian posterior distribution captured more of the assessment model uncertainty than using the maximum of the posterior density function. Resampling recruits rather than recruits per spawner was recommended because only the southern fringe of the stock occurs in waters off the U.S. West Coast. One would want to resample recruits per spawner if measured recruitment is a function of measured stock size. However, it is unlikely that the recruitment measured off the U.S. West Coast is wholly from the portion of the parental stock occurring in these same waters. Therefore, resampling recruits was advised.
A Pacific ocean perch rebuilding plan was adopted by the Council and submitted for incorporation in the groundfish FMP under Amendment 16-2. The rebuilding plan established a target rebuilding year of 2027 and the harvest control rule of F = 0.0082 (with a P_{MAX} of 70%) (Table 3.2.1-2).

3.2.1.7 Pacific Whiting

Distribution and Life History

Pacific whiting (*Merluccius productus*), also known as Pacific hake, are a semi-pelagic merlucciid (a cod-like fish species) that range from Sanak Island in the western Gulf of Alaska to Magdalena Bay, Baja, California Sur. They are most abundant in the California Current System (Bailey 1982; Hart 1988; Love 1991; NOAA 1990). Smaller populations of Pacific whiting occur in several of the larger semi-enclosed inlets of the northeast Pacific Ocean, including the Strait of Georgia, Puget Sound, and the Gulf of California (Bailey *et al.* 1982; Stauffer 1985). The highest densities of Pacific whiting are usually between 50 m and 500 m, but adults occur as deep as 920 m and as far offshore as 400 km (Bailey 1982; Bailey *et al.* 1982; Dark and Wilkins 1994; Dorn 1995; Hart 1988; NOAA 1990). Pacific whiting school at depth during the day, then move to the surface and disband at night for feeding (McFarlane and Beamish 1986; Sumida and Moser 1984; Tanasich *et al.* 1991). Coastal stocks spawn off Baja, California in the winter, then the mature adults begin moving northward and inshore following food supply and Davidson Currents (NOAA 1990). Pacific whiting reach as far north as southern British Columbia by fall. They then begin a southern migration to spawning grounds further offshore (Bailey *et al.* 1982; Dorn 1995; Smith 1995; Stauffer 1985).

Spawning occurs from December through March, peaking in late January (Smith 1995). Pacific whiting are oviparous with external fertilization. Eggs of the Pacific whiting are neritic and float to neutral buoyancy (Bailey 1982; Bailey *et al.* 1982; NOAA 1990). Hatching occurs in five days to six days, and within three months to four months juveniles are typically 35 mm (Hollowed 1992). Juveniles move to deeper water as they get older (NOAA 1990). Females mature at three years to four years (34 cm to 40 cm) and nearly all males are mature by three years (28 cm). Females grow more rapidly than males after four years; growth ceases for both sexes at 10 years to 13 years (Bailey *et al.* 1982).

All life stages feed near the surface late at night and early in the morning (Sumida and Moser 1984). Larvae eat calanoid copepods, as well as their eggs and nauplii (McFarlane and Beamish 1986; Sumida and Moser 1984). Juveniles and small adults feed chiefly on euphausiids (NOAA 1990). Large adults also eat amphipods, squid, herring, smelt, crabs, and sometimes juvenile whiting (Bailey 1982; Dark and Wilkins 1994; McFarlane and Beamish 1986; NOAA 1990). Eggs and larvae of Pacific whiting are eaten by pollock, herring, invertebrates, and sometimes Pacific whiting. Juveniles are eaten by lingcod, Pacific cod, and rockfish species. Adults are preyed on by sablefish, albacore, pollock, Pacific cod, marine mammals, soupfin sharks, and spiny dogfish (Fiscus 1979; McFarlane and Beamish 1986; NOAA 1990).

Stock Status and Management History

The history of the coastal whiting fishery is characterized by rapid changes brought about by the development of foreign fisheries in 1966, joint-venture fisheries in the early 1980s, and domestic fisheries in 1990s. Whiting are assessed annually by a joint technical team of U.S. and Canadian scientists. The 2001 assessment (Helser *et al.* 2002) incorporated 2001 hydroacoustic survey data and was completed and examined by the Council's groundfish Stock Assessment Review (STAR) Panel for whiting in late February. This whiting stock assessment showed the spawning stock biomass declined substantially and had been lower during the past several years than previously estimated. The stock assessment estimated the biomass in 2001 was 0.7 million mt, and the female spawning biomass was less than 20% of the unfished biomass. This is substantially lower than indicated in the 1998 assessment (Dorn *et al.* 1999), which estimated the biomass to be at 39% of its unfished biomass. Therefore, NMFS declared the whiting stock overfished in April 2002. The stock was projected to be near 25% of the unfished biomass in 2002 and above $B_{25\%}$ in 2003. In retrospect, revised biomass estimates based on the results of the 2001assessment indicate the exploitation rates in 1999 (28%), 2000 (24%) and 2001 (31%) were above the overfishing level.

Although a large amount of juvenile fish spawned in 1999, are expected to mature and enter the fishery in the near future, the spawning biomass is not expected to increase above the MSY biomass level of $B_{40\%}$ for several years. Any increases in biomass will depend on the survival of juvenile fish that mature and enter the fishery and the exploitation rates during the course of rebuilding.

A workshop on whiting stock assessment is expected in late-2003 or early 2004 to discuss the results of hydroacoustic surveys conducted in the summer of 2003, discuss potential changes to whiting population modeling, and incorporate new management agreements on whiting between the United States and Canada. A new assessment and rebuilding analysis are anticipated for review by March 2004. A rebuilding plan for Pacific whiting, based on a new assessment and rebuilding analysis, will be analyzed in an EIS contemplated for groundfish FMP Amendment 16-4 scheduled for 2004.

3.2.1.8 Widow Rockfish

Distribution and Life History

Widow rockfish (*Sebastes entomelas*) range from Albatross Bank of Kodiak Island to Todos Santos Bay, Baja, California (Eschmeyer *et al.* 1983; Miller and Lea 1972a; NOAA 1990). Widow rockfish occur over hard bottoms along the continental shelf (NOAA 1990). Widow rockfish prefer rocky banks, seamounts, ridges near canyons, headlands, and muddy bottoms near rocks. Large widow rockfish concentrations occur off headlands such as Cape Blanco, Cape Mendocino, Point Reyes, and Point Sur. Adults form dense, irregular, midwater and semi-demersal schools deeper than 100 m at night and disperse during the day (Eschmeyer *et al.* 1983; NOAA 1990; Wilkins 1986). All life stages are pelagic, but older juveniles and adults are often associated with the bottom (NOAA 1990). All life stages are fairly common from Washington to California (NOAA 1990). Pelagic larvae and juveniles co-occur with yellowtail rockfish, chilipepper, shortbelly rockfish, and bocaccio larvae and juveniles off Central California (Reilly *et al.* 1992).

Widow rockfish are ovoviviparous, have internal fertilization, and brood their eggs until released as larvae (NOAA 1990; Ralston *et al.* 1996a; Reilly *et al.* 1992). Mating occurs from late fall-early winter. Larval release occurs from December through February off California, and from February through March off Oregon. Juveniles are 21 mm to 31 mm at metamorphosis, and they grow to 25 cm to 26 cm over three years. Age and size at sexual maturity varies by region and sex, generally increasing northward and at older ages and larger sizes for females. Some mature in three years (25 cm to 26 cm), 50% are mature by four years to five years (25 cm to 35 cm), and most are mature in eight years (39 cm to 40 cm) (NOAA 1990). The maximum age of widow rockfish is 28 years, but rarely over 20 years for females and 15 years for males (NOAA 1990). The largest size is 53 cm and about 2.1 kg (Eschmeyer *et al.* 1983; NOAA 1990).

Widow rockfish are carnivorous. Adults feed on small pelagic crustaceans, midwater fishes (such as age-one or younger Pacific whiting), salps, caridean shrimp, and small squids (Adams 1987; NOAA 1990). During spring, the most important prey item is salps, during the fall fish are more important, and during the winter widow rockfish primarily eat sergestid shrimp (Adams 1987). Feeding is most intense in the spring after spawning (NOAA 1990). Pelagic juveniles are opportunistic feeders, and their prey consists of various life stages of calanoid copepods, and euphausiids (Reilly *et al.* 1992).

Stock Status and Management History

Widow rockfish are an important commercial species from British Columbia to central California, particularly since 1979, when 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). Widow rockfish are a minor component of the recreational groundfish fisheries.

The previous assessment of the widow rockfish stock occurred in 2000 (Williams *et al.* 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. A rebuilding plan is being developed for incorporation into the FMP through Amendment 16-3.

A new assessment for widow rockfish was completed in 2003 (He *et al.* 2003b). This assessment concluded that the widow rockfish stock size is 22.4% of the unfished biomass, but indicates that 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 2 and 4 in the Santa Cruz midwater juvenile survey. The SSC did not recommend a power coefficient higher than 4 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 strategic rebuilding parameters for widow rockfish did not change dramatically with the new rebuilding analysis (Table 3.2.1-2). 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 these rebuilding trajectories has dropped significantly, in response to the new understanding of decreased stock productivity. The interim rebuilding OY for 2003 using the 2000 rebuilding analysis was 832 metric tons. Under the 2003 rebuilding analysis (He *et al.* 2003a), the OY for 2004 is 284 mt using the base model (Model 8, which uses a power coefficient of 3).

3.2.1.9 Yelloweye Rockfish

Distribution and Life History

Yelloweye rockfish (*Sebastes ruberrimus*) range from the Aleutian Islands, Alaska to northern Baja, California and are common from Central California northward to the Gulf of Alaska (Eschmeyer *et al.* 1983; Hart 1988; Love 1991; Miller and Lea 1972b; O'Connell and Funk 1986). Yelloweye rockfish occur in water 25 m to 550 m deep with 95% of survey catches occurring from 50 m to 400 m (Allen and Smith 1988). Yelloweye rockfish are bottom dwelling, generally solitary, rocky reef fish, found either on or just over reefs (Eschmeyer *et al.* 1983; Love 1991; Miller and Lea 1972b; 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 ovoviviparous and give birth to live young in June off Washington (Hart 1988). The age of first maturity is estimated at six years and all are estimated to be mature by eight years (Wyllie Echeverria 1987). Yelloweye rockfish can grow to 91 cm (Eschmeyer *et al.* 1983; Hart 1988). Males and females probably grow at the same rates (Love 1991; O'Connell and Funk 1986). The growth rate of yelloweye rockfish levels off at approximately 30 years of age (O'Connell and Funk 1986). Yelloweye rockfish can live to be 114 years old (Love 1991; O'Connell and Funk 1986). Yelloweye rockfish are a large predatory reef fish that usually feeds close to the bottom (Rosenthal *et al.* 1982). They have a widely varied diet, including fish, crabs, shrimps and snails, rockfish, cods, sand lances, and herring (Love 1991). Yelloweye rockfish have been observed underwater capturing smaller rockfish with rapid bursts of speed and agility. Off Oregon the major food items of the yelloweye rockfish include cancroid crabs, cottids, righteye flounders, adult rockfishes, and pandalid shrimps (Steiner 1978). Quillback and yelloweye rockfish have many trophic features in common (Rosenthal *et al.* 1982).

Stock Status and Management History

The first ever yelloweye rockfish stock assessment was conducted in 2001 (Wallace 2002). This assessment incorporated two area assessments: one from Northern California using catch per unit of effort (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 INPFC 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 the biomass distribution of yelloweye rockfish on the West Coast was centered in waters off Washington and that useable data from Washington were available. The Council received that testimony and 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 (Table 3.2.1-1). 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.

TABLE 3.2.1-1. Current rebuilding parameter/target estimates specified for overfished West Coast groundfish: shelf species. (Page 1 of 2)

	Shelf rockfish & lingcod				
Rebuilding Parameter/Target	**Bocaccio**[a/]	**Canary**[b/]	**Cowcod**[c/]	**Lingcod**[d/]	**Yelloweye**[e/]
T_0 (year declared overfished)	1999	2000	2000	1999	2002
T_{MIN} (minimum time to achieve B_{MSY}; F = 0)	2018	2057	2062	2007	2027
Mean generation time	14 years	19 years	37 years	NA	44 years
T_{MAX} (maximum time to achieve B_{MSY})	2032	2076	2099	2009	2071
P_{MAX} (P to achieve B_{MSY} by T_{MAX})[f/]	$70%	60%	55%	60%	92%
Most recent stock assessment	MacCall 2003a	Methot and Piner 2002a	Butler *et al.* 1999	Jagielo *et al.* 2000	Methot *et al.* 2002
Most recent rebuilding analysis	MacCall 2003b	Methot and Piner 2002b	Butler and Barnes 2000	Jagielo and Hastie 2001	Methot and Piner 2002
B_0 (estimated unfished biomass)	13,387 B eggs in 2003	31,550 mt	3,367 mt	22,882 mt N 20,971 mt S	3,875 mt
$B_{CURRENT}$ (current estimated biomass)	984 B eggs in 2003	2,524 mt in 2002	238 mt in 1998	3,527 mt N 3,220 mt S in 2000	934 mt in 2002
$B_{CURRENT}$ % Unfished Biomass	7.4% in 2003	8% in 2002	7% in 1998	17% N 15% S in 2000	24% in 2002
MSST (minimum stock size threshold = 25% of B_0)	3,347 B eggs	7,888 mt	842 mt	5,720 mt N 5,243 mt S	969 mt
B_{MSY} (rebuilding biomass target = 40% of B_0)	5,355 B eggs	12,620 mt	1,350 mt	9,153 mt N 8,389 mt S	1,550 mt
MFMT (maximum fishing mortality threshold = F_{MSY})	$F_{50\%}$	$F_{73\%}$	$F_{50\%}$	$F_{45\%}$: F = 0.12 N F = 0.14 S	$F_{57\%}$
Harvest control rule[f/]	F . 0.041	F = 0.0220	F = 0.0136	F = 0.053 N F = 0.061 S	F = 0.0139
T_{TARGET}[f/]	2021	2074	2095	2009	2052

TABLE 3.2.1-1. Current rebuilding parameter/target estimates specified for overfished West Coast groundfish: shelf species. (Page 2 of 2)

Rebuilding Parameter/Target	Shelf rockfish & lingcod				
	Bocaccio[a/]	Canary[b/]	Cowcod[c/]	Lingcod[d/]	Yelloweye[e/]

a/ Bocaccio were assessed by MacCall (2003a) in the Conception and Monterey INPFC areas combined. Biomass estimates are spawning output in billions of eggs. All rebuilding parameters based on model STATc in the most recent rebuilding analysis (MacCall 2003b). The strategic rebuilding parameters (T_{TARGET}, the harvest control rule (F), and P_{MAX}) are interpolated from model STATc results. A rebuilding plan for bocaccio south of 40°10' N latitude will be analyzed in an EIS contemplated for groundfish FMP Amendment 16-3 scheduled for 2004.

b/ A canary rockfish rebuilding plan was adopted by the Council and submitted for incorporation in the groundfish FMP under Amendment 16-2. The *Council OY* alternative does not contemplate changing the harvest control rule nor the target rebuilding year adopted for West Coast canary rockfish with Amendment 16-2.

c/ Cowcod were assessed in the Conception area. All parameters/targets are for the Conception area, although harvest specifications and management measures decided under the proposed action analyzed under the *Council OY* alternative are for the Conception and Monterey INPFC areas combined. A rebuilding plan for cowcod will be analyzed in an EIS contemplated for groundfish FMP Amendment 16-3 scheduled for 2004.

d/ West coast lingcod were assessed as two stocks north (Columbia and U.S. Vancouver INPFC areas) and south (Eureka, Monterey, and Conception INPFC areas). The *Council OY* alternative does not contemplate changing the harvest control rule nor the target rebuilding year adopted for lingcod with Amendment 16-2.

e/ Yelloweye rockfish rebuilding parameters are from the most recent rebuilding analysis (Methot and Piner 2003). A rebuilding plan for yelloweye rockfish will be analyzed in an EIS contemplated for groundfish FMP Amendment 16-3 scheduled for submission in 2004.

f/ Under *Council OY* alternative harvest specifications and/or rebuilding strategies.

TABLE 3.2.1-2. Current rebuilding parameter/target estimates specified for overfished West Coast groundfish: slope and midwater species. (Page 1 of 2)

	Slope rockfish		**Midwater species**	
Rebuilding Parameter/Target	**Darkblotched**[a/]	**POP**[b/]	**Widow**[c/]	**Pacific whiting**[d/]
T_0 (year declared overfished)	2000	1999	2001	2002
T_{MIN} (minimum time to achieve B_{MSY} @ F = 0)	2011	2011	2026	2004
Mean generation time	33 years	28 years	16 years	8 years
T_{MAX} (maximum time to achieve B_{MSY})	2044	2042	2042	2012
P_{MAX} (P to achieve B_{MSY} by T_{MAX})[e/]	>90%	>70%	60%	NA
Most recent stock assessment	Rogers 2003	Hamel *et al.* 2003	He *et al.* 2003a	Helser *et al.* 2002
Most recent rebuilding analysis	Rogers 2003	Punt *et al.* 2003	He *et al.* 2003b	NA
B_0 (estimated unfished biomass)[e/]	30,775 mt	37,230 units of spawning output	43,580 M eggs	5.25 M mt
$B_{CURRENT}$ (current estimated biomass)	3,385 mt in 2003	10,313 units of spawning output in 2003	9,756 M eggs in 2002	1.26 M mt in 2002
% Unfished Biomass	11% in 2003	27.7% in 2003	22.4% in 2002	24% in 2002
MSST (minimum stock size threshold = 25% of B_0)	7,694 mt	9,308 units of spawning output	10,895 M eggs	1.31 M mt
B_{MSY} (rebuilding biomass target = 40% of B_0)	12,310 mt	14,892 units of spawning output	17,432 M eggs	2.1 M mt
MFMT (maximum fishing mortality threshold = F_{MSY})	$F_{50\%}$	$F_{50\%}$	$F_{50\%}$	$F_{40\%}$
Harvest control rule[e/]	F = 0.032	F = 0.0257	F = 0.0093	Decision deferred until adoption of groundfish FMP Amendment 16-4
T_{TARGET}[e/]	2030	2027	2037	

TABLE 3.2.1-2. Current rebuilding parameter/target estimates specified for overfished West Coast groundfish: slope and midwater species. (Page 2 of 2)

	Slope rockfish		Midwater species	
Rebuilding Parameter/Target	**Darkblotched[a/]**	**POP[b/]**	**Widow[c/]**	**Pacific whiting[d/]**

a/ A darkblotched rockfish rebuilding plan was adopted by the Council and submitted for incorporation in the groundfish FMP under Amendment 16-2. The proposed action (*Council OY*) is to raise the harvest control rule (F) from 0.027 estimated in the previous rebuilding analysis (Methot and Rogers 2001) and specified in FMP Amendment 16-2 to 0.032 estimated in the recent rebuilding analysis (Rogers 2003). However, the target rebuilding year of 2030 is not being revised as part of the proposed action (*Council OY*) resulting in an increased probability of rebuilding by T_{MAX} (P_{MAX} increases from 80% to >90%). Rebuilding parameters are based on an intermediate model run and are consistent with the range of OY adopted by the Council. See Section 4.2.1.2 for more details.

b/ A Pacific ocean perch rebuilding plan was adopted by the Council and submitted for incorporation in the groundfish FMP under Amendment 16-2. The proposed action (*Council OY*) is to change the harvest control rule (F) from 0.0082 estimated in the previous rebuilding analysis (Punt and Ianelli 2001) and specified in FMP Amendment 16-2 to 0.0257 estimated in the most recent rebuilding analysis (Punt *et al.* 2003). However, the target rebuilding year of 2027 is not being revised as part of the proposed action (*Council OY*) resulting in an increased probability of rebuilding by T_{MAX} (P_{MAX} increases from 70% to >70%). See Section 4.2.1.2 for more details.

c/ The widow rockfish stock was assessed in 2003. All rebuilding parameters estimated in the most recent rebuilding analysis (He *et al.* 2003). Rebuilding spawning biomass parameters (i.e., B_0, B_{MSY}, $B_{CURRENT}$, MSST) are in millions of eggs. A rebuilding plan for coastwide widow rockfish will be analyzed in an EIS contemplated for groundfish FMP Amendment 16-3 scheduled for 2004.

d/ The Pacific whiting stock was assessed in 2002. Biomass estimates are in millions of mt of age 3+ fish. Some rebuilding parameters are unspecified since a rebuilding analysis has not been endorsed by the SSC. A new Pacific whiting assessment and rebuilding analysis is anticipated in March, 2004. A rebuilding plan for Pacific whiting based on a new assessment and rebuilding analysis will be analyzed in an EIS contemplated for groundfish FMP Amendment 16-4 scheduled for 2004.

e/ Under either a Council-adopted rebuilding plan (for those species' plans considered under FMP Amendment 16-2) or under the *Council OY* alternative, except Pacific whiting.

3.2.2 Precautionary Zone Stocks

3.2.2.1 Dover Sole

Distribution and Life History

Dover sole (*Microstomus pacificus*) are distributed from the Navarin Canyon in the northwest Bering Sea and westernmost Aleutian Islands to San Cristobal Bay, Baja, California (Hagerman 1952; Hart 1988; NOAA 1990). Dover sole are a dominant flatfish on the continental shelf and slope from Washington to Southern California. Adults are demersal and are found from 9 m to 1,450 m, with highest abundance below 200 m to 300 m (Allen and Smith 1988). Adults and juveniles show a high affinity toward soft bottoms of fine sand and mud. Juveniles are often found in deep nearshore waters. Dover sole are considered to be a migratory species. In the summer and fall, mature adults and juveniles can be found in shallow feeding grounds, as shallow as 55 m off British Columbia (Westrheim and Morgan 1963). By late fall, Dover sole begin moving offshore into deep waters (400 m or more) to spawn. Although there is an inshore-offshore seasonal migration, little north-south coastal migration occurs (Westrheim and Morgan 1963).

Spawning occurs from November through April off Oregon and California (Hart 1988; NOAA 1990; Pearcy *et al.* 1977) in waters 80 m to 550 m depth at or near the bottom (Hagerman 1952; Hart 1988; Pearcy *et al.* 1977). Dover sole are oviparous and fertilization is external. Larvae are planktonic and are transported to offshore nursery areas by ocean currents and winds for up to two years. Settlement to benthic living occurs mid-autumn to early spring off Oregon, and February through July off California (Markle *et al.* 1992). Juvenile fish move into deeper water with age and begin seasonal spawning and feeding migrations upon reaching maturity.

Dover sole larvae eat copepods, eggs, and nauplii, as well as other plankton. Juveniles and adults eat polychaetes, bivalves, brittlestars, and small benthic crustaceans. Dover sole feed diurnally by sight and smell (Dark and Wilkins 1994; Gabriel and Pearcy 1981; Hart 1988; NOAA 1990). Dover sole larvae are eaten by pelagic fishes like albacore, jack mackerel and tuna, as well as sea birds. Juveniles and adults are preyed upon by sharks, demersally feeding marine mammals, and to some extent by sablefish (NOAA 1990). Dover sole compete with various eelpout species, rex sole, English sole, and other fishes of the mixed species flatfish assemblage (NOAA 1990).

Stock Status and Management History

The 1997 Dover sole assessment north of the Conception area provided landed catch OYs based on the $F_{40\%}$ harvest rate (Brodziak *et al.* 1997). The Groundfish Management Team (GMT) recommended a 2001 total catch OY of 7,151 mt, which is the average of yields calculated for 2000 through 2002 at (with the 40-10 adjustment), inflated to reflect 5% discard. The groundfish FMP set the original ABC for the Conception Area at 1,000 mt based on average landings. For 1998, this was inflated to reflect 5% discard for a total catch ABC of 1,053 mt. The coastwide total catch ABC is 8,204 mt. To calculate the total catch OY (7,677 mt), the GMT reduced the Conception area's OY contribution by 50% (to 526 mt), consistent with the new harvest policy. The coastwide landed catch target was then calculated to be 95% of OY, or 7,293 mt.

The 1997 Dover sole stock assessment treated the entire population from the Monterey area through the U.S./Vancouver area as a single stock based on recent research addressing the genetic structure of the population. The assessment author generated projections of spawning biomass and expected landings for 1998 to 2000 under a variety of harvest policies and three recruitment scenarios. The hypothetical harvest policies ranged from an immediate reduction to the $F_{45\%}$ harvest rate to an increase up to the $F_{20\%}$ harvest rate. In all cases, for each of the low, medium, and high projected recruitments, the expected spawning biomass increased from the estimated year-end level in 1997 through the year 2000 due to growth of the exceptionally large 1991 year class and to the lower catches observed in the fishery since 1991.

Researchers carried out a new Dover sole stock assessment in 2001, resulting in an estimated spawning stock size that is about 29% of the unexploited biomass (Sampson and Wood 2001). Although there is no recent clear trend in abundance, stocks steadily declined from the 1950s until the mid-1990s. The 1991 year class was the last strong one, which confirms the findings of the 1997 assessment. Poor ocean conditions associated with the El Niños in the 1990s have likely affected Dover sole recruitment. The 2001 assessment authors projected five years of Dover sole harvest levels based on preferred, optimistic, and pessimistic projections of recruitment. These options varied the harvest rate from $F_{40\%}$ (the current F_{MSY} proxy) to $F_{50\%}$. The Council adopted an ABC of 8,510 mt and an OY of 7,440 mt, which is calculated using the current F_{MSY} proxy and the 40-10 adjustment.

3.2.2.2 Sablefish

Distribution and Life History

Sablefish (*Anoplopoma fimbria*) are abundant in the north Pacific, from Honshu Island, Japan, north to the Bering Sea, and southeast to Cedros Island, Baja, California. There are at least three genetically distinct populations off the West Coast of North America: one south of Monterey characterized by slower growth rates and smaller average size, one that ranges from Monterey to the U.S./Canada border that is characterized by moderate growth rates and size, and one ranging off British Columbia and Alaska characterized by fast growth rates and large size. Large adults are uncommon south of Point Conception (Hart 1988; Love 1991; McFarlane and Beamish 1983a; McFarlane and Beamish 1983b; NOAA 1990). Adults are found as deep as 1,900 m, but are most abundant between 200 m and 1,000 m (Beamish and McFarlane 1988; Kendall and Matarese 1987; Mason *et al.* 1983). Off Southern California , sablefish are abundant to depths of 1,500 m (MBC 1987). Adults and large juveniles commonly occur over sand and mud (McFarlane and Beamish 1983a; NOAA 1990) in deep marine waters. They were also reported on hard-packed mud and clay bottoms in the vicinity of submarine canyons (MBC 1987).

Spawning occurs annually in the late fall through winter in waters greater than 300 m (Hart 1988; NOAA 1990). Sablefish are oviparous with external fertilization (NOAA 1990). Eggs hatch in about 15 days (Mason *et al.* 1983; NOAA 1990) and are demersal until the yolk sac is absorbed (Mason *et al.* 1983). Age-zero juveniles become pelagic after the yolk sac is absorbed. Older juveniles and adults are benthopelagic. Larvae and small juveniles move inshore after spawning and may rear for up to four years (Boehlert and Yoklavich 1985; Mason *et al.* 1983). Older juveniles and adults inhabit progressively deeper waters. Estimates indicate that 50% of females are mature at five years to six years (24 inches) and 50% of males are mature at five years (20 inches).

Sablefish larvae prey on copepods and copepod nauplii. Pelagic juveniles feed on small fishes and cephalopods- mainly squids (Hart 1988; Mason *et al.* 1983). Demersal juveniles eat small demersal fishes, amphipods, and krill (NOAA 1990). Adult sablefish feed on fishes like rockfishes and octopus (Hart 1988; McFarlane and Beamish 1983a). Larvae and pelagic juvenile sablefish are heavily preyed upon by seabirds and pelagic fishes. Juveniles are eaten by Pacific cod, Pacific halibut, lingcod, spiny dogfish, and marine mammals, such as Orca whales (Cailliet *et al.* 1988; Hart 1988; Love 1991; Mason *et al.* 1983; NOAA 1990). Sablefish compete with many other co-occurring species for food, mainly Pacific cod and spiny dogfish (Allen 1982).

Stock Status and Management History

Of the three sablefish populations off the West Coast, the Council actively assesses and manages the stock found between California and Washington.

The 2001 sablefish ABC (7,661 mt) was based on the proxy $F_{45\%}$ harvest rate, and the OY (6,895 mt) on application of the 40-10 harvest policy (the stock was estimated at 37% of the initial biomass). The OY applied north of 36° N latitude. A 22% trawl discard rate was based on discard rates observed in the mid to late 1980s. The GMT assumed an average mortality rate of 70% for discarded fish, which may have been too low for a predominantly summer fishery and too high for a winter fishery.

In 2001 two stock assessments were done for the sablefish stock north of Monterey (Hilborn *et al.* 2001; Schirripa and Methot 2001). The assessments incorporated new survey and fishery data and extended the assessment area south from 36° N latitude to 34°27' N latitude (Point Conception). Both assessments indicated a normal decline in biomass since the late 1970s due to the fishing down of the unfished stock and an unexpected decline in recruitment during the early 1990s. A change in environmental conditions may have been responsible for the abrupt decline in recruitment in the 1990s, or this low recruitment may have been the natural consequence of the gradual decline in spawning biomass. The sablefish stock is currently estimated to be between 27% and 38% of the unfished biomass, depending on the assessment scenario and the basis for estimating unfished biomass. Recruitment scenarios in both assessments hinge on two different hypotheses: whether sablefish recruitment has been most affected by density dependence, or by environmental regime shifts. Because of this uncertainty, two 2002 ABC estimates were produced and reviewed by the Council: an ABC of 4,786 mt based on the current F_{MSY} proxy of $F_{45\%}$, and an ABC of 4,062 mt based on a reduced harvest rate of $F_{50\%}$. The Council adopted the ABC based on the proxy harvest rate, but adjusted it to reflect the distribution north and south of 36 N latitude. This was done, because a plan amendment would be needed to change the management area since groundfish FMP Amendment 14 (permit stacking) specified only the area north of 36^{o} N latitude. The OY was based on the 40-10 adjustment. The Council also wanted to verify industry reports of a large abundance of juvenile sablefish; an observation that was confirmed to some extent by preliminary results from the 2001 NMFS slope survey. Based on these considerations, the Council recommended a new expedited assessment be done in 2002.

Schirripa (2002) recently re-assessed the stock under the Terms of Reference developed by the SSC for Expedited Stock Assessments. Under these Terms of Reference, the assessment would be updated with new survey and fishery data, but would not be restructured in any substantive fashion. This allowed an expedited but less rigorous review of the updated assessment, compared to an assessment that uses a new model. The expedited assessment confirmed fishers' anecdotal reports of a large 1999 year class, which is also apparent in the preliminary results of the 2001 slope survey. This new assessment also suggests that 2000 produced a relatively strong year class.

3.2.2.3 Shortspine Thornyhead

Distribution and Life History

Shortspine thornyhead (*Sebastolobus alascanus*) are found from northern Baja, California to the Bering Sea and occasionally to the Commander Islands north of Japan (Jacobson and Vetter 1996). They are common from Southern California northward (Love 1991). Shortspine thornyhead inhabit areas over the continental shelf and slope (Erickson and Pikitch 1993; Wakefield and Smith 1990). Although they can occur as shallow as 26 m (Eschmeyer *et al.* 1983), shortspine thornyhead mainly occur between 100 m and 1,400 m off Oregon and California, most commonly between 100 m to 1,000 m (Jacobson and Vetter 1996).

Spawning occurs in February and March off California (Wakefield and Smith 1990). Shortspine thornyhead are thought to be oviparous (Wakefield and Smith 1990), although there is no clear evidence to substantiate this (Erickson and Pikitch 1993). Eggs rise to the surface to develop and hatch. Larvae are pelagic for about 12 months to 15 months. During January to June, juveniles settle onto the continental shelf and then move into deeper water as they become adults (Jacobson and Vetter 1996). Off California, they begin to mature at five years; 50% are mature by 12 years to 13 years; and all are mature by 28 years (Owen and Jacobson 1992). Although it is difficult to determine the age of older individuals, Owen and Jacobson (1992) report that off California, they may live to over 100 years of age. The mean size of shortspine thornyhead increases with depth and is greatest at 1,000 m to 1,400 m (Jacobson and Vetter 1996).

Benthic individuals are ambush predators that rest on the bottom and remain motionless for extended periods of time (Jacobson and Vetter 1996). Off Alaska, shortspine thornyhead eat a variety of invertebrates such as shrimps, crabs, and amphipods, as well as fishes and worms (Owen and Jacobson 1992). Longspine thornyhead are a common item found in the stomachs of shortspine thornyhead. Cannibalism of newly settled juveniles is important in the life history of thornyheads (Jacobson and Vetter 1996).

Stock Status and Management History

Shortspine thornyhead is a major component of the deepwater fishery on the continental slope, especially the trawl fishery for Dover sole, thornyheads, and sablefish (referred to as the DTS complex). The status of this stock is subject to substantial public debate; the species is one of the most numerous components of the slope ecosystem. However, this is an especially long-lived species and cannot sustain aggressive harvest rates. It is taken coincidentally with Dover sole, sablefish, and longspine thornyhead, especially in the upper slope and lower shelf; in deeper water, longspine thornyhead is a more predominate species. The two thornyhead species are often difficult to distinguish, and historical landings data combine the two into a single category. Shortspine thornyhead is a “constraining species” in the deepwater fishery; that is, coincidental catch of this species prevents full harvest of Dover sole and sablefish.

The individual assessments for shortspine thornyhead and longspine thornyhead in 1997 covered the area from Central California at 36° N latitude (the southern boundary of the Monterey management area) to the U.S./Canada border (the northern boundary of the U.S./Vancouver management area) (Rogers *et al.* 1997). The STAR Panel expressed concern that management requires more detailed information on thornyheads than could be obtained from the available data. Given the kinds and quality of data, the more accurate assessments are difficult because, (1) growth and natural mortality for shortspine thornyhead is uncertain, (2) it is difficult to differentiate between longspine and shortspine thornyheads in the historic landings, (3) year class strength is not easily estimated, and (4) true discard rates are unknown.

The 2001 shortspine thornyhead ABC (757 mt) was based on a synthesis of two stock assessments prepared in 1998 (NMFS STAT and OT STAT 1998; Rogers *et al.* 1998) and application of the $F_{50\%}$ harvest rate. The 2001 shortspine thornyhead ABCs and OYs were separately specified north and south of 36° N latitude, which is the northern boundary of the Conception area. The stock size was estimated to be 32% of the unfished abundance in 1999. The 2001 OY (689 mt) was based on $F_{50\%}$ and the 40-10 policy. The landed catch equivalent reflected a 20% reduction for discard.

There were a range of uncertainties in the most recent assessment of shortspine thornyhead, in 2001, not the least of which was the estimated biomass (Piner and Methot 2001). The assessment was extended south to Point Conception (in contrast to past surveys, which were limited to stocks north of 36° N latitude management area boundary). The authors concluded the 2001 spawning biomass ranged between 25% and 50% of unexploited spawning biomass. The uncertainty in abundance largely revolved around the uncertainty in recruitment and survey Q, or catchability, of shortspine thornyhead in slope surveys. The authors also concluded the trend in stock biomass was increasing and the stock was not overfished. Based on estimated biomass and application of the GMT-recommended F=0.75M principle (which approximates an $F_{50\%}$ proxy harvest rate for shortspine thornyhead), the assessment authors and GMT recommended a slight increase in the ABC and OY for 2002 and combining the previous Monterey area north and Conception area specifications to a coastwide one. Despite the uncertainty in biomass estimates and determination of whether shortspine thornyhead should be treated as a precautionary zone stock, these recommendations did treat the stock as such by applying the 40-10 adjustment. The Council adopted the GMT-recommended coastwide ABC of 1,004 mt, and the associated total catch OY of 955 mt for 2002 management.

3.2.3 Stocks at or Above Target Levels

3.2.3.1 Arrowtooth Flounder

Distribution and Life History

Arrowtooth flounder (*Atheresthes stomias*) range from the southern coast of Kamchatka to the northwest Bering Sea and Aleutian Islands to San Simeon, California. Arrowtooth flounder is the dominant flounder species on the outer continental shelf from the western Gulf of Alaska to Oregon. Eggs and larvae are pelagic; juveniles and adults are demersal (Garrison and Miller 1982; NOAA 1990). Juveniles and adults are most commonly found on sand or sandy gravel substrates, but occasionally occur over low-relief rock-sponge bottoms. Arrowtooth flounder exhibit a strong migration from shallow water summer feeding grounds on the continental shelf to deep water spawning grounds over the continental slope (NOAA 1990). Depth distribution may vary from as little as 50 m in summer to more than 500 m in the winter (Garrison and Miller 1982; NOAA 1990; Rickey 1995).

Arrowtooth flounder are oviparous with external fertilization. Spawning may occur deeper than 500 m off Washington (Rickey 1995). Larvae eat copepods, their eggs, and copepod nauplii (Yang 1995; Yang and Livingston 1985). Juveniles and adults feed on crustaceans (mainly ocean pink shrimp and krill) and fish (mainly gadids, herring, and pollock) (Hart 1988; NOAA 1990). Arrowtooth flounder exhibit two feeding peaks, at noon and midnight.

3.2.3.2 Bank Rockfish

Distribution and Life History

Bank rockfish (*Sebastes rufus*) are found from Newport, Oregon, to central Baja, California, most commonly from Fort Bragg southward (Love 1992). Bank rockfish occur offshore (Eschmeyer *et al.* 1983) from depths of 31 m to 247 m (Love 1992), although adults prefer depths over 210 m (Love *et al.* 1990). Observations of commercial catches indicate juveniles occupy the shallower part of the species range (Love *et al.* 1990). Bank rockfish are a midwater, aggregating species and are found over hard bottoms (Love 1992), over high relief or on bank edges (Love *et al.* 1990), and along the ledge of Monterey Canyon (Sullivan 1995). They also frequent deep water over muddy or sandy bottoms (Miller and Lea 1972b). Spawning occurs from December to May (Love *et al.* 1990). Peak spawning of bank rockfish in the Southern California Bight occurs in January and a month later in Central and Northern California. Off California, bank rockfish are multiple brooders (Love *et al.* 1990). Females grow to a larger maximum size (50 cm) than males (44 cm), but grow at a slightly slower rate (Cailliet *et al.* 1996). Males reach first maturity at 28 cm, 50% maturity at 31 cm, and 100% at 38 cm. Females reach first maturity at 31 cm, 50% at 36 cm, and 100% maturity at 39 cm (Love *et al.* 1990). Bank rockfish are midwater feeders, eating mostly gelatinous planktonic organisms such as tunicates, but also preying on small fishes and krill (Love 1992).

3.2.3.3 Black Rockfish

Distribution and Life History

Black rockfish (*Sebastes melanops*) are found from Southern California (San Miguel Island) to the Aleutian Islands (Amchitka Island) and they occur most commonly from San Francisco northward (Hart 1988; Miller and Lea 1972b; Phillips 1957; Stein and Hassler 1989). Black rockfish occur from the surface to greater than 366 m; however, they are most abundant at depths less than 54 m (Stein and Hassler 1989). Off California, black rockfish are found along with the blue, olive, kelp, black-and-yellow, and gopher rockfishes (Hallacher and Roberts 1985). Adults are usually observed well up in the water column (Hallacher and Roberts 1985). The abundance of black rockfish in shallow water declines in the winter and increases in the summer (Stein and Hassler 1989). Densities of black rockfish decrease with depth during both the upwelling and non-upwelling seasons (Hallacher and Roberts 1985; PFMC 1996). Off Oregon, larger fish seem to be found in deeper water (20 m to 50 m) (Stein and Hassler 1989). Black rockfish off the northern Washington coast and outer Strait of Juan de Fuca exhibit no significant movement. However, fish appear to move from the Central Washington coast southward to the Columbia River, but not into waters off Oregon. Movement displayed by black rockfish off the northern Oregon coast is primarily northward to the Columbia River (Culver 1986). Black rockfish form mixed sex, midwater schools, especially in shallow water (Hart 1988; Stein and Hassler 1989). Black rockfish larvae and young juveniles (<40 mm to 50 mm) are pelagic, but are benthic at larger sizes (Hart 1988; Laroche and Richardson 1980; Stein and Hassler 1989).

Black rockfish have internal fertilization and annual spawning (Stein and Hassler 1989). Parturition occurs from February through April off British Columbia, January through March off Oregon, and January through May off California (Stein and Hassler 1989). Spawning areas are unknown, but spawning may occur in offshore waters because gravid females have been caught well offshore (Dunn and Hitz 1969; Hart 1988; Stein and Hassler 1989). Black rockfish can live to be more than 20 years in age. The maximum length attained by the black rockfish is 60 cm (Hart 1988; Stein and Hassler 1989). Off Oregon, black rockfish primarily prey on pelagic nekton (anchovies and smelt) and zooplankton such as salps, mysids, and crab megalops. Off Central California, juveniles eat copepods and zoea, while adults prey on juvenile rockfish, euphausiids, and amphipods during upwelling periods. During periods without upwelling they primarily consume invertebrates. Black rockfish feed almost exclusively in the water column (Culver 1986). Black rockfish are known to be eaten by lingcod and yelloweye rockfish (Stein and Hassler 1989).

3.2.3.4 Blackgill Rockfish

Distribution and Life History

Blackgill rockfish (*Sebastes melanostomus*) are distributed from Washington to Punta Abreojos in central Baja, California (Love 1991; Moser and Ahlstrom 1978). Adult blackgill rockfish are found offshore at depths of 219 m to 768 m (Eschmeyer *et al.* 1983). Blackgill rockfish usually inhabit rocky or hard bottom habitats along steep drop-offs, such as the edges of submarine canyons and over seamounts (Love 1991). However, they may also occur over soft bottoms (Eschmeyer *et al.* 1983). Blackgill rockfish are a transitional species, occupying both midwater and benthic habitats (Love *et al.* 1990), although they are rarely taken at more than 9 m above the bottom (Love 1991). Blackgill are considered an aggregating species (Love 1991).

Blackgill rockfish spawn from January to June (peaking in February) off Southern California , and in February off Central and northern California (Love 1991; Love *et al.* 1990; Moser and Ahlstrom 1978). The largest blackgill rockfish on record is 61 cm (Eschmeyer *et al.* 1983; Love 1991; Love *et al.* 1990). Blackgill rockfish primarily prey on such planktonic prey as euphausiids and pelagic tunicates, as well as small fishes (e.g., juvenile rockfishes and Pacific whiting, anchovies, and lantern fishes), and squid (Love *et al.* 1990).

3.2.3.5 *Chilipepper Rockfish*

Distribution and Life History

Chilipepper rockfish (*Sebastes goodei*) are found from Magdalena Bay, Baja, California, to as far north as the northwest coast of Vancouver Island, British Columbia (Allen 1982; Hart 1988; Miller and Lea 1972b). Chilipepper have been taken as deep as 425 m, but nearly all in survey catches were taken between 50 and 350 m (Allen and Smith 1988). Adults and older juveniles usually occur over the shelf and slope; larvae and small juveniles are generally found near the surface. In California, chilipepper are most commonly found associated with deep, high relief rocky areas and along cliff drop-offs (Love *et al.* 1990), as well as on sand and mud bottoms (MBC 1987). They are occasionally found over flat, hard substrates (Love *et al.* 1990). Love (1991) does not consider this to be a migratory species. Chilipepper may migrate as far as 45 m off the bottom during the day to feed (Love 1991).

Chilipeppers are ovoviviparous and eggs are fertilized internally (Reilly *et al.* 1992). Chilipepper school by sex just prior to spawning (MBC 1987). In California, fertilization of eggs begins in October and spawning occurs from September to April (Oda 1992) with the peak occurring during December to January (Love *et al.* 1990). Chilipepper may spawn multiple broods in a single season (Love *et al.* 1990). Females of the species are significantly larger, reaching lengths of up to 56 cm (Hart 1988). Males are usually smaller than 40 cm (Dark and Wilkins 1994). Males mature at two years to six years of age, and 50% are mature at three years to four years. Females mature at two years to five years with 50% mature at three years to four years (MBC 1987). Females may attain an age of about 27 years, whereas the maximum age for males is about 12 years (MBC 1987).

Larval and juvenile chilipepper eat all life stages of copepods and euphausiids, and are considered to be somewhat opportunistic feeders (Reilly *et al.* 1992). In California, adults prey on large euphausiids, squid, and small fishes such as anchovies, lanternfish, and young hake (Hart 1988; Love *et al.* 1990). Chilipepper are found with widow rockfish, greenspotted rockfish, and swordspine rockfish (Love *et al.* 1990). Juvenile chilipepper compete for food with bocaccio, yellowtail rockfish, and shortbelly rockfish (Reilly *et al.* 1992).

3.2.3.6 *English Sole*

Distribution and Life History

English sole (*Parophrys vetulus*) are found from Nunivak Island in the southeast Bering Sea and Agattu Island in the Aleutian Islands, to San Cristobal Bay, Baja, California Sur (Allen and Smith 1988). In research survey data, nearly all occurred at depths <250 m (Allen and Smith 1988). Adults and juveniles prefer soft bottoms composed of fine sands and mud (Ketchen 1956), but also occur in eelgrass habitats (Pearson and Owen 1992). English soles use nearshore coastal and estuarine waters as nursery areas (Krygier and Pearcy 1986; Rogers *et al.* 1988). Adults make limited migrations. Those off Washington show a northward post-spawning migration in the spring on their way to summer feeding grounds and a southerly movement in the fall (Garrison and Miller 1982). Tagging studies have identified separate stocks based on this species' limited movements and meristic characteristics (Jow 1969).

Spawning occurs over soft-bottom mud substrates (Ketchen 1956) from winter to early spring depending on the stock. Eggs are neritic and buoyant, but sink just before hatching (Hart 1988), juveniles and adults are demersal (Garrison and Miller 1982). Small juveniles settle in the estuarine and shallow nearshore areas all along the coast, but are less common in southerly areas, particularly south of Point Conception. Large juveniles commonly occur up to depths of 150 m. Although many postlarvae may settle outside of estuaries, most will enter estuaries during some part of their first year of life (Gunderson *et al.* 1990). Some females mature as three-year-olds (26 cm), but all females over 35 cm long are mature. Males mature at two years (21 cm).

Larvae are planktivorous. Juveniles and adults are carnivorous, eating copepods, amphipods, cumaceans, mysids, polychaetes, small bivalves, clam siphons, and other benthic invertebrates (Allen 1982; Becker 1984; Hogue and Carey 1982; Simenstad *et al.* 1979). English sole feed primarily by day, using sight and smell, and sometimes dig for prey (Allen 1982; Hulberg and Oliver 1979). A juvenile English sole's main predators are probably piscivorous birds such as great blue heron (*Ardia herodias*), larger fishes, and marine mammals. Adults may be eaten by marine mammals, sharks, and other large fishes.

3.2.3.7 Longspine Thornyhead

Distribution and Life History

Longspine thornyhead (*Sebastolobus altivelis*) are found from the southern tip of Baja, California to the Aleutian Islands (Eschmeyer *et al.* 1983; Jacobson and Vetter 1996; Love 1991; Miller and Lea 1972b; Smith and Brown 1983), but are abundant from Southern California northward (Love 1991). Juvenile and adult longspine thornyhead are demersal and occupy the benthic surface (Smith and Brown 1983). Off Oregon and California, longspine thornyhead mainly occur at depths of 400 m to 1,400 plus m, most between 600 m and 1,000 m in the oxygen minimum zone (Jacobson and Vetter 1996). Thornyhead larvae (*Sebastolobus spp.*) have been taken in research surveys up to 560 km off the California coast (Cross 1987; Moser *et al.* 1993). Juveniles settle on the continental slope at about 600 m to 1,200 m (Jacobson and Vetter 1996). Longspine thornyhead live on soft bottoms, preferably sand or mud (Eschmeyer *et al.* 1983; Jacobson and Vetter 1996; Love 1991). Longspine thornyheads neither school nor aggregate (Jacobson and Vetter 1996).

Spawning occurs in February and March at 600 m to 1,000 m (Jacobson and Vetter 1996; Wakefield and Smith 1990). Longspine thornyhead are oviparous and are multiple spawners, spawning two to four batches per season (Love 1991, Wakefield and Smith 1990). Eggs rise to the surface to develop and hatch. Floating egg masses can be seen at the surface in March, April, and May (Wakefield and Smith 1990). Juveniles (<5.1 cm long) occur in midwater (Eschmeyer *et al.* 1983). After settling, longspine thornyhead are completely benthic (Jacobson and Vetter 1996). Longspine thornyhead can grow to 38 cm (Eschmeyer *et al.* 1983; Jacobson and Vetter 1996; Miller and Lea 1972b) and live more than 40 years (Jacobson and Vetter 1996). Longspine thornyhead reach the onset of sexual maturity at 17 cm to 19 cm total length (10% of females mature) and 90% are mature by 25 cm to 27 cm (Jacobson and Vetter 1996).

Longspine thornyhead are ambush predators (Jacobson and Vetter 1996). They consume fish fragments, crustaceans, bivalves, and polychaetes and occupy a tertiary consumer level in the food web. Pelagic juveniles prey largely on herbivorous euphausiids and occupy a secondary consumer level in the food web (Love 1991; Smith and Brown 1983). Longspine thornyhead are commonly found in shortspine thornyhead stomachs. Cannibalism in newly settled longspine thornyhead may occur, because juveniles settle directly onto adult habitat (Jacobson and Vetter 1996). Sablefish commonly prey on longspine thornyhead.

3.2.3.8 Pacific Cod

Distribution and Life History

Pacific cod (*Gadus macrocephalus*) are widely distributed in the coastal north Pacific, from the Bering Sea to Southern California in the east, and to the Sea of Japan in the west. Adult Pacific cod occur as deep as

875 m (Allen and Smith 1988), but the vast majority occurs between 50 m and 300 m (Allen and Smith 1988; Hart 1988; Love 1991; NOAA 1990). Along the West Coast, Pacific cod prefer shallow, soft-bottom habitats in marine and estuarine environments (Garrison and Miller 1982), although adults have been found associated with coarse sand and gravel substrates (Garrison and Miller 1982; Palsson 1990). Larvae and small juveniles are pelagic; large juveniles and adults are parademersal (Dunn and Matarese 1987; NOAA 1990). Adult Pacific cod are not considered to be a migratory species. There is, however, a seasonal bathymetric movement from deep spawning areas of the outer shelf and upper slope in fall and winter to shallow middle-upper shelf feeding grounds in the spring (Dunn and Matarese 1987; Hart 1988; NOAA 1990; Shimada and Kimura 1994).

Pacific cod have external fertilization (Hart 1988; NOAA 1990)with spawning occurring from late fall to early spring. Their eggs are demersal. Larvae may be transported to nursery areas by tidal currents (Garrison and Miller 1982). Half of females are mature by three years (55 cm) and half of males are mature by two years (45 cm) (Dunn and Matarese 1987, Hart 1986). Juveniles and adults are carnivorous and feed at night (Allen and Smith 1988; Palsson 1990) with the main part of the adult Pacific cod diet being whatever prey species is most abundant (Kihara and Shimada 1988; Klovach *et al.* 1995). Larval feeding is poorly understood. Pelagic fish and sea birds eat Pacific cod larvae, while juveniles are eaten by larger demersal fishes, including Pacific cod. Adults are preyed upon by toothed whales, Pacific halibut, salmon shark, and larger Pacific cod (Hart 1986, Love 1991, NOAA 1990, Palsson 1990). The closest competitor of the Pacific cod for resources is the sablefish (Allen 1982).

3.2.3.9 Petrale Sole

Distribution and Life History

Petrale sole (*Eopsetta jordani*) are found from Cape Saint Elias, Alaska to Coronado Island, Baja, California. The range may possibly extend into the Bering Sea, but the species is rare north and west of southeast Alaska and in the inside waters of British Columbia (Garrison and Miller 1982; Hart 1988). Nine separate breeding stocks have been identified, although stocks intermingle on summer feeding grounds (Hart 1988; NOAA 1990). Of these nine, one occurs off British Columbia, two off Washington, two off Oregon, and four off California (NOAA 1990). Adults are found from the surf line to 550 m, but their highest abundance is <300 m (NOAA 1990). Adults migrate seasonally between deepwater, winter spawning areas to shallower, spring feeding grounds (NOAA 1990). They show an affinity to sand, sandy mud, and occasionally muddy substrates (NOAA 1990).

Spawning occurs over the continental shelf and continental slope to as deep as 550 m. Spawning occurs in large spawning aggregations in the winter. Eggs are pelagic and juveniles and adults are demersal (Garrison and Miller 1982). Eggs and larvae are transported from offshore spawning areas to nearshore nursery areas by oceanic currents and wind. Larvae metamorphose into juveniles at six months (22 cm) and settle to the bottom of the inner continental shelf (Pearcy *et al.* 1977). Petrale sole tend to move into deeper water with increased age and size. Petrale sole begin maturing at three years. Half of males mature by seven years (29 cm to 43 cm) and half of the females are mature by eight years (>44 cm) (Pearcy *et al.* 1977; Pedersen 1975a; Pedersen 1975b). Near the Columbia River, petrale sole mature one to two years earlier (Pedersen 1975a; Pedersen 1975b).

Larvae are planktivorous. Small juveniles eat mysids, sculpins, and other juvenile flatfishes. Large juveniles and adults eat shrimps and other decapod crustaceans, as well as euphausiids, pelagic fishes, ophiuroids, and juvenile petrale sole (Garrison and Miller 1982; Hart 1988; Pearcy *et al.* 1977; Pedersen 1975a; Pedersen 1975b). Petrale sole eggs and larvae are eaten by planktivorous invertebrates and pelagic fishes. Juveniles are preyed upon (sometimes heavily) by adult petrale sole, as well as other large flatfishes. Adults are preyed upon by sharks, demersally feeding marine mammals, and larger flatfishes and pelagic fishes (NOAA 1990). Petrale sole competes with other large flatfishes. It has the same summer feeding grounds as lingcod, English sole, rex sole, and Dover sole (NOAA 1990).

3.2.3.10 Shortbelly Rockfish

Distribution and Life History

Shortbelly rockfish (*Sebastes jordani*) are found from San Benito Islands, Baja, California, Mexico to La Perouse Bank, British Columbia (Eschmeyer *et al.* 1983; Lenarz 1980). The habitat of the shortbelly rockfish is wide ranging (Eschmeyer *et al.* 1983). Shortbelly rockfish inhabit waters from 50 m to 350 m in depth (Allen and Smith 1988) on the continental shelf (Chess *et al.* 1988) and upper-slope (Stull and Tang 1996). Adults commonly form very large schools over smooth bottoms near the shelf break (Lenarz 1992). Shortbelly rockfish have also been observed along the Monterey Canyon ledge (Sullivan 1995). During the day shortbelly rockfish are found near the bottom in dense aggregations. At night they are more dispersed (Chess *et al.* 1988). During the summer shortbelly rockfish tend to move into deeper waters and to the north as they grow, but they do not make long return migrations to the south in the winter to spawn (Lenarz 1980).

Shortbelly rockfish are ovoviviparous, bearing advanced yolk sac larvae (Ralston *et al.* 1996a). Shortbelly rockfish spawn off California during January through April (Lenarz 1992). Larvae metamorphose to juveniles at 27 mm and appear to begin forming schools at the surface at that time (Laidig *et al.* 1991; Lenarz 1980). A few shortbelly rockfish mature at age two, while 50% are mature at age three, and nearly all are mature by age four (Lenarz 1992). They live to be about ten years old (Lenarz 1980; MacGregor 1986) with the maximum recorded age being 22 years (Lenarz 1992).

Shortbelly rockfish feed primarily on various life stages of euphausiids and calanoid copepods both during the day and night (Chess *et al.* 1988; Lenarz and Echeverria 1991). Shortbelly rockfish play a key role in the food chain as they are preyed upon by chinook and coho salmon, lingcod, black rockfish, Pacific whiting, bocaccio, chilipepper, pigeon guillemots, western gull, marine mammals, and other taxa (Chess *et al.* 1988; Eschmeyer *et al.* 1983; Hobson and Howard 1989; Lenarz 1980).

3.2.3.11 Splitnose Rockfish

Distribution and Life History

Splitnose rockfish (*Sebastes diploproa*) occur from Prince William Sound, Alaska to San Martin Island, Baja, California (Miller and Lea 1972b). Splitnose rockfish occur from zero m to 800 m, with most survey catches occurring in depths of 100 m to 450 m (Allen and Smith 1988). The relative abundance of juveniles (<21 cm) is quite high in the 91 m to 272 m depth zone and then decreases sharply in the 274 m to 475 m depth zone (Boehlert 1980). Splitnose rockfish have a pelagic larval stage, a prejuvenile stage, and a benthic juvenile stage (Boehlert 1977). Benthic splitnose rockfish associate with mud habitats (Boehlert 1980). Young occur in shallow water, often at the surface under drifting kelp (Eschmeyer *et al.* 1983). The major types of vegetation juveniles are found under are Fucus spp. (dominant), eelgrass, and bull kelp (Shaffer *et al.* 1995). Juvenile splitnose rockfish off Southern California are the dominant rockfish species found under drifting kelp (Boehlert 1977).

Splitnose rockfish are ovoviviparous and release yolk sac larvae (Boehlert 1977). They may have two parturition seasons, or may possibly release larvae throughout the year (Boehlert 1977). In general, the main parturition season get progressively shorter and later toward the north (Boehlert 1977). Splitnose rockfish growth rates vary with latitude, being generally faster in the north. Splitnose rockfish mean sizes increase with depth in a given latitudinal area. Mean lengths of females are generally greater than males (Boehlert and Kappenman 1980). Off California, 50% maturity occurs at 21 cm, or five years of age, whereas off British Columbia 50% of males and females are mature at 27 cm (Hart 1988). Adults can achieve a maximum size of 46 cm (Boehlert 1980; Eschmeyer *et al.* 1983; Hart 1988). Females have surface ages to 55 years and section ages to 81 years.

Adult splitnose rockfish off Southern California feed on midwater plankton, primarily euphausiids (Allen 1982). Juveniles feed mainly on planktonic organisms, including copepods and cladocerans during June and August. In October, their diets shift to larger epiphytic prey and are dominated by a single amphipod species. Juvenile splitnose rockfish actively select prey (Shaffer *et al.* 1995) and are probably diurnally active (Allen 1982). Adults are probably nocturnally active, at least in part (Allen 1982).

3.2.3.12 Yellowtail Rockfish

Distribution and Life History

Yellowtail rockfish (*Sebastes flavidus*) range from San Diego, California, to Kodiak Island, Alaska (Fraidenburg 1980; Gotshall 1981; Lorz *et al.* 1983; Love 1991; Miller and Lea 1972b; Norton and MacFarlane 1995). The center of yellowtail rockfish abundance is from Oregon to British Columbia (Fraidenburg 1980). Yellowtail rockfish are a common, demersal species abundant over the middle shelf (Carlson and Haight 1972; Fraidenburg 1980; Tagart 1991; Weinberg 1994). Yellowtail rockfish are most common near the bottom, but not on the bottom (Love 1991; Stanley *et al.* 1994). Yellowtail rockfish adults are considered semi-pelagic (Stanley *et al.* 1994; Stein *et al.* 1992) or pelagic, which allows them to range over wider areas than benthic rockfish (Pearcy 1992). Adult yellowtail rockfish occur along steeply sloping shores or above rocky reefs (Hart 1988). They can be found above mud with cobble, boulder and rock ridges, and sand habitats; they are not, however, found on mud, mud with boulder, or flat rock (Love 1991; Stein *et al.* 1992). Yellowtail rockfish form large (sometimes greater than 1,000 fish) schools and can be found alone or in association with other rockfishes (Love 1991; Pearcy 1992; Rosenthal *et al.* 1982; Stein *et al.* 1992; Tagart 1991). These schools may persist at the same location for many years (Pearcy 1992).

Yellowtail rockfish are ovoviviparous (Norton and MacFarlane 1995) and mate from October to December. Parturition peaks in February and March and from November to March off California (Westrheim and Harling 1975). Young-of-the-year pelagic juveniles often appear in kelp beds beginning in April and live in and around kelp in midwater during the day, descending to the bottom at night (Love 1991; Tagart 1991). Male yellowtail rockfish are 34 cm to 41 cm in length (five years to nine years) at 50% maturity, females are 37 cm to 45 cm (six years to ten years) (Tagart 1991). Yellowtail rockfish are long-lived and slow-growing; the oldest recorded individual was 64 years old (Fraidenburg 1981; Tagart 1991). Yellowtail rockfish have a high growth rate relative to other rockfish species (Tagart 1991). They reach a maximum size of about 55 cm in approximately 15 years (Tagart 1991). Yellowtail rockfish feed mainly on pelagic animals, but are opportunistic, occasionally eating benthic animals as well (Lorz *et al.* 1983). Large juveniles and adults eat fish (small Pacific whiting, Pacific herring, smelt, anchovies, lanternfishes, and others), along with squid, krill, and other planktonic organisms (euphausiids, salps, and pyrosomes) (Love 1991; Phillips 1964; Rosenthal *et al.* 1982; Tagart 1991).

3.2.3.13 Groundfish Stock Complexes

Rockfish Stock Complexes

Rockfish species, excluding thornyheads, are divided into categories north and south of Cape Mendocino (40º 10' N latitude) depending on the depths where they are most often caught; nearshore, shelf, and slope (see Table 3.2.0-1 for species distributions by depth). South of Cape Mendocino, the minor nearshore complex is further divided into three categories; shallow nearshore species, deeper nearshore species, and California scorpionfish. The shallow nearshore category includes black-and-yellow rockfish, China rockfish, gopher rockfish, grass rockfish, and kelp rockfish. The deeper nearshore category includes black rockfish, blue rockfish, brown rockfish, calico rockfish, copper rockfish, olive rockfish, quillback rockfish, and treefish.

Other Groundfish Stock Complexes

“Other Fish” are those FMP groundfish species or species groups for which there is not specified landing limit, size limit, quota or harvest guideline (as defined in federal regulation at 50 CFR 660.302).

"Other Flatfish" are those species that do not have individual ABC/OYs and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, sand sole, and starry flounder. Life history descriptions of these species may be found in the EFH appendix document described in Section 3.1.2.

3.2.4 Nongroundfish Fish Stocks

As noted at the beginning of Section 3.2, the proposed action could potentially affect these species in two ways. They may be caught incidentally in fisheries targeting groundfish. Thus, management measures that change total fishing effort in groundfish fisheries could increase or decrease fishing mortality on incidentally-caught species. Alternatively, those fisheries targeting nongroundfish species (described in Section 3.5.2.2) may be affected by management measures intended to reduce or eliminate incidental catches of overfished groundfish species in these fisheries.

3.2.4.1 California Halibut

California halibut (*Paralichthys californicus*) are a left-eyed flatfish of the family Bothidae. They range from Northern Washington at approximately the Quileuete River to southern Baja, California (Eschmeyer *et al.* 1983), but are most common south of Oregon. They are predominantly associated with sand substrates from nearshore areas just beyond the surf line to about 183 m.

California halibut feed on fishes and squids and can take their prey well off the bottom. They are an important sport and commercial species, especially in California where they are targeted using hook-and-line and trawl gear.

3.2.4.2 California Sheephead

California sheephead (*Semicossyphus pulcher*) are a large member of the wrasse family Labridae. They range from Monterey Bay south to Guadalupe Island in central Baja, California and in the Gulf of California, but are uncommon north of Point Conception. They are associated with rocky bottom habitats, particularly in kelp beds to 55 m, but more commonly at depths of 3 m to 30 m.

They can live to 50 years of age and a maximum length of 91 cm (16 kg). Like some other wrasse species, California sheephead change sex starting first as a female, but changing to a male at about 30 cm in length.

3.2.4.3 Coastal Pelagic Species (CPS)

CPS are schooling fish, not associated with the ocean bottom, that migrate in coastal waters. These species include: northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinops sagax*), Pacific (chub) mackerel (*Scomber japonicus*), jack mackerel (*Trachurus symmetricus*), and market squid (*Decapoda spp*.). Until 1999, northern anchovy was managed under the Council's Northern Anchovy FMP. Amendment 8 to the Northern Anchovy FMP brought the remaining CPS species under federal management and renamed the FMP the Coastal Pelagic Species FMP. This FMP was implemented in December 1999.

Sardines inhabit coastal subtropical and temperate waters, and at times, have been the most abundant fish species in the California current. During times of high abundance, Pacific sardine range from the tip of Baja, California to southeastern Alaska. When abundance is low, Pacific sardine do not occur in large quantities north of Point Conception, California. Pacific mackerel in the northeastern Pacific range from Banderas Bay, Mexico to southeastern Alaska. They are common from Monterey Bay, California to Cabo San Lucas, Baja, California, and most abundant south of Point Conception, California. The central subpopulation of northern anchovy ranges from San Francisco, California to Punta Baja, Mexico. Jack mackerel are a pelagic schooling fish that range widely throughout the northeastern Pacific; however, much of their range lies outside the U.S. EEZ. Adult and juvenile market squid are distributed throughout the Alaska and California current systems, but are most abundant between Punta Eugenio, Baja, California and Monterey Bay, Central California.

Recent (December 1999 and July 1999, respectively) stock assessments indicate Pacific sardine and Pacific mackerel are increasing in relative abundance. Pacific sardine biomass in U.S. waters was estimated to be 1,581,346 mt in 1999; Pacific mackerel biomass (in U.S. waters) was estimated to be 239,286 mt. Pacific sardine landings for the directed fisheries off California and Baja, California reached the highest level in recent history during 1999, with a combined total of 115,051 mt harvested. In 1998 70,799 mt of Pacific mackerel were landed, representing near-record levels for the combined directed fisheries off California and Baja, California. Population dynamics for market squid are poorly understood, and annual fluctuations in commercial catch vary from <10,000 mt to 90,000 mt. Amendment 10 to the CPS FMP describes and analyzes several approaches for estimating an MSY-proxy for market squid. Amendment 10 was adopted by the Council in June 2002 and is currently under review by NMFS. Market squid are thought to have an annual mortality rate approaching 100%, which means the adult population is almost entirely new recruits and successful spawning is crucial to future years' abundance.

3.2.4.4 Dungeness Crab

The Dungeness crab (*Cancer magister*) is distributed from the Aleutian Islands, Alaska, to Monterey Bay, California. They live in bays, inlets, around estuaries, and on the continental shelf. Dungeness crab are found to a depth of about 180 m. Although it is found at times on mud and gravel, this crab is most abundant on sand bottoms; frequently it occurs among eelgrass. The Dungeness crab, which are typically harvested using traps (crab pots), ring nets, by hand (scuba divers), or dip nets are incidentally taken or harmed unintentionally by groundfish gears. Dungeness crab are managed by the states of Oregon and California, and by the State of Washington in cooperation with Washington Coast treaty tribes.

3.2.4.5 Highly Migratory Species (HMS)

Highly migratory species (HMS) include tunas, billfish, dorado, and sharks—species that range great distances during their lifetime, extending beyond national boundaries into international waters and among the EEZs of many nations in the Pacific. The Council is adopting a Highly Migratory Species FMP to federally regulate the take of HMS within and outside the EEZ. The draft HMS FMP/DEIS (PFMC 2001a) describes species proposed for active management in detail. These are five tuna species, five shark species, striped marlin, swordfish, and dorado or dolphinfish. A much longer list of species, constituting all those that have been caught in HMS fisheries and not already under state or federal management, will be monitored, but are not part of the management unit.

3.2.4.6 Ocean Whitefish

Ocean whitefish (*Caulolatilus princeps*) occur as far north as Vancouver Island in British Columbia, but are rare north of Central California. A solitary species, it inhabits rocky bottoms and is also found on soft sand and mud bottoms. Whitefish dig into the substrate for food.

3.2.4.7 Pacific Pink Shrimp

Pacific pink shrimp (*Pandalus jordani*) are found from Unalaska in the Aleutian Islands to San Diego, California, at depths of 25 fm to 200 fm (46 m to 366 m). Off the U.S. West Coast these shrimp are harvested with trawl gear from Northern Washington to Central California between 60 fm and 100 fm (110 m to 180 m). The majority of the catch is taken off the coast of Oregon. Concentrations of pink shrimp are associated with well-defined areas of green mud and muddy-sand bottoms. Shrimp trawl nets are usually constructed with net mesh sizes smaller than the net mesh sizes for legal groundfish trawl gear. Thus, shrimp trawlers that commonly take groundfish in association with shrimp (rather than the reverse). Pacific shrimp fisheries are managed by the states of Washington, Oregon, and California.

3.2.4.8 Pacific Halibut

Pacific halibut (*Hippoglossus stenolepis*) belong to a family of flounders called Pleuronectidae. Pacific halibut can be found along the continental shelf in the North Pacific and Bering Sea. They have flat, diamond-shaped bodies and are able to migrate long distances. Most adult fish tend to remain on the same grounds year after year, making only a seasonal migrations from the more shallow feeding grounds in summer to deeper spawning grounds in winter. Halibut are usually found in deep water (40 m to 200 m).

Pacific halibut are managed by the bilateral (U.S./Canada) International Pacific Halibut Commission (IPHC). The Pacific Halibut Catch Sharing Plan for waters off Washington, Oregon, and California (Area 2A) specifies IPHC management measures for Pacific halibut on the West Coast. Implementation of IPHC catch levels and regulations is the responsibility of the Council, the states of Washington, Oregon, and California, and the Pacific halibut treaty tribes.

3.2.4.9 Ridgeback Prawn

Ridgeback prawns (*Sicyonia ingentis*) are found south of Monterey, California to Baja, California in depths of 145 metric feet to 525 metric feet (Sunada *et al.* 2001). They are more abundant south of Point Conception and are the most common invertebrate appearing in trawls. Their preferred habitat is sand, shell and green mud substrate, and they are relatively sessile. Although information about their feeding habits is limited, these prawns probably are detritus feeders. In turn, they are prey for sea robins, rockfish, and lingcod. Unlike other shrimp species, which carry their eggs during maturation, ridgeback prawns release their eggs into the water column. They spawn seasonally from June to October. Surveys recorded increasing abundance of ridgeback prawns from 1982, when surveys began, to 1985. The population then declined. More recent CPUE data suggest increased abundance in the 1990s. These changes may be due to climate phenomena, particularly El Niño events.

3.2.4.10 Sea Cucumber

Two sea cucumber species are targeted commercially: the California sea cucumber *(Parastichopus californicus*) and the warty sea cucumber (*P. parvimensis*) (Rogers-Bennett and Ono 2001). These species are tube-shaped Echinoderms, a phylum that also includes sea stars and sea urchins. The California sea cucumber occurs as far north as Alaska, while the warty sea cucumber is uncommon north of Point Conception and does not occur north of Monterey. Both species are found in the intertidal zone to as deep as 300 feet. These bottom-dwelling organisms feed on detritus and small organisms found in the sand and mud. Because sea cucumbers consume bottom sediment and remove food from it, they can alter the substrate in areas where they are concentrated. They can also increase turbidity as they excrete ingested sand or mud particles. They are preyed upon by sea stars, crabs, various fishes, and sea otters. They spawn by releasing gametes into the water column, and spawning occurs simultaneously for different segments of a population. During development, they go through several planktonic larval stages, settling to the bottom two months to three months after fertilization of the egg. Little is known about the population status of these two species; and assessment is difficult, because of their patchy distribution. However, density surveys suggest abundance has declined since the late 1980s. This is not unexpected since a commercial fishery for these species began in the late 1970s and expanded substantially after 1990.

3.2.4.11 Spot Prawn

Spot prawn (*Pandalus platyceros*) are the largest of the pandalid shrimp and range from Baja, California north to the Aleutian Islands and west to the Korean Strait (Larson 2001). They inhabit rocky or hard bottoms including coral reefs, glass sponge reefs, and the edges of marine canyons. They have a patchy distribution, which may result from active habitat selection and larval transport. Spot prawn are hermaphroditic, first maturing as males at about three years of age. They enter a transition phase after mating at about four years of age when they metamorphose into females.

Spot prawns are taken by both traps and trawls on the West Coast with the fishery taking predominantly older females. These fisheries are open access and managed by the West Coast states.

3.2.4.12 White Seabass

White seabass (*Atractoscion nobilis*), a large member of the croaker family, range from southeast Alaska to Baja but are rare north of California (Eschmeyer *et al.* 1983). White seabass are primarily targeted with driftnet gear since the setnet fishery for white seabass was prohibited in 1994. White seabass may also be caught with commercial hook-and-line gear in the early spring, when large seabass are available. Regulations covering white seabass have been in effect since 1931 and have included a minimum size limit, closed seasons, bag limits, and fishing gear restrictions. Such regulations are in effect today, with slight variations. An FMP for white seabass is presently being adopted and the need for additional regulations will be considered (Vojkovich and Crooke 2001).

3.2.4.13 Miscellaneous Species

Little information is available on nongroundfish species that are incidentally captured in the groundfish fishery. Other than those species mentioned above, documentation from the whiting fishery indicates that species such as American shad (*Alosa sapidissima*) and walleye pollock (*Theragra chalcogramma*) are taken incidentally. According to preliminary data, about 112 mt of shad and 280 mt of pollock were taken as incidental catch in the at-sea sector of the Pacific whiting fishery in 2001, through October. American shad was also taken in the shore-based whiting fishery. Introduced in 1885, they have flourished throughout the lower Columbia River, producing a record run of 4.0 million fish in 1990 (ODFW and WDFW 2002). Walleye pollock are found in the waters of the Northeastern Pacific Ocean from the Sea of Japan, north to the Sea of Okhotsk, east in the Bering Sea and Gulf of Alaska, and south in the Northwestern Pacific Ocean along the Canadian and U.S. West Coast to Carmel, California. In 2002 trawlers began targeting this species off Washington after the primary whiting fishery closed, based on reports of larger concentrations of the fish in these waters. Since this species is not managed under any of the Council's FMPs, there are no harvest levels, management measures, or observer requirements specified for this fishery. In 2003, WDFW sponsored an EFP to explore selective harvesting of pollock while minimizing impacts to incidental species. WDFW has submitted an application for this EFP to continue in 2004.

3.3 Protected Species

Protected species fall under three overlapping categories, reflecting four mandates: the Endangered Species Act of 1973 (ESA), the Marine Mammal Protection Act of 1972 (MMPA), the Migratory Bird Treaty Act (MBTA), and EO 13186. These mandates, and the species thus protected, are described below.

3.3.1 ESA-listed Species

3.3.1.1 Salmon

Salmon caught in West Coast fisheries have life cycle ranges that include coastal streams and river systems from Central California to Alaska and marine waters along the U.S. and Canada seaward into the north central Pacific Ocean, including Canadian territorial waters and the high seas. Some of the more critical portions of these ranges are the freshwater spawning grounds and migration routes.

Chinook, or king salmon (*Oncorhynchus tshawytscha*), and coho, or silver salmon (*O. kisutch*), are the main species caught in Council-managed ocean salmon fisheries. In odd-numbered years, catches of pink salmon (*O. gorbuscha*) can also be significant, primarily off Washington and Oregon. NMFS issues a Biological Opinion for fisheries with a potential interaction with protected salmon species listed under the ESA (Table 3.3.1-1), specifying the allowable take given ESA conservation constraints. Additional information on Council-managed salmon fisheries and affected stocks may be found in the most recent environmental assessment for the ocean salmon fishery, prepared by the Council (PFMC 2003a).

Salmon are caught incidentally in both the at-sea and shore-based segments of the whiting fishery. This bycatch is closely monitored through an at-sea observer program and dockside sorting of shore deliveries. A salmon bycatch reduction plan has also been implemented in this fishery. Because several chinook salmon runs are listed under the ESA, bycatch of chinook salmon is a concern in the at-sea whiting fishery. In 2002, the most recent data available, the catcher-processor fleet caught 970 chinook for a bycatch rate of 0.0235 chinook per metric ton of whiting, the non-tribal mothership fleet caught 709 chinook for a bycatch rate of 0.0269 , and the tribal whiting fishery caught 1,018 chinook for a bycatch rate of 0.467 (NMFS 2003a). Vessels supplying fish to shore-based processors caught 1,062 chinook for a bycatch rate of .023 (NMFS

2003d). Table 3.3.1-2 provides the equivalent data for the years 1999-2001. It can be seen that bycatch rates both fluctuate year-to-year and differ among sectors.

The estimated coastwide bycatch of chinook in the whiting fishery, including the shore-based component, has averaged 7,067 annually since 1991. Limits on chinook bycatch in the whiting fishery were established as result of the September 27, 1993, BO issued pursuant to the ESA. This opinion established the bycatch rate of 0.05 chinook salmon/mt of whiting with an 11,000 fish limit for the entire whiting fishery (at-sea and shore-base sectors combined). Re-initiation of the Biological Opinion is required if both the bycatch rate and bycatch limit are exceeded (NMFS 2003c). Table 3.3.1-3 shows the incidental annual catch of chinook salmon for all sectors of the whiting fleet combined (at-sea and shore-based), from 1991 to 2001. Values in bold indicate years in which the threshold established in the biological opinion was exceeded.

3.3.1.2 Sea Turtles

Sea turtles are highly migratory, and four of the six species found in U.S. waters have been sighted off the West Coast. These species include: Loggerhead *(Caretta caretta*), Green (*Chelonia mydas),* Leatherback (*Dermochelys coriacea*), and Olive ridley (*Lepidochelys olivacea*). Little is known about the interactions between sea turtles and West Coast fisheries. Directed fishing for sea turtles in West Coast groundfish fisheries is prohibited because of their ESA listings (Table 3.3.1-4); however, incidental take of sea turtles by longline or trawl gear may occur. The management and conservation of sea turtles is shared between NMFS and the U.S. Fish and Wildlife Service (FWS).

TABLE 3.3.1-1. Protected salmon species on the West Coast with their protected species designations. (Page 1 of 1)

Species and Stock	Scientific Name
Salmon species listed as endangered under the ESA	
Chinook salmon- Sacramento River Winter; Upper Columbia Spring	*Oncorhynchus tshawytscha*
Sockeye salmon- Snake River	*Oncorhynchus nerka*
Steelhead- Southern California; Upper Columbia	*Oncorhynchus mykiss*
Salmon species listed as threatened under the ESA	
Coho salmon- Central California, Southern Oregon, and Northern California Coasts	*Oncorhynchus kisutch*
Chinook salmon- Snake River Fall, Spring, and Summer; Puget Sound; Lower Columbia; Upper Willamette; Central Valley Spring; California Coastal	*Oncorhynchus tshawytscha*
Chum salmon- Hood Canal Summer; Columbia River	*Oncorhynchus keta*
Sockeye salmon- Ozette Lake	*Oncorhynchus nerka*
Steelhead- South-Central California, Central California Coast, Snake River Basin, Lower Columbia, California Central Valley, Upper Willamette, Middle Columbia, Northern California	*Oncorhynchus mykiss*

TABLE 3.3.1-2. Total catch of salmon (number) and chinook salmon bycatch rates (number of salmon/mt of whiting) taken by the at-sea and shore-based processing fleets, 1999-2001. (Page 1 of 1)

	Catcher-processors		Non-tribal Motherships		Tribal Mothership		Shore-based	
Species	Catch	Bycatch	Catch	Bycatch	Catch	Bycatch	Catch	Bycatch
2001								
Chinook	847	0.014	1,721	0.048	959	0.158	2,634	0.036
Other	146		624		16		371	
2000								
Chinook	1,839	0.027	4,420	0.094	1,947	0.312	3,321	0.039
Other	88	0.001	27	0.001	16	0.003	24	
1999								
Chinook	2,704	0.040	1,687	0.036	4,497	0.174	1696	0.020
Other	296		506		278		16	

Source: (NMFS 2003c; NMFS 2003d)

TABLE 3.3.1-3. Incidental catch of chinook salmon in the whiting fishery 1991-2001, all sectors. (Page 1 of 1)

Year	Whiting (mt)	Chinook Salmon (no.)[a/]	Bycatch Rate (no/mt whiting)[a/]
1991	222,114	6,194	0.0279
1992	201,168	4,753	0.0236
1993	135,516	5,387	0.0398
1994	248,768	4,605	0.0185
1995	175,255	**15,062**	**0.0859**
1996	212,739	2,327	0.0109
1997	232,958	5,896	0.0253
1998	232,587	5262	0.0226
1999	224,459	10,579	0.0471
2000	202,527	**11,516**	**0.0569**
2001	173,857	6,161	0.0354
2002	130,004	3,759	0.0289

a/ Values in bold indicate years in which the threshold established in the biological opinion was exceeded. Source: (NMFS 2003c)

TABLE 3.3.1-4. Protected sea turtles on the West Coast with their protected species designations. (Page 1 of 1)

Species	Scientific Name
Sea turtles listed as endangered under the ESA	
Green turtle	*Chelonia mydas*
Leatherback turtle	*Dermochelys coriacea*
Olive ridely turtle	*Lepidochelys olivacea*

3.3.2 Marine Mammals

The waters off Washington, Oregon, and California support a wide variety of marine mammals. Approximately 30 species, including seals and sea lions, sea otters, whales, dolphins, and porpoise, occur within the EEZ. Many marine mammal species seasonally migrate through West Coast waters, while others are year-round residents.

In addition to the ESA, the federal MMPA guides marine mammal species protection and conservation policy. Under the MMPA, on the West Coast NMFS is responsible for the management of cetaceans and pinnipeds, while the FWS manages sea otters. Stock assessment reports review new information every year for strategic stocks and every three years for non-strategic stocks. (Strategic stocks are those whose human-caused mortality and injury exceeds the potential biological removal [PBR].) Marine mammals, whose abundance falls below the optimum sustainable population (OSP), are listed as “depleted” according to the MMPA.

Fisheries that interact with species listed as depleted, threatened, or endangered (Table 3.3.2-1) may be subject to management restrictions under the MMPA and ESA. NMFS publishes an annual list of fisheries in the *Federal Register* separating commercial fisheries into one of three categories based on the level of serious injury and mortality of marine mammals occurring incidentally in that fishery. The categorization of a fishery in the list of fisheries determines whether participants in that fishery are subject to certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements. West Coast groundfish fisheries are in Category III, denoting a remote likelihood of, or no known, serious injuries or mortalities to marine mammals.

TABLE 3.3.2-1. Protected marine mammals on the West Coast with their protected species designations. (Page 1 of 1)

Species and Stock	Scientific Name
Marine mammals listed as threatened under the ESA	
Steller sea lion- eastern stock	*Eumetopias jubatus*
Guadalupe fur seal	*Arctocephalus townsendi*
Southern sea otter- California stock	*Enhydra lutris*
Marine mammals listed as depleted under the MMPA	
Sperm whale- West Coast stock	*Physeter macrocephalus*
Humpback whale- West Coast and Mexico stock	*Megaptera novaeangliae*
Blue whale- eastern north Pacific stock	*Balaenoptera musculus*
Fin whale- West Coast stock	*Balaenoptera physalus*

3.3.3 Seabirds

The highly productive California Current System, an eastern boundary current that stretches from Baja Mexico to southern British Columbia, supports more than two million breeding seabirds and at least twice that number of migrant visitors. Tyler, *et al.* (1993) reviewed seabird distribution and abundance in relation to oceanographic processes in the California Current System and found that over 100 species have been recorded within the EEZ including: albatross, shearwaters, petrels, storm-petrels, cormorants, pelicans, gulls, terns, and alcids (murres, murrelets, guillemots, auklets, and puffins). In addition to these "classic" seabird, millions of other birds are seasonally abundant in this oceanic habitat including: waterfowl, waterbirds (loons and grebes), and shorebirds (phalaropes). Not surprisingly, there is considerable overlap of fishing areas and areas of high bird density in this highly productive upwelling system. The species composition and abundance of birds varies spatially and temporally. The highest seabird biomass is found over the continental shelf, and bird density is highest during the spring and fall when local breeding species and migrants predominate.

The FWS is the primary federal agency responsible for seabird conservation and management. Four species found off the Pacific Coast are listed under the ESA, as noted in Table 3.3.3-1. In 2002, the FWS classified several seabird species that occur off the Pacific Coast as "Species of Conservation Concern." These species include: black-footed albatross (*Phoebastria nigripes*), ashy storm-petrel (*Oceanodroma homochroa*), gull-billed tern (*Sterna nilotica*), elegant tern (*Sterna elegans*), arctic tern (*Sterna paradisaea*), black skimmer (*Rynchops niger*), and Xantus's murrelet (*Synthliboramphus hypoleucus*).

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing, or possessing migratory birds is unlawful. In addition to the MBTA, an Executive Order, Responsibilities of Federal Agencies to Protect Migratory Birds (EO 13186) directs federal agencies to negotiate Memoranda of Understanding with the U.S. Fish and Wildlife Service (FWS) that would obligate agencies to evaluate the impact on migratory birds as part of any NEPA process. In 2002 and 2003, the FWS and NMFS have been working together to draft a Memorandum of Understanding concerning seabirds.

Under the Magnuson-Stevens Act, NMFS must ensure fishery management actions comply with other laws designed to protect seabirds. NMFS is also required to consult with FWS if fishery management plan actions may affect seabird species listed as endangered or threatened. Taken together, these laws and directives underscore the need to consider impacts to seabirds in decision making and consider ways to reduce potential impacts of the proposed action. In February 2001, NMFS adopted a National Plan of Action (NPOA) to Reduce the Incidental Take of Seabirds in Longline Fisheries. This NPOA contains guidelines that are applicable to relevant groundfish fisheries and would require seabird incidental catch mitigation if a significant problem is found to exist. During the first two years of NPOA implementation, NMFS regions were tasked with assessing the incidental take of seabirds in longline fisheries. In the limited entry groundfish longline fleet off the coast of Washington, Oregon, and California during September 2001 - October 2002, there were no incidental seabird takes documented by West Coast Groundfish Observers. (During the assessment period, approximately 30% of landings by the limited entry fixed gear fleet had observer coverage.)

TABLE 3.3.3-1. Protected seabirds on the West Coast with their protected species designations. (Page 1 of 1)

Species	Scientific Name
Seabirds listed as endangered under the ESA	
Short-tail albatross	*Phoebastria (=Diomedea) albatrus*
California brown pelican	*Pelecanus occidentalis*
California least tern	*Sterna antillarum browni*
Seabirds listed as threatened under the ESA	
Marbled murrelet	*Brachyramphs marmoratus*

3.4 Public Sector

The public sector includes those entities directly affected by changes to the current management regime, but does not include participants in the fishery or the fishing communities of the West Coast (see Section 3.5 for a description of the socioeconomic environment). Therefore, the public sector, as defined in this EIS, represents the policy, science, and management entities that comprise the current management regime. The management regime is an important issue because it generates direct and indirect impacts. The regime is also itself affected by changes in law and policy, which can cumulatively affect the environment. This section discusses stock assessments and research fisheries, both crucial components in the process of determining sustainable fishery yields; uncertainty, which underlies the range of alternatives evaluated in this EIS; enforcement, which affects the efficacy of prescribed management measures; and legal authorities and jurisdictions, which also directly affect the management regime.

3.4.1 Current Management Issues

This section briefly summarizes current management issues that are being developed to end overfishing and create long term sustainability in West Coast groundfish fisheries. While not an all-inclusive list of issues, these are the initiatives that are fundamental objectives specified in the Magnuson-Stevens Act, groundfish FMP, and the Council's groundfish management strategic plan (Ad-Hoc Pacific Groundfish Fishery Strategic Plan Development Committee 2000).

3.4.1.1 Minimizing Impacts to Essential Fish Habitat

The 1996 Sustainable Fisheries Act re-authorizing and amending the Magnuson-Stevens Act obligates the Councils and NMFS to identify and characterize EFH, which for West Coast groundfish is defined as the aquatic habitat necessary to allow for groundfish production to support long-term sustainable fisheries for groundfish, and for groundfish contributions to a healthy ecosystem. To satisfy this description, EFH must be described for all life history stages of managed species. EFH descriptions have been incorporated into the groundfish FMP in both Section 11.10 and in a detailed appendix (available online at: http://www.nwr.noaa.gov/1sustfsh/efhappendix/page1.html). West Coast groundfish species managed by the groundfish FMP (Table 3.2.0-1) occur throughout the EEZ and occupy diverse habitats at all stages in their life histories. EFH for any one species may be large because a species' pelagic eggs and larvae are widely dispersed, for example, or comparatively small as is the case with the adults of many nearshore rockfishes which show strong affinities to a particular location or type of substrate.

Minimizing impacts requires a better understanding of the effect of fishing activities on EFH and the distribution of EFH and those fishing activities. A comprehensive analysis of West Coast groundfish EFH and the effect of current fishing practices on these habitats is being prepared by NMFS in an EIS. Through the EFH EIS process, NMFS is proposing to amend the groundfish FMP to identify and describe EFH for each managed species, identify habitat areas of particular concern (HAPCs) within EFH, and to minimize adverse effects on EFH caused by fishing.

These actions are being proposed to ensure the conservation and enhancement of EFH as required by the Magnuson-Stevens Fishery Conservation and Management Act as well as comply with the American Oceans Campaign v. Daley court order requiring a thorough National Environmental Policy Act (NEPA) analysis of alternatives and impacts.

More information on the EIS process for EFH can be found on the Council's website at: http://www.pcouncil.org/habitat/habback.html. NMFS is scheduled to publish a draft EFH EIS in February 2005, and a final EIS in December 2005.

3.4.1.2 Fleet Reduction and Fishery Rationalization

Fleet reduction and capacity rationalization have been under Council discussion since the 1980s. The first step was the inception of the limited entry committee that designed the West Coast groundfish license limitation program. The Council adopted the groundfish license limitation program in 1991 under Amendment 6 (implemented in 1994), acknowledging that additional capacity control measures were also required.

The groundfish strategic plan, adopted in October 2000, listed reduction of harvesting capacity as one of its main goals and included a trawl vessel buyback program as a short to intermediate term objective, and a trawl IQ or mandatory stacking program as an intermediate to long-term objective. Since the adoption of the groundfish strategic plan, a significant portion of the fixed gear sablefish fishery was placed under a tiered, stackable permit system under Amendment 14.

In 2003, a referendum was held to decide whether or not to have a groundfish limited entry trawl buyback program. The program provided $46 million to buy back 92 trawl vessels and 240 permits: $10 million in the form of a grant and the remainder in the form of a loan that those vessels remaining in the fishery will repay. This program will reduce the number of trawl vessels operating off the West Coast by 38% beginning January 2004.

In September 2003, the Council authorized appointment of a trawl groundfish individual quota committee. The committee is charged with making recommendations to the Pacific Council regarding development of individual quotas associated with the groundfish trawl fishery. The committee’s first meeting occurred in October 2003.

3.4.2 The Stock Assessment Process

Stock assessments for Pacific Coast groundfish are generally conducted by staff scientists of the California Department of Fish and Game, Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife, Oregon State University, University of Washington, and the Southwest, Northwest, and Alaska Fisheries Science Centers. These assessments describe the condition or status of a particular stock. This allows biologically sustainable harvest levels to be forecast. Scientists can then make management recommendations to maintain or restore the stock. If a stock is determined to be overfished (less than 25% of its unfished biomass), a rebuilding analysis and a rebuilding plan are developed.

For more than 20 years, groundfish assessments have primarily been concentrated on important commercial and recreational species. These species account for most of the historical catch and have been the targets of fishery monitoring and resource survey programs that provide basic information for quantitative stock assessments. However, not all groundfish assessments have the same level of information and precision.

Quantitative and non-quantitative assessments are used for groundfish stocks. Stocks are assessed quantitatively. Scientists use life history data to build a biologically realistic model of the fish stock for these stock assessments; they then calibrate the model so that it reproduces the observed fishery and survey data as closely as possible. During the 1990s, most West Coast groundfish assessments were conducted using the stock synthesis model. Recently there has been development of similar, but more powerful, models using state-of- the-art software tools. Assessment models and results are independently reviewed by the Council's stock assessment review (STAR) panels. It is the responsibility of the STAR Panels to review draft stock assessment documents and relevant information to determine if they use the available scientific data effectively to provide an accurate assessment of the condition of the stock. In addition, the STAR Panels review the assessment documents to see that they are sufficiently complete and the research needed to improve assessments in the future is identified. 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 the assessment results are as accurate and error-free as possible.

Following review of assessment models by the STAR Panels and subsequently the Groundfish Management Team (GMT) and Scientific and Statistical Committee (SSC), the GMT uses the reviewed assessments to recommend preliminary ABCs and OYs to the Council. The SSC comments on the STAR review results and the GMT recommendations. Biomass estimates from an assessment may be for a single year or an the average of the current and several future years. In general, an ABC will be calculated by applying the appropriate harvest policy (MSY proxy) to the best estimate of current biomass. ABCs based on quantitative assessments remain in effect until revised by either a full or partial assessment.

Full assessments provide information on the abundance of the stock relative to historical and target levels, and provide information on current potential yield. Scientists conduct partial assessments when they do not have enough data for a full assessment. Even full assessments can vary widely in reliability because of the amount of data available for modeling. Council-affiliated scientists conduct several assessments each year. Individual stocks are periodically reassessed as often as every year—currently only the case for Pacific whiting—to every three or four years. However some species have been assessed only once.

Stocks with ABCs set by non-quantitative 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 rates are unknown.

Many species have never been assessed and lack the data necessary to conduct even a qualitative assessment, such as a general indication in biomass trend. ABC values have been established for only about 26 stocks. 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 invulnerability to survey sampling gear. Precautionary measures continue to be taken when setting harvest levels (the OYs) for species that have no or only rudimentary assessments. Since implementation of the 2000 specifications, ABCs have been reduced by 25% to set OYs for species with less rigorous stock assessments, and by 50% to set OYs for those species with no stock assessment. At-sea observer data are expected to be available for use in the near future to upgrade the assessment capability or evaluate overfishing potential of these stocks. Interim ABC values may be established for these stocks based on qualitative information.

The accuracy and reliability of various data used in assessments—and the scientific assumptions on which they are based—need to be further evaluated to improve the quality of forecasts. Uncertainty associated with fishery logbook data, calibration of surveys, and accuracy of aging techniques also need more evaluation when considering survey reliability. Finally, a better understanding of ecosystem change and its influence on groundfish abundance will also improve stock assessments. The Council and NMFS have identified a range of projects that will help to improve stock assessments including:

- develop models to better quantify uncertainty and thus better specify precautionary management measures;

- develop models specifically for species with limited data;

- make assessment methods more standardized and conduct a formal review of these methods in order to shorten subsequent review of each species' assessment, which could allow more assessments to be reviewed each year;

- develop models to better represent spatially-structured populations, such as populations with low rates of internal mixing or populations with ontogenetic patterns spanning a range of habitats.

3.4.3 Capture of Fish in Research Fisheries

Research fisheries, or resource surveys, are an essential part of the management process. Two important issues arise in connection with these surveys. First, they provide fishery-independent data which—because it is gathered in a uniform, consistent manner—provide "benchmarks" used to track natural and anthropogenic changes in fish abundance. In some cases, a single survey or a short time series can be directly calibrated to absolute abundance. An annual survey will most closely track natural biological fluctuations and smooth out apparent fluctuations caused by environmental effects on catchability. However, a second issue stems from the fact that most current surveys involve catching fish, adding to total fishing mortality. For overfished stocks with low OY values, the research take can represent a significant proportion of the harvest specification. At the same time, the reduction in fishery catches means less data are available from this source, making it even more difficult to determine abundance, measure stock recovery, and estimate potential yields. Long-term groundfish survey efforts include:

- <u>Acoustic and midwater trawl survey</u>: A coastwide survey that is conducted triennially (1977-2001) for Pacific whiting. Recent surveys have been coordinated with the Canadian acoustic survey to assure adequate coverage in northern areas.

- <u>Shelf survey</u>: A bottom trawl survey conducted triennially in midsummer, with sufficient coastwide coverage for most target species. Areas south of Point Conception were not surveyed until recently, however. The survey covers bottom depths of 30 fm to 275 fm using two large (125 foot) chartered vessels.

- Slope survey: A bottom trawl survey conducted nearly annually in mid-autumn, covering bottom depths of 100 fm to 700 fm. Survey was started in 1998 and 1999.

- Nearshore survey: These are SCUBA and hook-and-line surveys for various nearshore rockfish off California and are conducted by CDFG.

- Mark-recapture survey: This effort targets black rockfish and lingcod by WDFW.

- Shelf rockfish recruitment survey: A midwater trawl survey off Central California by Southwest Fisheries Science Center (SWFSC) for age zero rockfish.

- California Cooperative Oceanographic Fisheries Investigation (CalCOFI): A multi-species, multi-disciplinary oceanographic and egg and larvae survey off Southern California, which is currently conducted quarterly.

- International Pacific Halibut Commission annual survey: This survey using longline vessels is important for management of Pacific halibut. However, it catches groundfish incidentally.

Additional surveys would increase the accuracy and reliability of management specifications. Increasing the number of surveys and geographic scope would provide information about distribution, abundance, and age structure of many groundfish populations while new types of survey could provide a better index of spawning biomass. A variety of other initiatives are needed to test the accuracy of existing techniques and develop new methods. Because catches of overfished species has become a critical concern, survey methods that do not involve capture need to be developed. For example, submersible surveys, where fish are counted and basic measurements taken through photography are being developed and tested. These may be especially appropriate for depleted rockfish species that occur in discrete habitats such as reefs and rock piles.

3.4.4 The Harvest Management Cycle (Biennial Management)

The process for setting West Coast groundfish harvest specifications and management measures has been an annual one. Since a 2001 federal district court ruling in *Natural Resources Defense Council* v. *Evans*, 2001 168 F. Supp. 2d 1149 (N.D. Cal. 2001) requiring NMFS to undergo a full public notice and comment period in accordance with the National Environmental Policy Act (NEPA), the annual management process has been contracted in time with a greater analytical burden (i.e., NEPA documents like this EIS need to be completed before a final decision is made by the Secretary). This has created a workload burden on participants in the process to the point where other groundfish strategic plan initiatives, like capacity reduction and fishery rationalization, cannot be developed. Therefore, in November 2002, the Council adopted FMP Amendment 17, which specifies a new biennial management process where harvest specifications and management measures are set for two years at a time in a three-meeting Council process. The three meeting process for the first biennial management period (2005-2006) began in November 2003, where a range of harvest specifications and an initial range of management measures is adopted for analysis. The second meeting is scheduled for April 2004, where final harvest specifications are adopted and the range of management measures is refined. Final management measures for 2005-2006 are expected to be adopted in June 2004. The NEPA document supporting those decisions is submitted to NMFS and the Environmental Protection Agency in the summer of 2004, allowing adequate public notice and comment before a final decision is made by the Secretary of Commerce and regulations are implemented on January 1, 2005.

Under this new biennial management framework, there would be an "off-year" where the Council could advance the groundfish strategic plan (and other) initiatives. Assessment models and surveys could be better developed as well during this "off-year" to address some of the critical questions inherent in West Coast groundfish science.

3.4.5 Enforcement

Traditional fishery monitoring techniques include air and surface craft surveillance, declaration requirements, landing inspections, and analysis of catch records and logbooks. Until recently, depth restrictions have not been used on a large scale in Council-managed fisheries, and the ability to monitor vessels' locations related to depth-based closed areas will be essential to effective management. Vessel monitoring systems (VMS) will provide this information to enforcement agencies through the use of a specialized transmitter on subject fishing vessels, which transmits position information via satellite. There are several issues related to the implementation of VMS in a fishery, including the variety of equipment types and associated costs, vessels' ability to carry VMS, VMS operating requirements, VMS vessel coverage, and integration of VMS with traditional enforcement techniques. As a new monitoring tool for West Coast groundfish fisheries, VMS will dramatically enhance rather than replace traditional techniques.

Current assets for patrolling offshore areas include helicopter and fixed wing aircraft deployed by the U.S. Coast Guard and state enforcement entities, one large 210 foot Coast Guard cutter, and smaller Coast Guard and state enforcement vessels. Only the aircraft and large cutter are suitable for patrolling the more distant offshore closed areas. The availability of Coast Guard assets may be challenged by other missions such as Homeland Security and search and rescue. State enforcement assets may be compromised by pessimistic budget outlooks that threaten to reduce these assets as state programs are rationalized under an increasingly constrained fiscal environment. Ensuring compliance with depth restrictions requires consideration for substantially increasing an at-sea enforcement presence coupled with a VMS that remotely tracks vessels using satellites and transponders.

State enforced declaration requirements have been utilized to increase the efficiency of at-sea patrols and improve enforcement, particularly in areas closed to certain gear types or fishing strategies. Under declaration programs, planned legal incursions into closed areas must be reported to state enforcement authorities prior to fishing. This requirement is generally reserved for vessels that would otherwise appear to be fishing illegally when viewed from an at-sea patrol craft.

Shoreside enforcement activities complement at-sea monitoring and declaration requirements by inspecting recreational and commercial vessels for compliance with landing limits, gear restrictions, and seasonal fishery closures. State agencies are increasingly using dockside sampling as a means of assessing groundfish catch in recreational fisheries, which when combined with state and federal enforcement patrols at boat launches and marinas, provides a means of ensuring compliance with bag limits and fishery closures. Commercial landings are routinely investigated upon landing or delivering to buying stations or processing plants and can be tracked through fishticket and logbook records.

In response to enforcement complexities of the depth-based closures first adopted in 2002, the Council requested the EC form a work group to investigate the feasability of phasing in a VMS for West Coast groundfish fisheries. The EC recommended VMS equipment requirements, identified approximate fleet sizes for fishing sectors likely to be considered for VMS units, and estimated the cost associated with purchase, installation, and operation of VMS units. Following this investigation, the Council formed the VMSC comprised of fishing industry representatives and EC participants to further investigate VMS and other enforcement issues relative to depth-based management. NMFS, in consultation with the Council and the

VMSC, published a final rule in the *Federal Register* on November 4, 2003 and has prepared an associated Environmental Assessment(EA)/RIR/IRFA for a VMS program beginning January 1, 2004. The RIR/IRFA provides a description of the range of fishery monitoring alternatives considered, including their associated costs, and an analysis of their impacts.

The burden of covering the costs associated with VMS is a significant issue, and federal funds have not been identified for these expenditures. The Council has recommended that VMS units be installed on the limited entry trawl and limited entry fixed gear fleets and that NMFS fully fund all VMS requirements if funding becomes available. In the absence of federal funding, the costs may be bourne entirely by the vessel owners. NMFS has revised its type-approval process and is constantly evaluating emerging technologies for inclusion in the VMS program. A current list of approved VMS equipment was published in the *Federal Register* on November 17, 2003, and additional equipment may be approved at a later date.

The RIR/IRFA and *Federal Register* notices, including the final rule and a list of approved equipment, can be found at the website of NMFS Northwest Region Sustainable Fisheries Division (www.nwr.noaa.gov/1sustfsh/groundfish/VMS/index.html). Additional information at the site, specifically for vessel owners, includes a guide for complying with the VMS program, instructions for installation and activation of transmitting units, and worksheets to help users navigate an automated phone declaration system.

3.4.6 Federal, State, and Tribal Roles and Responsibilities in Management

3.4.6.1 State/Federal Jurisdiction under the Magnuson-Stevens Act

Under the Magnuson-Stevens Act, NMFS manages the groundfish fishery in the Exclusive Economic Zone, which starts at the seaward boundary of the states (3 nm from shore) and extends 200 miles offshore. The states retain jurisdiction to manage fisheries in State waters (within 3 nm of shore). A state can also regulate vessels registered under the laws of that state outside the boundaries of that state if the state's laws and regulations are consistent with the FMP and applicable federal law.

In practice, the states and federal government manage the groundfish fishery consistently and cooperatively. For the groundfish fishery, the states, the responsible federal agencies, and the Pacific Fishery Management Council coordinate closely. Each state has a representative of its fishery agency as a voting member on the Council. NMFS has a voting member on the Council, and the U.S. Coast Guard, U.S. Fish and Wildlife Service, and the Pacific States Marine Fisheries Commission have non-voting members on the Council. The states and NMFS have representatives on the Council management and scientific committees that help develop the management measures. In short, there is very close coordination between the states and NMFS.

Management measures—including catch limits, bag limits, and size limits—apply to vessels operating in the EEZ (50 CFR 660.301). However, these limits, which apply to vessels that fish in the EEZ, also include fish caught between 0 and 3 miles from shore (50 CFR 660.323(a)). Therefore, if a vessel fishes in both state and federal waters, any fish caught count toward the limits in the federal groundfish regulations, no matter whether the fish were caught in state or federal waters. In addition, because the regulations have been developed cooperatively through the Council process, the States of Washington, Oregon, and California adopt regulations under their own authority that are the same as the federal regulations. For area closures, the federal regulations implement closed areas in federal waters, and state regulations implement closed areas in state waters.

3.4.6.2 Treaty Indian Fishing Rights

Treaties between the United States and numerous Pacific Northwest Indian tribes reserve to these tribes the right of taking fish at usual and accustomed grounds and stations ("u & a grounds") in common with all citizens of the United States. See U.S. v. Washington, 384 F. Supp. 312, 349-350 (W.D. Wash. 1974).

NMFS recognizes four tribes as having u & a grounds in the marine areas managed by the Pacific Coast groundfish FMP: the Makah, Hoh, and Quileute tribes, and the Quinault Indian Nation. The Makah Tribe is a party to the Treaty of Neah Bay, Jan. 31, 1855, 12 Stat. 939. See 384 F. Supp. at 349, 363. The Hoh and Quileute tribes and the Quinault Indian Nation are successors in interest to tribes that signed the Treaty with the Quinault, *et al.* (Treaty of Olympia), July 1, 1855, 12 Stat. 971. See 384 F. Supp. at 349, 359 (Hoh), 371 (Quileute), 374 (Quinault). The tribes' u&a grounds do not vary by species of fish. U.S. v. Washington, 157 F. 3d 630, 645 (9th Cir. 1998).

NMFS recognizes the areas set forth in the regulations cited below as marine u&a grounds of the four Washington coastal tribes. The Makah u&a grounds were adjudicated in U.S. v. Washington, 626 F.Supp. 1405, 1466 (W.D. Wash. 1985), aff'd 730 F.2d 1314 (9th Cir. 1984); see also Makah Indian Tribe v. Verity, 910 F.2d 555, 556 (9th Cir. 1990); Midwater Trawlers Co-op. v. Department of Commerce, 282 F.3d 710, 718 (9th Cir. 2002). The u&a grounds of the Quileute, Hoh, and Quinault tribes have been recognized administratively by NMFS. See, e.g., 67 Fed. Reg. 30616, 30624 (May 7, 2002) (u&a grounds for salmon); 50 CFR 660.324(c) (u&a grounds for groundfish); 50 CFR 300.64(I) (u&a grounds for halibut). The u&a grounds recognized by NMFS may be revised as ordered by a federal court.

The treaty fishing right is generally described as the opportunity to take a fair share of the fish, which is interpreted as up to 50% of the harvestable surplus of fish that pass through the tribes' u&a grounds. Washington v. Washington State Commercial Passenger Fishing Vessel Association, 443 U.S. 658, 685-687 (1979) (salmon); U.S. v. Washington, 459 F. Supp. 1020, 1065 (1978) (herring); Makah v. Brown, No. C85-160R, and U.S. v. Washington, Civil No. 9213 - Phase I, Subproceeding No. 92-1 (W.D. Wash., Order on Five Motions Relating to Treaty Halibut Fishing, at 6, Dec. 29, 1993) (halibut); U.S. v. Washington, 873 F. Supp. 1422, 1445 and n. 30 (W.D. Wash. 1994), aff'd in part and rev'd in part, 157 F. 3d 630, 651-652 (9th Cir. 1998), cert. denied, 119 S.Ct. 1376 (1999) (shellfish); U.S. v. Washington, Subproceeding 96-2 (Order Granting Makah's Motion for Summary Judgment, etc. at 4, November 5, 1996) (Pacific whiting). The court applied the conservation necessity principle to federal determinations of harvestable surplus in Makah v. Brown, No. C85-160R/ United States v. Washington, Civil No. 9213 - Phase I, Subproceeding No. 92-1, Order on Five Motions Relating to Treaty Halibut Fishing, at 6-7, (W.D. Wash. Dec. 29, 1993); Midwater Trawlers Co-op. v. Department of Commerce, 282 F.3d 710, 718-719 (9th Cir. 2002).

The treaty right was originally adjudicated with respect to salmon and steelhead. However, it is now recognized as applying to all species of fish and shellfish within the tribes' u&a grounds. U.S. v. Washington, 873 F.Supp. 1422, 1430, aff'd 157 F. 3d 630, 644-645 (9th Cir. 1998), cert. denied, 119 S.Ct. 1376; Midwater Trawlers Co-op. v. Department of Commerce, 282 F.3d 710, 717 (9th Cir. 2002) ["The term 'fish' as used in the Stevens Treaties encompassed all species of fish, without exclusion and without requiring specific proof (citations omitted)".]

In 1994, the U.S. government formally recognized that the four Washington Coastal Tribes (Makah, Quileute, Hoh, and Quinault) have treaty rights to fish for groundfish, and concluded that, in general terms, the quantification of those rights is 50% of the harvestable surplus of groundfish available in the tribes' u&a grounds. In 1996, NMFS promulgated a "framework rule" on treaty Indian fishing rights to groundfish. This rule is codified at 50 CFR 660.324. The rule establishes procedures for implementing treaty rights, and provides that rights will be implemented either through an allocation of fish that will be managed by the tribes, or through federal regulations that apply specifically to tribal fisheries. Under 50 CFR 660.332(a), tribal allocations are subtracted from the species OY before limited entry and open access allocations are derived.

For 2004, the tribal fisheries for sablefish, black rockfish, and Pacific whiting are separate fisheries, and are regulated by the tribes so as not to exceed their allocations. The tribal allocation for black rockfish is the same in 2004 as in 2003 (30,000 lb harvest guideline). Also similar to 2003, the tribal sablefish allocation is 10 percent of the total catch OY specified for the Monterey, Eureka, Columbia, and U.S./Vancouver INPFC areas under the proposed action (751 mt), less 3% for estimated discard mortality, or 728 mt.

In 1999 through 2002, the tribal allocation of Pacific whiting has been based on a methodology originally proposed by the Makah Tribe in 1998. The methodology is an abundance-based sliding scale that determines the tribal allocation based on the level of the overall U.S. OY, up to a maximum 17.5% tribal harvest ceiling at OY levels below 145,000 mt. The tribes have proposed using the same methodology in 2004. The Pacific whiting U.S. OY specification is expected to be decided at March 2004 Council meeting.

The sliding scale methodology used to determine the treaty Indian share of Pacific whiting is the subject of ongoing litigation. In United States v. Washington, Subproceeding 96-2, the Court held that the methodology is consistent with the Magnuson-Stevens Act, and is the best available scientific method to determine the appropriate allocation of whiting to the tribes. United States v. Washington, 143 F.Supp.2d 1218 (W.D. Wash. 2001). This ruling was reaffirmed in July 2002. Midwater Trawlers Cooperative v. Daley, C96-1808R (W.D. Wash.) (Order Granting Defendants' Motion to Supplement Record, July 17, 2002). Additional briefing will occur in this case. However, at this time NMFS remains under a court order in Subproceeding 96-2 to continue use of the methodology unless the Secretary finds just cause for its alteration or abandonment, the parties agree to a permissible alternative, or further order issues from the court. Therefore NMFS is obliged to continue to use the methodology unless one of the events identified by the court occurs. Since NMFS finds no reason to change the methodology, it has been used to determine the 2003 tribal whiting allocation.

For some species on which the tribes have a modest harvest, no specific allocation has been determined. Rather than try to reserve specific allocations for the tribes, NMFS establishes trip limits recommended by the tribes and the Council to accommodate modest tribal fisheries.

3.4.7 Uncertainty and Risk in the Management Process

Fishery managers are constantly confronted with uncertainty, and the environmental consequences of decision making is often a product of this uncertainty. Resource characteristics make this more of an issue in fisheries than in most other resource systems, because populations are widely dispersed in an inaccessible environment. In fact, the range of harvest level alternatives evaluated in this EIS is largely a product of uncertainty; given perfect knowledge (and perfect agreement about social objectives) it would be possible to precisely specify the optimal harvest level.[17/] Walters (1986) classifies uncertainty in three broad

17/ Traditionally, MSY has been viewed as an OY or target harvest level; but for populations below MSY, harvest levels must be adjusted downward to allow rebuilding to the MSY biomass. Further, although fishery managers view MSY dynamically by specifying fishing mortality rates (versus constant catch), population productivity (recruitment) can vary due to environmental factors such as regime shifts. Over the long term these environmental factors need to be accounted for or the population size can move away (continued...)

categories; Mace and Sissenwine (2002) identify an additional two management-related sources of uncertainty. These five sources of uncertainty are:

- Natural variation in the environment, including that caused by other, non-fishing human activities. Natural variability in recruitment is probably the most germane factor for estimating sustainable yields.

- Observation errors, including measurement error—an inaccurate temperature reading for example—and sampling error, or the difference between the distribution of values in a set of measurements and the actual frequency and range of values in the population or phenomenon being measured.

- Model mis-specification, or the accuracy of abstract representations of reality (models) in terms of causal relationships and system dynamics.

- Translation of scientific advice into management measures. Scientists may express uncertainty by bracketing a value with a range or confidence interval. Managers may be tempted to choose a value at the high end of the range if there is no more specific information about the risk (versus short-term benefit) of such an action.

- Imperfect implementation of management measures. The most common implementation error stems from inaccurate monitoring of the fishery. If fishing mortality is not accurately measured on a reasonably "real time" basis total catch may exceed the harvest specification

Groundfish management (like many other management regimes) suffers from all of these sources of uncertainty.

Greater uncertainty about the outcome of a particular action or event generally increases the level of risk, depending on how many possible outcomes would be undesirable. Risk analysis evaluates the likelihood that a given action will produce an undesirable outcome, often using statistical methods to specify the probability of certain outcomes. The rebuilding analyses that underlie the range of harvest specifications for overfished species use these methods to compute the probability of a population rebuilding to B_{MSY} within the specified time period if a given level of harvest is allowed. This is a form of risk analysis; the residual probability value expresses the risk of the population not reaching B_{MSY}. But the rebuilding analyses only evaluate recruitment variability, one component of the many sources of uncertainty about future stock performance. These analyses do, however, present managers with a more explicit measure of risk on which to base their decisions.

Resources users' and the public's skepticism of the validity of science highlights the significance of uncertainty and risk. The following sources of uncertainty can be identified in relation to specifying 2004 management measures:

17/ (...continued)
from the MSY level. Even if the biological system were perfectly specified, society may value resources in complex ways, for example, by attaching non-consumptive value to some proportion of the resource. Finally, the precautionary approach and National Standards Guidelines treat MSY as a limit rather than a target. In summary, annual specification is ongoing, and in a world without uncertainty these variables would have to be correctly identified each year for future yields to achieve MSY.

- Changes in the environmental regime (natural variability). As noted in Section 3.1.1, meso-scale climate variability influences stock productivity.

- The effect of human activity on population productivity. Although fishing and non-fishing impacts to habitat may be demonstrably damaging, it is not possible to quantify the effect on stock productivity or precisely specify the relationship between habitat impacts and productivity. The effect of changes in trophic structure is also uncertain.

- Observation error comes into play in all cases where fishery-dependent and independent data are gathered. Measurement error is common to much fishery-dependent data; bycatch estimates represent one crucial source of error of this type. Although measurement error is more easily reduced in survey work, sampling error is almost always present. For example, random stratified assignment of fishery observers allows partial coverage to be representative of what occurs in a fishery as a whole, but some, albeit quantifiable, level of uncertainty exists.

- Model error is unavoidable and not always transparent. For this reason the STAR process described above, involves several stages of review by a range of experts and interested parties. This may reduce risk (even if sources of uncertainty are not formally addressed) through a shared understanding about the state of nature being modeled and described.

- Mistranslation and misapplication in the management process are ongoing issues. Mistranslation—the choice of "over-optimistic" harvest levels, for example—are reduced somewhat through the procedures such as the rebuilding analyses now used to determine harvest specifications for those species. In contrast to a point estimate bounded by a confidence interval, a rebuilding analysis can specify the risk (in terms of the probability of the stock rebuilding with a given time period) for any value within a range. Misapplication is still a major problem, one that overlaps with observation error. Timely and accurate estimates of recreational catches are currently a major challenge to effective inseason management. Since bocaccio were declared overfished, for example, actual catches have exceeded harvest specifications, largely for this reason.

Uncertainty and risk are also translatable into socioeconomic impacts, an issue not explored by Mace and Sissenwine. Very broadly, mis-specification of harvest levels involves the assumption of either short-term or long-term risk. Short-term risk accords with under-harvest, if harvests are set below a level that is both sustainable in the long term and below some social optimum (representing a mix of consumptive market and non-consumptive, non-market values). Long-term risk is usually expressed as the potential of over-harvest compromising future returns from the fishery; it involves the tradeoff of short-term benefit (harvests now) against long-term gain (potentially higher harvests in the future). To a large degree the management process implicitly plays off these two types of risk. However, current analytical capability precludes effective quantification of the tradeoff.

3.5 Socioeconomic Environment

This section is subdivided into seven sub-sections, describing fishery sectors, fishing communities and general public interest in the resource. Section 3.5.1 provides an overview of the fishery. The subsequent sub-sections, 3.5.2 through 3.5.6, describe, respectively: commercial harvesters; buyers, processors, and seafood markets; the recreational and tribal fishery sectors, and the characteristics of fishing communities substantially dependent on or engaged in groundfish fishing. Finally, sub-section 3.5.7 describes "nonuse" values that may be held by the general public. Another segment of the socioeconomic environment, is described in Section 3.4, "The Public Sector." Section 3.4 describes fishery management agencies, enforcement agencies and other affected governmental entities.

3.5.1 Overview

The Pacific Coast groundfish fishery is a multi-species fishery that takes place off the coasts of Washington, Oregon, and California. Maintaining year-round fishing opportunities for groundfish has been one of the primary management objectives for the fishery. Pacific Coast groundfish support or contribute to a wide range of commercial, recreational, and tribal fisheries and the communities dependent on these fisheries. Groundfish is only one component of the West Coast fish harvest that supports commercial seafood vessels, processors, and commercial seafood dependent communities. Tables 3.5.1-1 and 3.5.1-2 list historical landings (round weight and exvessel value, respectively) for the primary West Coast target species. Commercial groundfish data by state are provided in Tables 3.5.1-3 and 3.5.1-4. Of 4,579 vessels active during November 2000 through October 2001, 1,341 (37% of the fleet) landed some groundfish (derived from PacFIN data). This segment of the fleet was responsible for 47% of the value of all West Coast landings (groundfish and nongroundfish species). Commercial fisheries targeting groundfish are, for the most part, regulated under a license limitation program implemented in 1994. Fisheries targeting groundfish that are not under the groundfish license limitation program, and fisheries that catch groundfish incidentally while targeting nongroundfish species are termed open access fisheries. The Council allocates commercial harvest (OYs) between limited entry and open access fisheries. Buyers and processors are an important value added component of regional fisheries and are described in more detail in Section 3.5.3.

Marine recreational fisheries consist of both charter and private vessels. Charter vessels are larger vessels for hire that can typically fish farther offshore than most vessels in the private recreational fleet. Both nearshore and shelf opportunities are important for West Coast recreational groundfish fisheries. Recreational fisheries are addressed in Section 3.5.4.

In addition to these fisheries, Indian tribes in Washington, primarily the Makah, Quileute, and Quinault, harvest groundfish in the EEZ. There are set tribal allocations for sablefish and Pacific whiting, while the other groundfish species' allocations are determined through the Council process in coordination with the tribes, states, and NMFS. Commercial tribal groundfish fisheries are described in Section 3.5.5.

TABLE 3.5.1-1. Overview of domestic shoreside landings and at-sea deliveries (round weight mt) from West Coast (Washington, Oregon, California) ocean area fisheries (0-200 miles) coastwide, 1981-2001 (includes commercial tribal fisheries, based on PacFIN data and Council [1997]). (Page 1 of 1)

Year	Lingcod	Whiting, At Sea	Whiting, Shoreside	Flatfish	Sablefish	Rockfish	Other Groundfish	Pink Shrimp	Spot Prawn - Trawl	Spot Prawn - Pot	Ridgeback Prawn - Trawl	Pacific Halibut	California Halibut	Salmon	Sea Cucumber	California Sheephead	Gillnet Complex	CPS Squid	CPS Wetfish	HMS	Dungeness Crab	Other Crustaceans	Other Species	Total
1981	3,307	**73,557**	838	25,972	11,419	59,774	1,729	18,202	174	4	87	160	191	7,967	0	0	1,258	23,510	105,357	152,465	9,011	1,480	38,365	534,827
1982	3,822	**67,465**	1,027	32,613	18,625	61,470	1,277	12,704	162	8	61	164	180	8,831	63	0	1,173	16,360	79,436	115,923	7,623	1,233	46,247	476,468
1983	4,163	**72,100**	1,051	29,639	14,685	48,157	889	6,052	58	1	70	322	289	2,936	74	0	678	1,959	32,076	114,644	7,169	1,403	48,437	386,852
1984	4,060	**78,889**	2,721	27,703	14,077	40,020	1,079	4,488	29	0	259	598	239	2,180	24	0	829	993	38,084	85,203	6,239	1,849	37,260	346,822
1985	3,883	**31,692**	3,894	30,400	14,308	37,347	967	12,408	26	4	357	536	149	5,043	0	0	1,954	11,071	26,657	34,004	7,703	1,754	43,790	267,947
1986	1,894	**81,639**	3,463	26,127	13,290	37,012	661	26,330	12	13	130	748	197	7,384	35	0	1,801	21,290	28,817	36,916	7,402	1,567	51,113	347,841
1987	2,586	**105,997**	4,795	28,796	12,784	40,242	2,644	31,060	21	14	85	307	224	9,410	49	0	1,370	19,985	36,860	35,902	8,464	1,447	56,546	399,588
1988	2,656	**135,781**	6,867	27,043	10,876	40,980	3,788	32,334	23	41	55	260	249	12,518	72	0	1,082	37,232	37,902	36,616	16,715	1,430	59,874	464,392
1989	3,580	**203,578**	7,414	29,880	10,439	45,334	2,694	35,550	30	48	61	212	273	6,869	0	0	875	40,936	35,160	27,446	16,045	1,806	67,110	535,341
1990	2,932	**175,685**	8,115	27,701	9,179	43,265	1,813	24,553	19	101	34	153	190	4,682	67	0	775	28,447	39,198	16,088	13,529	2,223	49,672	448,422
1991	3,167	200,594	21,040	30,515	9,496	35,282	2,978	19,064	21	103	52	169	235	3,734	264	0	851	37,388	45,047	11,135	6,185	2,035	31,752	461,107
1992	1,883	148,186	56,127	24,796	9,360	37,000	3,255	35,710	35	65	27	217	272	2,049	0	0	379	13,116	39,219	13,899	15,125	1,607	26,641	428,968
1993	2,200	91,640	42,108	22,107	8,145	38,252	3,483	22,451	51	105	33	252	218	2,214	295	0	309	42,889	31,397	17,300	17,411	1,773	20,341	364,974
1994	2,834	162,923	73,611	19,284	7,661	35,361	3,638	14,981	133	66	71	179	188	1,802	298	118	208	55,489	26,669	20,349	17,682	1,221	17,421	462,186
1995	1,700	98,376	74,967	19,706	7,951	32,171	2,135	11,342	136	42	187	142	262	4,756	268	115	276	70,363	52,963	18,538	16,937	1,462	17,857	432,652
1996	1,790	123,419	85,127	20,807	8,339	30,487	2,559	13,800	178	54	264	150	306	3,306	381	115	347	80,715	49,154	29,396	24,564	1,498	18,931	495,685
1997	1,652	142,726	87,410	19,508	7,951	25,576	2,271	17,456	263	79	177	201	415	3,700	209	141	340	70,471	70,617	26,406	12,347	2,010	22,731	514,655
1998	506	142,810	88,601	16,722	4,410	22,619	2,180	4,342	257	117	197	223	415	1,850	349	119	255	2,931	68,576	29,640	11,748	1,720	10,671	411,294
1999	441	139,940	83,637	20,213	6,660	16,408	1,627	12,404	185	93	632	220	385	2,709	272	63	394	92,122	76,092	17,702	15,783	1,478	11,901	501,575
2000	145	120,411	85,843	16,315	6,296	11,702	1,498	14,653	121	81	705	223	218	3,707	291	79	333	117,984	103,360	14,534	13,015	1,619	13,496	526,692
2001	156	99,875	73,475	13,863	5,646	7,806	1,427	17,595	92	95	161	331	245	3,358	323	68	264	85,959	106,105	14,816	11,234	1,643	12,530	457,100

NOTE: For 1981-1990, at-sea whiting catch estimates are from Council 1997.

TABLE 3.5.1-2. Overview of domestic shoreside landings and at-sea deliveries (exvessel revenue, thousands of inflation adjusted dollars) from West Coast (Washington, Oregon, California) ocean area fisheries (0-200 miles) coastwide, 1981-2001 (includes commercial tribal fisheries, based on PacFIN data and Council [1997]). (Page 1 of 1)

Year	Lingcod	Whiting, At Sea	Whiting, Shoreside	Flatfish	Sablefish	Rockfish	Other Groundfish	Pink Shrimp	Spot Prawn - Trawl	Spot Prawn - Pot	Ridgeback Prawn - Trawl	Pacific Halibut	California Halibut	Salmon	Sea Cucumber	California Sheephead	Gillnet Complex	CPS Squid	CPS Wetfish	HMS	Dungeness Crab	Other Crustaceans	Other Species	Total
1981	2,903	**21,422**	246	25,912	9,184	39,021	1,322	35,215	1,362	66	289	718	990	55,498	0	0	3,636	8,873	24,774	349,001	31,894	5,940	50,397	668,663
1982	3,438	**19,535**	299	32,484	16,932	43,603	1,144	23,511	1,336	144	259	713	907	61,603	41	0	3,123	5,897	15,868	221,464	29,896	6,494	44,789	533,482
1983	3,612	**20,220**	295	28,053	12,166	37,607	836	15,427	585	21	223	1,273	1,470	14,378	41	0	1,836	1,325	8,637	186,543	37,056	6,054	45,837	423,496
1984	3,332	**17,907**	619	24,956	10,196	33,727	972	6,904	331	1	499	1,686	1,368	16,394	15	0	2,131	762	10,452	145,062	33,250	10,227	26,708	347,498
1985	3,314	**6,850**	845	27,559	15,625	34,348	852	14,270	362	69	714	1,814	876	30,866	0	0	3,947	6,012	7,218	62,210	36,425	6,182	33,885	294,242
1986	1,912	**15,351**	654	25,224	15,902	37,166	694	44,838	171	170	339	3,603	1,252	36,460	23	0	3,594	6,553	7,031	65,121	32,872	7,685	33,865	340,484
1987	3,026	**20,629**	934	31,285	18,887	43,715	2,742	65,474	286	248	294	1,759	1,501	64,825	33	0	3,211	5,572	7,750	69,272	36,210	7,285	40,957	425,895
1988	2,909	**30,545**	1,546	28,308	17,014	39,914	3,050	39,651	327	605	210	1,505	1,696	92,630	44	0	2,635	10,710	8,795	80,405	59,221	7,838	47,483	477,042
1989	3,628	**38,346**	1,404	26,897	14,150	42,122	2,058	37,505	282	659	231	1,131	1,756	35,066	0	0	2,515	9,125	7,891	52,354	52,291	8,268	53,446	391,125
1990	2,889	**28,485**	1,323	21,762	12,186	40,988	1,240	33,522	200	1,389	128	1,141	1,242	27,707	46	0	2,080	5,989	6,837	31,125	57,515	9,065	60,424	347,283
1991	2,998	28,597	2,923	25,924	17,485	35,290	2,036	28,561	271	1,451	180	1,314	1,522	17,330	228	0	2,155	7,426	8,618	21,017	26,168	8,370	63,324	303,188
1992	1,931	21,460	7,029	19,649	16,283	37,761	2,195	32,597	517	1,049	156	1,238	1,723	11,073	0	0	1,122	2,982	7,489	31,264	46,441	8,014	56,861	308,835
1993	2,147	8,225	3,307	17,062	11,642	37,837	2,063	19,159	709	1,797	163	1,130	1,333	10,388	411	0	1,052	11,857	4,448	36,209	49,707	6,939	44,357	271,941
1994	2,758	14,731	5,587	14,888	15,914	40,796	2,305	22,016	1,952	1,139	241	1,034	1,272	8,270	483	854	616	16,369	4,422	42,699	59,941	6,541	40,900	305,726
1995	1,877	11,370	8,724	17,141	26,368	44,149	1,920	20,176	2,117	747	531	754	1,747	17,225	464	782	889	24,921	5,987	30,272	70,808	8,440	43,260	340,667
1996	1,994	14,899	5,593	17,082	28,363	37,024	2,125	19,901	2,823	924	851	837	1,903	10,226	596	760	1,076	23,994	5,971	49,928	81,432	8,861	42,992	360,158
1997	1,869	20,621	8,768	15,387	29,949	29,955	2,196	16,355	3,998	1,327	741	957	2,342	10,856	249	924	1,413	22,246	8,873	43,526	55,707	11,310	37,388	326,957
1998	762	14,364	5,141	13,277	12,074	26,522	3,126	5,360	3,923	1,972	808	842	2,236	6,060	484	735	946	1,730	7,279	42,731	49,105	9,186	12,113	220,776
1999	748	12,268	7,190	14,315	17,898	21,450	2,665	13,418	2,807	1,650	1,617	1,007	2,177	10,138	437	473	1,551	34,958	7,752	34,556	70,362	6,454	18,692	284,585
2000	353	11,137	8,154	14,304	20,796	17,802	2,700	13,251	2,233	1,673	1,835	1,237	1,380	14,266	619	607	1,310	27,704	12,212	33,705	63,088	8,387	20,718	279,472
2001	387	10,569	5,748	12,631	17,512	12,880	1,957	10,293	1,703	1,905	532	1,474	1,545	10,578	581	515	1,095	16,866	12,322	31,505	51,301	8,515	17,890	230,303
1981-2001 Avg	2,323	18,454	3,635	21,624	16,978	34,937	1,914	24,638	1,347	905	516	1,294	1,535	26,754	228	269	1,997	11,994	9,077	79,046	49,081	7,907	39,823	356,277

NOTE: For 1981-1990, at-sea whiting catch estimates are from Council 1997 and value estimates are based on shoreside prices.

TABLE 3.5.1-3. Overview of domestic shoreside landings and at-sea deliveries (round weight mt) from West Coast (Washington, Oregon, California) ocean area fisheries (0-200 miles) north and south of Cape Mendocino and by state, 1981-2001 (includes commercial tribal fisheries, based on PacFIN data (August, 2002) and Council (1997). (Page 1 of 1)

	All Groundfish							All Species						
	At-Sea Included		Not Including At Sea					At-Sea Included		Not Including At Sea				
Year	North of Cape Mendocino	South of Cape Mendocino	WA	OR	CA	Total	Total with At-Sea	North of Cape Mendocino	South of Cape Mendocino	WA	OR	CA	Total	Total with At-Sea
1981	151,004	25,592	23,290	37,315	42,434	103,039	176,596	200,657	334,063	33,937	66,554	360,779	461,270	534,827
1982	152,292	34,007	25,200	40,999	52,635	118,834	186,299	183,276	293,142	32,915	57,250	318,838	409,003	476,468
1983	143,709	26,973	22,912	35,103	40,567	98,583	170,683	164,636	222,109	30,740	44,898	239,115	314,752	386,852
1984	141,626	26,923	20,888	28,178	40,593	89,659	168,548	158,876	187,813	26,158	36,598	205,177	267,933	346,822
1985	96,178	26,312	19,166	28,967	42,665	90,798	122,490	125,107	142,474	27,921	43,062	165,272	236,255	267,947
1986	137,395	26,692	15,939	24,883	41,625	82,448	164,087	178,713	168,874	27,489	47,623	191,090	266,202	347,841
1987	174,325	23,519	20,097	30,531	41,219	91,847	197,844	220,706	178,523	31,820	58,994	202,778	293,591	399,588
1988	208,073	19,917	20,332	32,125	39,753	92,210	227,991	266,841	197,210	39,009	62,679	226,923	328,611	464,392
1989	279,717	23,202	20,012	36,836	42,492	99,341	302,919	340,343	194,791	36,795	72,104	222,864	331,763	535,341
1990	246,481	22,210	18,329	35,509	39,168	93,006	268,691	293,533	154,619	30,679	61,455	180,603	272,737	448,422
1991	283,082	19,989	16,941	49,750	35,786	102,477	303,071	314,390	146,533	24,777	66,239	169,497	260,513	461,107
1992	260,347	20,260	15,729	81,919	34,773	132,421	280,607	320,508	108,325	29,845	114,385	136,552	280,782	428,968
1993	191,730	16,205	17,018	71,211	28,066	116,295	207,935	241,100	123,751	34,261	92,938	146,135	273,334	364,974
1994	290,828	14,483	23,558	94,096	24,733	142,388	305,311	332,743	129,364	37,800	110,440	151,021	299,262	462,186
1995	219,667	17,339	18,455	91,644	28,531	138,630	237,006	255,753	176,863	32,695	107,495	194,086	334,276	432,652
1996	254,533	17,995	25,267	95,828	28,014	149,109	272,528	305,790	189,844	43,337	118,468	210,460	372,266	495,685
1997	270,417	16,675	19,106	95,875	29,333	144,314	287,093	313,325	201,296	30,163	116,860	224,838	371,862	514,655
1998	266,072	11,775	22,094	89,899	22,816	134,809	277,847	296,576	114,582	33,611	103,710	130,739	268,060	411,294
1999	260,219	8,707	21,496	92,089	14,863	128,448	268,926	296,771	204,567	32,007	112,253	216,505	360,765	501,575
2000	235,332	6,878	19,645	85,680	16,033	121,358	242,210	288,562	237,931	35,606	118,637	251,469	405,712	526,692
2001	196,620	5,627	24,197	66,450	11,403	102,051	202,247	263,965	192,980	49,532	104,343	202,565	356,440	457,100

NOTE: Includes at-sea whiting and tribal landings.

TABLE 3.5.1-4. Overview of domestic shoreside landings and at-sea deliveries (total exvessel revenue in thousands of inflation adjusted (2001) dollars) from West Coast (Washington, Oregon, California) ocean area fisheries (0-200 miles) north and south of Cape Mendocino and by state, 1981-2001 (includes commercial tribal fisheries, based on PacFIN data (August, 2002) and Council (1997). (Page 1 of 1)

	All Groundfish							All Species						
	At-Sea Included		Not Including At Sea					At-Sea Included		Not Including At Sea				
Year	North of Cape Mendo	South of Cape Mendo	WA	OR	CA	Total	Total with At-Sea	North of Cape Mendo	South of Cape Mendo	WA	OR	CA	Total	Total with At-Sea
1981	75,626	24,386	16,035	25,399	37,155	78,589	100,011	215,873	452,754	49,998	97,998	499,245	647,241	668,663
1982	85,664	31,772	18,767	33,149	45,984	97,900	117,435	183,942	349,468	45,052	81,054	387,841	513,947	533,482
1983	77,313	25,477	17,826	29,014	35,729	82,569	102,790	147,235	276,037	44,130	58,487	300,658	403,275	423,496
1984	66,561	25,149	15,836	22,974	34,992	73,802	91,709	120,235	226,876	33,178	45,885	250,528	329,591	347,498
1985	62,840	26,553	18,418	25,283	38,843	82,543	89,393	137,596	155,079	40,774	62,109	184,509	287,392	294,242
1986	67,114	29,789	15,525	24,311	41,715	81,552	96,903	167,471	172,056	41,981	77,899	205,253	325,132	340,484
1987	93,205	28,013	23,372	34,028	43,188	100,588	121,217	229,400	194,315	57,483	116,430	231,353	405,266	425,895
1988	99,646	23,641	21,355	32,561	38,826	92,742	123,287	244,355	230,382	67,159	107,893	271,446	446,497	477,042
1989	102,508	26,097	17,806	33,058	39,394	90,259	128,604	215,951	174,185	55,233	93,831	203,716	352,780	391,125
1990	84,246	24,627	14,504	29,308	36,575	80,388	108,873	196,999	149,438	48,083	84,778	185,937	318,798	347,283
1991	92,211	23,042	17,165	36,317	33,173	86,655	115,253	160,120	142,743	36,899	70,817	166,875	274,590	303,188
1992	82,887	23,418	13,638	37,082	34,128	84,848	106,307	185,908	122,757	45,263	85,305	156,807	287,375	308,835
1993	63,629	18,653	12,703	33,726	27,628	74,057	82,283	154,518	117,228	47,670	67,711	148,335	263,716	271,941
1994	77,872	19,106	17,098	37,166	27,983	82,247	96,977	176,100	129,443	53,800	72,159	165,037	290,996	305,726
1995	84,812	26,736	19,802	42,119	38,256	100,178	111,548	187,465	153,091	65,391	84,816	179,090	329,297	340,667
1996	80,561	26,519	17,834	37,300	37,046	92,181	107,080	203,993	156,002	66,293	89,236	189,729	345,258	360,158
1997	84,585	24,158	17,520	36,291	34,307	88,118	108,743	171,485	155,349	47,956	72,903	185,470	306,328	326,957
1998	57,242	18,024	11,494	24,202	25,053	60,750	75,266	126,454	94,153	38,051	51,964	116,187	206,202	220,776
1999	61,107	15,426	12,949	28,828	22,065	63,842	76,533	154,332	130,203	48,636	69,921	153,337	271,894	284,585
2000	61,103	14,143	11,599	30,550	21,574	63,724	75,246	157,934	121,420	47,234	79,652	141,058	267,944	279,472
2001	50,659	11,025	10,809	23,392	16,664	50,866	61,684	138,307	91,850	48,123	66,860	104,493	219,477	230,303

NOTE: Includes at-sea whiting and tribal landings.

3.5.2 Commercial Fisheries

In addition to addressing the economics of the fishery, this section includes information on the total catch of overfished groundfish species in the various directed fisheries. Total catch comprises both landed catch and fish discarded at sea, or bycatch. Controlling total catch of overfished species is a critical component of an effective rebuilding program and a central focus in the 2004 groundfish management decision. Total catch accountability and the uncertainty inherent in current catch monitoring systems by fishery sector is described. Table 3.5.2-15 summarizes these total catch estimates for overfished species.

Historic information on landed catch for some species is based on port samples. Species recently declared overfished, such as darkblotched rockfish and yelloweye rockfish, were previously managed as part of a species complex and were not required to be sorted. In such cases, species composition is estimated from a smaller sample of the landed catch; and, therefore, is more uncertain. Table 3.5.2-16 depicts landed commercial catch of overfished species by a two-month period from 1999 to 2001 by coastal regions and key West Coast ports. Table 3.5.2-17 depicts 1999 through 2001 recreational catch estimates, which include landings and discard.

In most cases bycatch has not been directly measured; instead, logbook and other data have been used to estimate bycatch. These data and past observations of bycatch indicate the skewed distribution of bycatch. Many efforts, regardless of sector, result in a relatively selective catch of target species with minimal bycatch. However, most of the accounted bycatch has occurred in relatively few instances. This distribution makes bycatch accountability particularly difficult to reliably estimate.

The NMFS Groundfish Observer Program was implemented in August 2001. About 10% of the limited entry trawl and fixed gear trips were observed in the first few months of the program. Observations increased to about 20% of limited entry trips during the first year and expanded to portions of the directed groundfish open access fleet.

3.5.2.1 Limited Entry Fisheries

General Description

Most of the Pacific Coast non-tribal, commercial groundfish harvest is taken by the limited entry fleet. The groundfish limited entry program includes most vessels using trawl, longline, and trap (or pot) gears. There are also several open access fisheries that take groundfish incidentally or in small amounts; participants in those fisheries may use, but are not limited to longline, vertical hook-and-line, troll, pot, setnet, trammel net, shrimp and prawn trawl, California halibut trawl, and sea cucumber trawl. Directed open access fisheries and open access fisheries that harvest groundfish incidentally or serve as part of the economic make-up for West Coast groundfish vessels are described below in this section.

In 1994, NMFS implemented Amendment 6 to the groundfish FMP, a license limitation program intended to restrict vessel participation in the directed commercial groundfish fisheries off Washington, Oregon, and California. The limited entry permits that were created through that program specify the gear type a permitted vessel may use to participate in the limited entry fishery and the vessel length associated with the permit. While longline and fishpot gear are allowed in both limited entry and open access fisheries, participation in the limited entry fleet generally affords greater fishing opportunity. A vessel may only participate in the fishery with the gear designated on its permit(s) and may only be registered to a permit appropriate to the vessel's length. Since 1994, the Council has created further license restrictions for the limited entry fixed gear (longline and fishpot gear) fleet that restrict the number of permits useable in the primary sablefish fishery (Amendment 9) and that allow up to three sablefish-endorsed permits to be used per vessel (Amendment 14.)

As of March, 2002, there were 450 vessels with Pacific Coast groundfish limited entry permits, of which approximately 54% were trawl vessels, 40% were longline vessels, and 6% were trap vessels. The number of vessels registered for use with limited entry permits has decreased since the 2001 implementation of the permit stacking program for sablefish-endorsed limited entry fixed gear permits. In 2002, of the approximately 164 sablefish-endorsed permits, 83 are held by vessels registered with more than one sablefish-endorsed permit. Of the vessels that are registered with multiple sablefish-endorsed permits, 25 were registered with two permits and 11 were registered with three permits.

Limited entry permits may be sold and leased out by their owners, so the distribution of permits between the three states often shifts. In 2002, roughly 23% of the limited entry permits were assigned to vessels making landings in California, 39% to vessels making landings in Oregon, and 37% to vessels making landings in Washington (Figure 3.3-1). In 1999, this division of permits was approximately 41% for California, 37% for Oregon, and 21% for Washington. This change in state distribution of limited entry permits may also be due to the implementation of the permit stacking program. Vessels operating from northern ports may have purchased or leased sablefish-endorsed permits from vessels that had been operating out of California ports.

Limited entry trawl fishers focus their efforts on many different species, with the largest landings by volume (other than Pacific whiting) from the following species: Dover sole, arrowtooth flounder, petrale sole, sablefish, thornyheads, and yellowtail rockfish. There are more than 55 rockfish species managed by the groundfish FMP, of which seven species have been declared overfished in the past four years. Protective fisheries regulations intended to reduce the directed and incidental catch of overfished rockfish and other depleted species have significantly reduced the harvest of rockfish in recent years. The primary target species for the fixed gear fishers is sablefish, with longline gears also targeting on rockfish.

Trawlers take the vast majority of the groundfish harvest by weight but somewhat less by value. In 2001, groundfish trawlers landed 97% of total groundfish harvest by weight but only 75% by value. Trawling is much more dominant north of Cape Mendocino (U.S./Vancouver, Columbia, and Eureka INPFC areas) than south of Cape Mendocino (Monterey and Conception areas). While non-trawl vessels took only 3% of the coastwide groundfish harvest by weight, their harvest accounted for about 25% of the exvessel value due to the prevalence of relatively high value sablefish in this fishery. When high-volume, but low-value whiting is excluded from the totals, non-trawl landings are in the 10% to 12% range by weight and in the 25% to 27% range by value (percent of coastwide total groundfish excluding whiting). Whiting landings are mostly caught by trawlers, with the majority of the harvest occurring in the Columbia INPFC. A large part of the harvest also occurs in the U.S. portion of the Vancouver INPFC area.

West Coast limited entry trawl vessels use midwater gear to target Pacific whiting and yellowtail and widow rockfish, or bottom gear for flatfish species (on the shelf and the slope) and DTS species in deep water. Some slope and shelf rockfish species have been important targets in the limited entry trawl fishery.

Large-scale harvesting of Pacific whiting in the U.S. EEZ began in 1966 when factory trawlers from the then Soviet Union began targeting Pacific whiting. During the mid 1970s, factory trawlers from Poland, the Federal Republic of Germany, the former German Democratic Republic, and Bulgaria also participated in the fishery. During 1966 through 1979, the catch in U.S. waters averaged 137,000 mt per year. A joint-venture fishery was initiated in 1978 between two U.S. trawlers and Soviet factory trawlers acting as motherships. By 1982, the joint-venture catch surpassed the foreign catch. In the late 1980s, joint-ventures involved fishing companies from Poland, Japan, the former Soviet Union, the Republic of Korea, and the

People's Republic of China. In 1989 the U.S. fleet capacity had grown to a level sufficient to harvest the entire quota, and no foreign fishing was allowed.

Historically, the foreign and joint-venture fisheries produced fillets and headed-and-gutted products. In 1989, Japanese motherships began producing surimi from Pacific whiting, using a newly developed process to inhibit deterioration of the flesh resulting from myxozoan-induced proteolysis. In 1990, domestic catcher-processors and motherships entered the Pacific whiting fishery in the U.S. zone. Previously, these vessels had engaged primarily in Alaskan pollock fisheries. The development of surimi production techniques made Pacific whiting a viable alternative. In 1991 the joint-venture fishery for Pacific whiting ended, because of the high level of participation by domestic catcher-processors and motherships and the growth of shore-based processing capacity. Shore-based processors of Pacific whiting had been constrained historically by a limited domestic market for Pacific whiting fillets and headed-and-gutted products. The construction of surimi plants in Newport and Astoria led to a rapid expansion of shore-based landings in the early 1990s.

While possessing about 230 permits, only about 180 limited entry fixed gear vessels are active in a given year. These vessels use longline or trap (including pots) gear, whichever is endorsed on their permit. Sablefish has long been an important target species in this sector; however, some shelf and slope rockfish species have also been important and valuable targets. While longline and pot vessels have been grouped into the "fixed gear" limited entry sector, this grouping has largely been driven by allocational issues surrounding groundfish. The size selectivity and species selectivity of the gears vary, with longline gear being somewhat more susceptible to bycatch of nonsablefish species during the sablefish fishery, and being capable of targeting nonsablefish groundfish.

Catch of Ovefished Species

Limited Entry Trawl Fishery

Of the West Coast limited entry trawl fisheries, those targeting Pacific whiting have the best accountability of overfished species bycatch (Table 3.5.2-18). At the Council request, bycatch rates have been updated to include information from the 2003 fishery in the analysis for 2004. Bycatch rates of overfished species appear to have declined in recent years, possibly due to industry efforts to avoid bycatch of overfished species. Much of the bycatch often occurs in single "disaster tows" in which the dominant species is other than the target species (except in the case of Pacific whiting). The at-sea sectors (motherships and catcher-processors) have had a long-standing, 100% observer program with direct estimation of bycatch. An EFP has been adopted annually by the Council and NMFS that allows suspension of at-sea sorting requirements in the shoreside whiting fishery to enable port sampling of the entire catch. Tribal landings are accounted for by the tribes, primarily the Makah Tribe, and provided to PacFIN.

Limited entry trawl landings of overfished shelf rockfish species in the non-whiting trawl fisheries were reduced dramatically by small footrope restrictions imposed in 2000 (Tables 3.5.2-15 and 3.5.2-16). However, with the absence of direct observations to determine discarded bycatch, other methods were needed to estimate the total catch of overfished groundfish species in the West Coast limited entry trawl fishery. (Hastie 2001) developed a trawl bycatch model, endorsed by the SSC and Council in November 2001 for use in 2002 management, that estimates the co-occurrence rate of five overfished groundfish species (bocaccio, canary rockfish, darkblotched rockfish, lingcod, and Pacific ocean perch) relative to the weight of key target groundfish species and complexes. The model stratified bycatch (or co-occurrence catch rates) by a two-month period, area north and south of Cape Mendocino, and gear type/target fishery (e.g., midwater yellowtail/widow rockfish, DTS, etc.) as determined from 1999 trawl logbook data, the Electronic Data

Collection Program, and fishtickets. The model also predicts trawl vessel participation and effort shifts given different fishing opportunities (vessel landing limits by species and species complex). Trawl fishing opportunities in 2002 were dramatically affected by active management of overfished species OYs as estimated by the Hastie model and as indexed by landings of target species.

Limited Entry Fixed Gear Fishery

Two major classes of fishing gear are used in the limited entry fixed gear sector: traps and longlines. These gears are both effective in catching sablefish, the most important target species in this sector, but have different rates of observed bycatch of the overfished species. Baited longlines, whether deployed horizontally on the bottom or deployed vertically in the water column, are much more effective at capturing rockfish, and therefore, more prone to incidentally catch overfished rockfish species than traps.

Limited entry fixed gear fisheries have primarily targeted rockfish and sablefish on the shelf and slope. Groundfish landings of overfished species by this sector are depicted in Tables 3.5.2-15 and 3.5.2-16. With no corresponding bycatch model for this fishery, discard in the fishery is not as well known as in the limited entry trawl fishery. Fixed gear fisheries have not exhibited a significant impact on overfished slope rockfish. Limited entry and open access fixed gears have accounted for only 3.0% and 0.2% of the average total landings of darkblotched rockfish and Pacific ocean perch, respectively, during 1981 through 2001 on the West Coast. Therefore, fixed gear opportunities targeting slope rockfish and sablefish on the slope may not pose a risk for overfished groundfish species.

The proportion of shelf rockfish species landed with fixed gear has increased in recent years. This has been especially true since the small footrope restrictions were imposed on the trawl fishery in 2000. Yelloweye rockfish landings in the last three years have been higher in this sector than in other groundfish sectors (Table 3.5.2-16), which is a management concern given the low harvest levels considered for rebuilding this stock. Some shelf rockfish species, such as canary rockfish and yelloweye rockfish, have been a highly valued target for this sector of the fishery. Yelloweye rockfish are particularly vulnerable to targeting due to their sedentary nature. Longline gears are particularly effective gears for targeting yelloweye rockfish in the high relief habitats they inhabit. In Washington, where yelloweye are most abundant, 97.5% of all rockfish landed in commercial directed line fisheries in 2001 were yelloweye rockfish. In 1999, there were 23 mt of yelloweye rockfish landed in Washington fixed gear fisheries.

3.5.2.2 Open Access Groundfish Fishery

Unlike the limited entry sector, the open access fishery has unrestricted participation and is comprised of vessels targeting or incidentally catching groundfish with a variety of gears, excluding groundfish trawl gear. While the open access groundfish fishery is under federal management and does not have participation restrictions, some state and federally-managed fisheries that land groundfish in the open access fishery have implemented their own limited entry (restricted access) fisheries or enacted management provisions that have affected participation in groundfish fisheries.

The commercial open access groundfish fishery includes vessels that do not necessarily depend on revenue from the fishery as a major source of income. Many vessels that predominately fish for other species inadvertently catch and land groundfish. Or, in times and areas when fisheries for other species are not profitable, some vessels will transition into the groundfish open access fishery for short periods. The commercial open access fishery for groundfish is split between vessels targeting groundfish (*directed fishery*) and vessels targeting other species (*incidental fishery*). The number of unique vessels targeting groundfish in the open access fishery between 1995 and 1998 coastwide was 2,723, while 2,024 unique vessels landed groundfish as incidental catch (1,231 of these vessels participated in both) (SSC Economic Subcommittee 2000).

Fisheries are generally distributed along the coast in patterns governed by factors such as location of target species, location of ports with supporting marine supplies and services, and restrictions/regulations of various state and federal governments. For the open access directed groundfish fishery, the majority of landings by weight by vessels that target groundfish occur off California. Oregon's directed groundfish open access fishery has the next highest landings, followed by Washington's. In the incidental groundfish fisheries, Washington again has the lowest landings by weight of incidental groundfish (PFMC 2001e). Participation in "both directed and bycatch contents of the open access fishery is much greater in California than in Oregon and Washington combined. For instance, in 1998, 779 California boats, 232 Oregon boats, and 50 Washington boats participated in the directed fishery. In that same year, 520 California boats, 305 Oregon boats, and 40 Washington boats participated in the bycatch fishery" (SSC Economic Subcommittee 2000).

Open access fisheries have been examined for their landings in the years 1996 and 2001, two randomly chosen years following the implementation of the limited entry program (Table 3.5.2-11). Overall and in each individual state, open access landings decreased between 1996 and 2001. Finally, landings limits for open access vessels were sharply reduced between 1996 and 2001. Exvessel value for open access groundfish fisheries also decreased coastwide between 1996 and 2001. The directed fishery decreased from over $7 million in 1996 to under $5 million in 2001, and the incidental fishery decreased by half, from roughly $800,000 in 1996 to roughly $400,000 in 2001.

Directed Open Access Fisheries

General Description

In the directed open access fishery, certain gears are used to target specific species. Hook-and-line gear, the most common gear type, is generally used to target sablefish, rockfish, and lingcod; while pot gear generally targets sablefish and some thornyheads and rockfish. Though largely restricted from use under current regulations, in the past in Southern and Central California, setnet gear has been used to target rockfish, including chilipepper, widow rockfish, bocaccio, yellowtail rockfish, and olive rockfish, and to a lesser extent vermillion rockfish.

Generally, managers cannot directly determine whether a fisher is targeting groundfish in this sector since his or her intentions or strategy are nowhere stated in the available data (landings receipts and logbooks). Managers must, therefore, somewhat arbitrarily classify a given trip or vessel as part of the directed fishery based on the species composition detailed in these data sources. A vessel is considered to target groundfish in the open access fishery during a fishing trip if it is fishing with any gear other than groundfish trawl and if over 50% of the revenue from landings in that trip was from groundfish species. Participation in the directed fishery has decreased from 1,357 vessels in 1994 to 1,032 in 1999. Reasons for this trend could include movement from the groundfish open access sector into other more profitable fisheries, or movement out of fishing all together.

In the directed open access fishery, fishers target groundfish in the "dead" and/or "live" fish fishery using a variety of gears. The terms dead and live fish fisheries refers to the state of the fish when they are landed. The dead fish fishery has historically been the most common way to land fish. The dead fish fishery made up 80% of the directed open access landings by weight coastwide in 2001. More recently, the market value for live fish has increased landings of live groundfish.

Live fish harvests are a recent but growing component of the directed fishery. Fish are caught using pots, stick gear, and rod-and-reel, and kept aboard the vessel in a seawater tank, to be delivered to foodfish markets—such as the large immigrant Asian communities in California—that pay a premium for live fish. Managers are faced with a similar problem as discussed above in determining landings from this fishery. Landings data do distinguish live fish sales, but the price information suggests that this classification is inaccurate. Therefore, in practice, only those sales of species other than sablefish that garner a landed price above $2.50 per pound are classified in the live fish sector (Table 3.5.2-10). Using this criterion 20% of coastwide directed open access landings by weight in 2001 are considered live fish, compared to only 6% in 1996. This growth in landings may be attributed to the price premium awarded live fish. Currently, Oregon and California are drafting nearshore fishery management plans (FMPs) that would transition some species of groundfish landed in the live fish fishery from federal to state management.

Catch of Overfished Species

Directed open access fisheries that target groundfish use the same fixed gear types and fish in the same areas as the limited entry fixed gear sector. Rockfish and sablefish are primary target species for this sector as well. The landings of overfished groundfish species in open access non-shrimp fisheries (Table 3.5.2-16) include landed catch from open access fisheries targeting groundfish and landings of incidentally-caught groundfish in incidental (non-shrimp) open access fisheries. At times, individual open access trips combine opportunities to target federally-managed groundfish and nongroundfish species. Further disaggregation of landings data between the direct open access and the incidental open access sectors is therefore somewhat arbitrary and dependent on the filtering criterion (i.e., if $50% of the landed catch in a trip is groundfish, the trip qualifies as directed open access). It is, therefore, more difficult to infer the proportion of recent landings of overfished groundfish species that were targeted versus incidentally-caught in open access fisheries.

Incidental Open Access Fishery

General Description

Many fishers catch groundfish incidentally when targeting other species, because of the kind of gear they use and the co-occurrence of target and groundfish species in a given area. Managers use the inverse set of criteria outlined above to identify landings and vessels in the directed open access fishery. If revenues from groundfish represent less than half of total revenue for a vessel landing some amount of groundfish, those landings are considered incidental, and the corresponding vessel can be classified in the incidental open access sector. A range of fisheries, identified by the target species, comprise this sector. These include pink shrimp, spot prawn, ridgeback prawn, California and Pacific halibut, Dungeness crab, salmon, sea cucumber, coastal pelagic species, California sheephead, highly migratory species, and the gillnet complex. A review of these fisheries follows, including their management, gear, regions fished, and participation.

The distribution of groundfish catch and bycatch in incidental open access fisheries is far less certain than in the other sectors (Table 3.5.2-19). In some cases, groundfish landings may have been an important supplement to the income generated while pursuing nongroundfish targets, while, in other cases, groundfish bycatch was truly incidental. This section includes what is known regarding the catch and bycatch of groundfish in these open access fisheries, given the same caveats expressed in the preceding discussion.

California Halibut

The commercial California halibut fishery extends from Bodega Bay in northern California to San Diego in Southern California, and across the international border into Mexico. California halibut, a state-managed species, is targeted with hook-and-line, setnets and trawl gear, all of which intercept groundfish. Fishing with 4.5-inch minimum mesh size trawl nets is permitted in federal waters, but prohibited within state waters, except in the designated "California halibut trawl grounds," where a 7.5-inch minimum mesh size must be used. These areas are also closed seasonally. Historically, commercial halibut fishers have preferred setnets, because of these restrictions. Setnets with 8.5-inch mesh and maximum length of 9,000 feet are the main gear type used in Southern California. Setnets are prohibited in certain designated areas, including a Marine Resources Protection Zone (MRPZ), covering state waters (to 3 nm) south of Point Conception and waters around the Channel Islands to 70 fm, but extending seaward no more than 1 mile. In comparison to trawl and setnet landings, commercial hook-and-line catches are historically insignificant. Over the last decade they have ranged from 11% to 23% of total California halibut landings. Most of those landings were made in the San Francisco Bay area by salmon fishers mooching or trolling slowly over the ocean bottom (Kramer *et al.* 2001).

Dungeness Crab

The Dungeness crab fishery is divided between treaty sectors, covering catches by Indian Tribes, and a non-treaty sector. The crab fishery is managed by the states of Washington, Oregon, and California with inter-state coordination through the Pacific States Marine Fisheries Commission. This fishery is managed on the basis of simple "3-S" principles: sex, season, and size. Only male crabs may be retained in the commercial fishery (thus protecting the reproductive potential of the populations), the fishery has open and closed seasons, and a minimum size limit is imposed on commercial landings of male crabs (Hankin and Warner 2001). In Washington, the Dungeness crab fishery is managed under a limited entry system with two tiers of pot limits and a December 1 through September 15 season. In Oregon, 306 vessels made landings in 1999 during a season that generally starts on December 1. In California, distinct fisheries occur in Northern and Central California, with the northern fishery covering a larger area. California implemented a limited entry program in 1995 and as of March 2000, about 600 California residents and 70 non-residents had limited entry permits. Nonetheless, effort has increased with the entry of larger multipurpose vessels from other fisheries. This effort increase has resulted in a "race for fish" with more than 80% of total landings made during the month of December (Hankin and Warner 2001).

Groundfish bycatch in the pot fishery is minimal although occasionally black rockfish or lingcod may be pulled up in a pot. Groundfish are caught incidentally in Dungeness crab pots off Washington, Oregon, and California, but can only be landed in Oregon and California ports. Coastwide, groundfish landed with Dungeness crabs have ranged between 5 mt in 1993 and 1998 to 17 mt in 1995. Overall, groundfish landings are less than 1% of Dungeness crab landings. For example, in 2001, 6 mt of groundfish were landed out of a total of 8,274 mt of Dungeness crab, or 0.07%. Similarly, out of the over 800 vessels that participate in the Dungeness crab fishery coastwide, generally less than 100 of those vessels also land groundfish.

Gillnet Complex

The gillnet complex is managed by the State of California and comprises two gear types. Fishers use setnets to target California halibut (discussed above), white seabass, white croaker, swordfish, and sharks. Driftnets are used for California halibut, white croaker, and angel shark. Southeast Asian refugees (mainly Vietnamese), many of whom had fished with this gear in their home country, entered this fishery and began targeting white croaker resulting in a shift in fishing effort from Southern California to Central California.

Most of the commercial catch is sold in the fresh fish market, although a small amount is used for live bait (Moore and Wild 2001). Currently, the only restriction on catches of white croaker off California is a small no-take zone off Palos Verdes peninsula. In the early 1990s, California's set gillnet fishery was subject to increasingly restrictive state regulations addressing high marine bird and mammal bycatch mortality. This forced the fleet into deeper water where shelf rockfish became their primary target. However, as open access rockfish limits became smaller, there was a shift from targeting shelf rockfish with setnets to the use of line gear in the more lucrative nearshore live-fish fishery. Thus, many fishers that were historically setnet fishers have changed their target strategy in response to increasing restrictions and changing market value. Table 3.5.2-2 summarizes catch and bycatch of rockfish species by depth strata for the gillnet fishery

PacFIN data shows that groundfish landed in the California gillnet complex as a whole have ranged from less than one mt in 1991 and 1992 to 54 mt in 1999 (out of a total of 1,223 mt landed in the gillnet complex). Participation in the gillnet complex fishery since 1993 has ranged between 99 vessels in 1993, to a high of 194 vessels in 1994, and was at 127 vessels in 2001. In 2001, 69 out of 127 total vessels in the gillnet complex fishery landed groundfish.

Pink Shrimp

The pink shrimp fishery is managed by the states of Washington, Oregon, and California. The Council has no direct management authority. In 1981, the three coastal states established uniform coastwide regulations for the pink shrimp fishery. The season runs from April 1 through October 31. Pink shrimp may be taken for commercial purposes only by trawl nets or pots. Most of the pink shrimp catch is taken with trawl gear with minimum mesh size of 1 inches to 3/8 inches between knots. In some years the pink shrimp trawl fishery has accounted for a significant share of canary rockfish incidental catch. The Council has discussed methods to control shrimp fishing activities, such as requiring all vessels to use bycatch reduction devices (finfish excluders). In 2002, finfish excluders in the pink shrimp fisheries were mandatory in California and Washington and were voluntary in Oregon until attainment of a specified groundfish incidental catch allowance at which point finfish excluders become mandatory. Many vessels that participate in the shrimp trawl fishery also have groundfish limited entry permits. When participating in the pink shrimp fishery, they must abide by the same rules as vessels that do not have limited entry permits. However, all groundfish landed by vessels that have limited entry permits are included in the limited entry total. Table 3.5.2-3 summarizes logbook information on fishing effort by depth for the pink shrimp trawl fishery south of Cape Mendocino.

Vessels targeting pink shrimp also land groundfish species, including rockfish, lingcod, sablefish, thornyheads, and flatfish. Between 1990 and 2001, incidental landings of groundfish in the pink shrimp fishery have not exceeded 10% of the total pink shrimp landings coastwide. The highest percentage of landings was in 1993 at 8% (896 mt of groundfish) of the total landings with shrimp. The lowest incidental landings of groundfish were in 2000 and 2001, with groundfish only making up 2% (153 mt) and 1% (94 mt) of total pink shrimp landings, respectively. This recent reduction in incidental landings of groundfish in the pink shrimp fishery is due in part to fewer vessels in the fishery, described in the following paragraph, and also to gear modifications. Efforts are underway to reduce the incidence of groundfish bycatch, by requiring bycatch reduction devices (BRDs a.k.a. finfish excluders) and no-fishing buffer zones above the seafloor. In 2001, Washington and Oregon instituted mandatory BRDs in pink shrimp trawl nets, effective August 1, 2001, to reduce finfish take, including canary rockfish, an overfished species. Historically, about 71% of the canary rockfish landed annually by Pacific Coast shrimpers were landed in Oregon (ODFW 2002). For 2002, Washington and Oregon are not requiring BRDs unless implemented through temporary emergency rule if canary rockfish landings reach a certain level, similar to 2001. California requires BRDs for all vessels landing shrimp in California ports.

In Washington, 19 vessels participated in the pink shrimp fishery in 2001, 17 of those vessels also landed groundfish while participating in the shrimp fishery. Washington monitors landings from the pink shrimp fishery through state fishtickets. Prior to 1993, Washington monitored landings through a mandatory logbook program, as well as through fishtickets. In Oregon, only 84 vessels landed shrimp in 2001 (74 double-rig; 10 single-rig) compared to 108 in 2000, 121 in 1999 and 109 vessels in 1998 (ODFW 2002). Oregon shrimpers are required to have a state permit to land shrimp and have historically been required to make annual shrimp landings to keep their permits. In 2001, the state removed the participation requirement and the exvessel value for shrimp was low – these two factors likely kept the number of participating shrimp vessels down. Despite lower landings in recent years, Oregon generally has the largest volume by weight of landings. In 1999, Oregon landed more shrimp than California, Washington, British Columbia and Alaska combined. As part of Oregon's management of the fishery, enhanced logbooks record and monitor the fishery. In California, the pink shrimp fishery has been managed by the state since 1952. An average of 88 vessels participated per season from 1983 through 1999. A record high of 155 boats shrimped during the 1994 fishery, the first year of a moratorium on new shrimp permits (Collier and Hannah 2001).

Pacific Halibut

The Pacific halibut fishery is managed by the International Pacific Halibut Commission (IPHC) with implementing regulations set by Canada and the U.S. in their own waters. A license from the IPHC is required to participate in the commercial Pacific halibut fishery. The commercial sector off the Pacific Coast, IPHC Area 2A, has both a treaty and non-treaty sector. The directed commercial fishery in Area 2A is confined to south of Point Chehalis, Washington, Oregon, and California. In the non-treaty commercial sector, 85% of the harvest is allocated to the directed halibut fishery and 15% to the salmon troll fishery to cover incidental catch. When the Area 2A total allowable catch (TAC) is above 900,000 pounds, halibut may be retained in the limited entry primary sablefish fishery north of Point Chehalis, Washington (46/53'18" N latitude). In 2001, the TAC was above this level for the first time, and 56% (47,946 pounds) of the allocation was harvested. Area 2A licenses, issued for the directed commercial fishery, have decreased from 428 in 1997 to 320 in 2001.

Groundfish are caught in the Pacific halibut fishery coastwide. Rockfish and sablefish are commonly intercepted, as they are found in similar habitat to Pacific halibut and are easily caught with longline gear. Landings of halibut are monitored by state fishtickets and through the mandatory logbooks required in the directed commercial halibut fishery. The amount of groundfish by weight landed coastwide between 1990 and 2001 with Pacific halibut has ranged from 6 mt in 1995 to 23 mt in 1997. In 1997, a high of 210 vessels participated in the Pacific halibut fishery coastwide, with participation concentrated off the Oregon coast north of Coos Bay. Of the coastwide participants in 1997, 168 of those vessels also landed groundfish in landings of Pacific halibut.

Salmon Troll

The ocean commercial salmon fishery, both non-treaty and treaty, is under federal management with a suite of seasons and total allowable harvest. The Council manages fisheries in the EEZ while the states manage fisheries in their waters (zero nm to three nm). All ocean commercial salmon fisheries off the West Coast states use troll gear. Chinook and coho are the principle target species with limited pink salmon landings in odd-years. However, commercial coho landings fell precipitously in the early 1990s and remain very low. Reductions in landings are mainly due to diminished opportunity as salmon populations declined. Poor ocean conditions, high harvest rates, and freshwater habitat degradation are contributing factors in this decline. Consequently, many natural salmon runs on the West Coast have been listed under the ESA.

Because of these listings, the management regime is largely structured around so-called “no jeopardy standards” developed through the ESA-mandated consultation process. Ocean fisheries are managed based on zones which reflect the distribution of salmon stocks and are structured to allow and encourage capture of hatchery-produced stocks while avoiding depressed natural stocks. The Columbia River, on the Oregon/Washington border, the Klamath River in Southern Oregon, and the Sacramento River in Central California support the largest runs of returning salmon.

The salmon troll fishery has an incidental catch of Pacific halibut and groundfish, including yellowtail rockfish. The historical data show that trips where no halibut are landed have a higher range of groundfish landings (11-149 mt) in comparison to trips where halibut was landed (1-19 mt). However, looking at groundfish catch frequency either by vessel or trips reveals that groundfish are caught more often by vessels or on trips catching halibut. Table 3.5.2-20 shows incidental catch of overfished rockfish species by the non-Indian salmon troll fisheries in 2000-2001. Small amounts of rockfish and other groundfish are taken as incidental catch in salmon troll fisheries. Although the gillnet/tangle net fishery does not technically occur in Council-managed waters, it may have some impact on groundfish that migrate through that area during part of their life cycle. To account for yellowtail rockfish caught incidentally while not promoting targeting on the species, a federal regulation was adopted in 2001 that allowed salmon trollers to land up to one pound of yellowtail rockfish per two pounds of salmon, not to exceed 300 pounds per month (north of Cape Mendocino). A similar regulation is in place for 2002.

Spot Prawn

Spot prawn are targeted with both trawl and pot gear. Although these fisheries are state-managed, for the purposes of managing incidentally-caught groundfish, the trawl fishery was categorized in the open access sector. As of 2003, trawling for spot prawns was prohibited in all three states. California had the largest and oldest trawl fishery with about 54 vessels operating from Bodega Bay south to the U.S./Mexico border. (Most vessels operate out of Monterey, Morro Bay, Santa Barbara, and Ventura, although some Washington-based vessels participate in this fishery during the fall and winter.) Standard gear was a single-rig shrimp trawl with roller gear, varying in size from eight-inch disks to 28-inch tires. Washington state completed the phase out of its trawl fishery in 2003 with the conversion of trawl permits to pot/trap permits. In California, area and season closures for the trawl fleet were instituted in 1984 to protect spot prawns during their peak egg-bearing months of November through January. In 1994, the trawl area and season closure was expanded to include the entire Southern California Bight. These closures, along with the development of ridgeback prawn, sea cucumber, and other fisheries, and also greater demand for fresh fish, have kept spot prawn trawl landings low and facilitated growth of the trap fishery. The trap fishery began in 1985 with a live prawn segment developing subsequently. The fleet operates from Monterey Bay—where 6 boats are based—to Southern California , where a 30 to 40 boat fleet results in higher production. In both fishing areas traps are set at depths of 600 feet to 1,000 feet along submarine canyons or along shelf breaks. Between 1985 and 1991 trapping accounted for 75% of statewide landings; trawling accounted for the remaining 25% (Larson 2001). Landings continued to increase through 1998, when they reached a historic high of 780,000 pounds. Growth in participation and a subsequent drop in landings led to the development of a limited entry program, which is still in the process of being implemented. Other recent regulations include closures, trap limits, bycatch reduction measures for the trawl fishery, and an observer program. Tables 3.5.2-4 and 3.5.2-5 summarize logbook information on fishing effort by depth for the spot prawn trawl and trap fisheries, respectively.

The fishery is concentrated south of Cape Mendocino with very low participation in the north. Most of the effort occurs in the 50 fm to 150 fm depth zone where bocaccio are most often found (Table 3.5.2-22). Of the two gear types, historically trawls incidentally caught more groundfish, including the overfished groundfish species (Table 3.5.2-23).

Ridgeback Prawn

Ridgeback prawns occur from Monterey, California to Cedros Island, Baja, California, at depths ranging from less than 145 feet to 525 feet. According to Sunada *et al.* (Sunada *et al.* 2001) this fishery occurs exclusively in California, centered in the Santa Barbara Channel and off Santa Monica Bay. In 1999, 32 boats participated in the ridgeback prawn fishery. Traditionally, a number of boats fish year-round for both ridgeback and spot prawns, targeting ridgeback prawns during the closed season for spot prawns and vice versa. Most boats typically use single-rig trawl gear. The ridgeback prawn fishery is managed by the State of California and, similar to spot prawn and pink shrimp, is considered an "exempted" trawl gear in the federal open access groundfish fishery, entitling the fishery to groundfish trip limits.

Following a 1981 decline in landings, the California Fish and Game Commission adopted a June through September closure to protect spawning female and juvenile ridgeback prawns. An incidental take of 50 pounds of prawns or 15% by weight is allowed during the closed period. During the season, a maximum of 1,000 pounds of other finfish may be landed with ridgeback prawns, of which federal regulations require no more than 300 pounds per trip be groundfish. Any amount of sea cucumbers may be landed with ridgeback prawns as long as the vessel owner/operator possesses a sea cucumber permit. Other regulations include a prohibition on trawling within state waters, a minimum fishing depth of 25 fm, a minimum mesh size of 1.5 inches for single-walled codends or 3 inches for double-walled codends and a logbook requirement. Ridgeback prawn trawl logs have been required since 1986. Table 3.5.2-6 shows the depth distribution of effort in this fishery.

Sea Cucumber

Along the West Coast, sea cucumbers are harvested by diving or trawling. Only the trawl fishery for sea cucumbers lands an incidental catch of groundfish. Sea cucumbers are managed by the states. In Washington, the sea cucumber fishery only occurs inside Puget Sound and the Straight of Juan de Fuca. Most of the harvest is taken by diving, although the tribes can also trawl for sea cucumbers in these waters.

Two species of sea cucumbers are fished in California: the California sea cucumber, also known as the giant red sea cucumber, and the warty sea cucumber. The warty sea cucumber is fished almost exclusively by divers. The California sea cucumber is caught principally by trawling in Southern California , but is targeted by divers in Northern California. Sea cucumber fisheries have expanded worldwide and, on this coast, there is a dive fishery for warty sea cucumbers in Baja, California, Mexico, and dive fisheries for California sea cucumbers in Washington, Oregon, Alaska, and British Columbia, Canada (Rogers-Bennett and Ono 2001). California implemented a permit program in 1992. In 1997 the state established separate, limited entry permits for the dive and trawl sectors. Permit rules encourage transfer to the dive sector, and this has lead to growth in this sector, which now accounts for 80% of landings. There are currently 113 sea cucumber dive permittees and 36 sea cucumber trawl permittees. Many commercial sea urchin and/or abalone divers also hold sea cucumber permits and began targeting sea cucumbers more heavily beginning in 1997. At up to $20 per pound wholesale for processed sea cucumbers, there is a strong incentive to participate in this fishery (also see Table 3.5.2-21 for effort and harvest information for this fishery by depth strata).

In Southern California, between 0 and 15 mt of groundfish have been landed with sea cucumbers, presumably in the trawl fishery. As many as 55 vessels have participated in the sea cucumber fishery in 1991. The largest number of vessels landing groundfish with sea cucumbers was in 1994, with 20 vessels landing groundfish out of 32 vessels participating in the sea cucumber fishery. Table 3.5.2-21 depicts the bycatch of overfished species by depth for this fishery.

Coastal Pelagic Species (CPS)

CPS are largely landed with round haul gear (purse seines and lampara nets). Vessels using round haul gear are responsible for 99% of total CPS landings and revenues per year. These fisheries are concentrated in California, but CPS fishing also occurs in Washington and Oregon. In Washington, the sardine fishery is managed under the Emerging Commercial Fishery provisions as a trial commercial fishery. The target of the trial fishery is sardines; however, anchovy, mackerel, and squid are also landed. The fishery is limited to vessels using purse seine gear. It is also prohibited inside of three miles and logbooks are required. Eleven of the 45 permits holders participated in the fishery in 2000, landing 4,791 mt of sardines (Robinson 2000). Three vessels accounted for 88% of the landings. Of these, two fished out of Ilwaco and one out of Westport. In Oregon, the sardine fishery is managed under the Development Fishery Program under annually-issued permits, which have ranged from 15 in 1999 and 2000 to 20 in 2001. Landings, almost all by purse seine vessels, have rapidly increased in Oregon: from 776 mt in 1999 to 12,798 mt in 2001. The number of vessels increased from three to 18 during this period (McCrae 2001; McCrae 2002). The Southern California round haul fleet is the most important sector of the CPS fishery in terms of landings. This fleet is primarily based in Los Angeles Harbor, along with fewer vessels in the Monterey and Ventura areas. The fishery harvests Pacific bonito, market squid, and tunas as well as sardines. The fleet consists of about 40 active purse seiners averaging 20 m in length. Approximately one-third of this fleet are steel-hull boats built during the last 20 years, the remainder are wooden-hulled vessels built from 1930 to 1949, during the boom of the Pacific sardine fleet. The Council manages these fisheries under its CPS FMP. Because stock sizes of these species can radically change in response to ocean conditions, the FMP takes a flexible management approach. Pacific mackerel and Pacific sardine are actively managed through annual harvest guidelines based on periodic assessments. Northern anchovy, jack mackerel, and market squid are monitored through commercial catch data. If appropriate, one third of the harvest guideline is allocated to Washington, Oregon, and northern California (north of 35°40' N latitude) and two-thirds is allocated to Southern California (south of 35°40' N latitude). An open access CPS fishery is in place north of 39° N latitude and a limited entry fishery is in place south of 39° N latitude. The Council does not set harvest guidelines for anchovy, jack mackerel, or market squid (PFMC 1998). Table 3.5.2-7 summarizes log book data on groundfish catch and bycatch in the market squid fishery.

Because CPS are harvested in mostly pure schools relatively near the water's surface, where fish are easily identified, the incidental catch of groundfish is thought to be minimal. However, incidental catch increases when purse seines are set in shallow water, such that the seine comes in contact with the bottom or a rocky outcropping.

In round haul gear, if larger fish are in the net, they can be released alive before pumping or brailing by lowering a section of the cork-line or by using a dip-net. The load is pumped out of the hold at the dock, where the catch is weighed and incidentally caught fish can be observed and sorted. Because pumping at sea is so common, any incidental catch of small fish would not be sorted at sea. Incidental harvest of non-prohibited larger fish are often taken home for personal use or processed.

The CPS fishery has not operated on a significant scale north of Monterey, California until very recently; therefore, little is known about the incidental catch of groundfish that might occur in this area. However, the states of Washington and Oregon are gathering information about the effects of these northern fisheries.

Information from at-sea observations of the CDFG and conversations with CPS fishers suggest that incidental catch has not been and is not significant (Table 3.5.2-7). These data are likely representative of actual incidental catch, because fish are pumped from the sea into fish holds aboard the fishing vessel. Fishers do not sort catch at sea that pass through the pump. They land whatever is caught and pumped into the hold.

Between 1985 and the partial year of 1999, there were 5,306 CDFG port samples taken from the sardine and mackerel landings. From 1992 to 1999, incidental catch was reported on only 179 occasions, representing only a 3.4% occurrence in which incidental catch was noted.

Between 1990 and 2001, incidental landings of groundfish in the CPS/squid fishery were less than 1% of the total CPS/squid landings. The highest landings were in 1990, 1997, and 1998-2001 with 1 mt of groundfish landed each year. Between 1990 and 2001, incidental landings of groundfish in the CPS/finfish fishery were also less than 1% of the total CPS/finfish landings. The highest landings were in 1992 with 1 mt of groundfish landed.

Highly Migratory Species (HMS)

Management of HMS is complex due to the multiple management jurisdictions, users, and gear types targeting these species. Adding to this complexity are oceanic regimes that play a major role in determining species availability and which species will be harvested off the U.S. West Coast in a given year. The states currently regulate the harvest of HMS but, as mentioned above, the Council is in the process of implementing an FMP for fisheries prosecuted in the West Coast EEZ or by vessels originating from West Coast ports fishing beyond the EEZ. There are five distinctive gear types used to harvest HMS commercially, with hook-and-line gear being the oldest and most common. Other gear types used to target HMS are driftnet, pelagic longline, purse seine, and harpoon. While hook-and-line can be used to take any HMS species, traditionally it has been used to harvest tunas. As mentioned in Section 3.2, the principal target species in these fisheries include albacore and other tunas, swordfish and other billfish, several shark species, and dorado. Albacore is the most important species, in terms of landings and is commonly caught with troll gear. The majority of albacore are taken by troll and jig-and-bait gear (92% in 1999), with a small portion of fish landed by gillnet, drift longline, and other gear. These gears vary in the incidence of groundfish interception depending on the area fished, time of year, as well as gear type. Overall, nearly half of the total landings of albacore coastwide were landed in California. Other gear includes pelagic longline, used to target swordfish, shark and tunas; drift gillnet gear for swordfish, tunas, and sharks off California and Oregon; purse seine gear for tuna off California and Oregon; and harpoon for swordfish off California and Oregon. Some vessels, especially longliners and purse seiners, fish outside of the U.S. EEZ, but may deliver to West Coast ports. Drift gillnet is most likely to intercept groundfish, including whiting, spiny dogfish, and yellowtail rockfish (Tables 3.5.2-8 and 3.5.2-9 show the historical and geographical distribution of HMS harvests, vessels and effort).

Some of the species of groundfish that have been reported as incidental catch in HMS fisheries include Pacific whiting, rockfish, lingcod, sablefish, leopard shark, soupfin shark, and spiny dogfish. These species have been reported from observers only on the drift gillnet fishery for swordfish and shark and the large vessel purse seine fishery for tuna. Other HMS fisheries have not required observers to date and have not reported incidental groundfish catch. The proposed HMS FMP is set to monitor only three groundfish species (leopard shark, soupfin shark, and spiny dogfish).

3.5.2.3 *Fishery Participation*

Catcher vessel owners and captains employ a variety of strategies to fill out a year of fishing. Fishers from the northern ports may fish in waters off of Alaska, as well as in the West Coast groundfish fishery. Others may change their operations throughout the year, targeting on salmon, shrimp, crab, or albacore, in addition to various high-value groundfish species, so as to spend more time in waters close to their communities. Factory trawlers and motherships fishing for or processing Pacific whiting off of the West Coast usually also participate in the Alaska pollock seasons, allowing the vessels and crews to spend a greater percentage of the year at work on the ocean. Commercial fisheries landings for species other than groundfish vary along the length of the coast. Dungeness crab landings are particularly high in Washington state, squid, anchovies, and other coastal pelagics figure heavily in California commercial landings, with salmon, shrimp, and highly migratory species like albacore more widely distributed, and varying from year to year.

3.5.2.4 *Vessel Type and Participation*

Figures 3.5-2a through 3.5-2c show the approximate concentration of groundfish vessels in fisheries for nongroundfish West Coast species, 1994 through 1998. These bar charts exclude some nongroundfish fisheries where participation by groundfish vessels was so minimal that a viewer could not reasonably see the corresponding portion of the bar chart. Data for these charts came from an ongoing Council staff project to create a socioeconomic profile of groundfish fishery participants.

It is clear from these three charts there is some degree of gear loyalty for groundfish vessels participating in nongroundfish fisheries. For example, a notable proportion of the nongroundfish fishery participation by groundfish trawl vessels occurs in the shrimp and prawn trawl fisheries. Similarly, the hook-and-line groundfish fisheries show high participation in the troll albacore and troll salmon fisheries. And, while all three gear groups participate in pot fisheries for crab, groundfish pot vessels show the greatest percentage of gear group participation in pot fisheries for crab and other crustaceans.

3.5.2.5 *Vessel Groups: Gears, Size, Dependence and Involvement*

Table 3.5.2-12 (a and b) provides information on the number of vessels and gross revenues by level of dependence in the fishery for November 2000 through October 2001. The fleet subdivisions provided here will be used in Chapter 4 to provide more information on the effects of the alternatives on different segments of the fleet. Table 3.5.2-1 provided information on vessel involvement in groundfish and other West Coast fisheries. Table 3.5.2-13 (a and b) provides similar information by vessel size and level of dependence. Table 3.5.2-14 relates vessel size to gear type and the species harvested by typical depth range for the species.

3.5.2.6 *Health and Safety On Commercial Seafood Vessels*

National Standards 10 of the Magnuson-Stevens Act calls for conservation and management measures to promote the safety of human life at sea to the extent practicable. Nevertheless, commercial fishing consistently ranks as one of the most hazardous occupations in the United States. Commercial fishing is inherently dangerous. However, repeated efforts to increase marine safety regulation and compliance have failed. While recreational fishing vessels also encounter safety risks, their risks are considerably different than those encountered by commercial vessels. See Section 3.5.4.6 for a discussion pertaining to safety on recreational vessels.

The 1999 report of the U.S. Coast Guard's Fishing Vessel Casualty Task Force (FVCTF), *Living to Fish, Dying to Fish* (FVCTF 1999) describes attempts to legislate safety in the commercial fishing industry. It describes casualty characteristics and presents recommendations for improving safety in the fishing industry. The report notes that much opposition to more stringent safety requirements has come from the fishing industry itself, both for cultural and economic reasons.

The Commercial Fishing Industry Vessel Safety Act of 1988 was one of the first successful attempts to legislate safety in the commercial fishing industry. The Act led to a set of regulations and a voluntary inspection program for commercial fishing vessels. While safety has improved since the Act went into effect, the Coast Guard report notes that "the level of fishing safety standards is analogous to *requiring* parachutes for an airplane crew, but only *marketing* voluntary measures to *encourage* a mechanically sound aircraft and a competent pilot and crew" (page 1). At present, certain safety gear such as EPIRBs (emergency position indicating radio beacons), radios, survival suits, fire protection equipment, life preservers, and life rafts are required on board commercial fishing vessels (requirements vary by the size and range of the vessel). Past efforts to implement safety regulations have attempted to address stability and seaworthiness, construction, licensing of skippers and crew, safety training, flooding detection, dewatering systems, prohibition of alcohol and drug use when engaged in commercial fishing operations, and related matters. These requirements have yet to be enacted. Currently, dockside safety inspections are strictly voluntary. (Different rules apply to recreational and charter boats. Regulations for charter boats vary depending on the size of the boat and where the boat is used.)

The Coast Guard reports that unsafe conditions on commercial fishing vessels are not exclusively created by mariners themselves. Systemic failures, such as regulations, pressure applied by owners, managers, and insurance companies, and larger market forces all contribute to the safety problems in the industry.

The Coast Guard report lists four solutions to the safety problem. These are *seaworthy boats, adequate survival gear, competent crews*, and *safety-conscious resource and industry management regimes*. This section provides a brief overview of the current state of these four areas and discusses other factors that affect safety.

Seaworthy Boats

Poor vessel or equipment condition is a primary cause of fishing casualties. Equipment may be used beyond its intended service life, used in ways that were not originally intended, poorly designed, or improperly installed. Even in the best of times, many boat owners put off needed replacements, maintenance, and repairs. This neglect arises from personal beliefs and values, economic reasons, lack of regulation, a culture that de-emphasizes safety concerns, and other factors. The Coast Guard report notes that "many fishers have strongly opposed standards that might save their own lives" (FVCTF 1999). This tendency to put off maintenance has been exacerbated during the past several years, as fishing regulations have grown increasingly stringent, and revenues have declined. Many commercial fishers have put off maintenance, hoping for better times.

Adequate Survival Gear

As noted above, the Coast Guard requires commercial fishing vessels to have certain survival equipment, such as EPIRBs, life rafts, and survival suits. This equipment is expensive and requires regular upkeep and inspection in order to function properly. For example, EPIRBs must be tested and registered, registration must be kept current, and batteries must be replaced. Life rafts must be inspected and repacked every year (after the first two years) at a cost of approximately $600 to $750 (Markle 2000). Immersion suits cost nearly

$500.[16/] They must also be inspected and tested regularly; batteries for the attached lights must be renewed periodically. Alarm systems must be tested and maintained. Many accidents have been caused by people neglecting these inspections or using equipment improperly. Finally, crew must know how to properly use and maintain these different types of safety equipment.

Competent Crews

As revenues in the fishing industry decline, vessel owners and captains report it has become more difficult to find, hire, and keep qualified crew. While there are many skilled and capable crew members working on West Coast commercial fishing boats, many who once would have been attracted to the industry are discouraged by increasing regulations and by the apparent lack of a promising future. Conversely, the industry attracts people who are unable to find work elsewhere, and who lack the requisite skills and training. Some are itinerant, and do not stay long enough to be fully trained or invested in vessel operations—including safety (Gilden and Conway 2000). The Coast Guard report (FVCTF 1999) notes that inadequate training to respond to emergencies or use survival gear, lack of awareness of stability issues, and ignoring stability issues contributed to several recent marine accidents. Unskilled or untrained skippers and crew can also cause accidents by loading vessels improperly or modifying vessels, creating unsafe conditions.

At present, there are no specific licensing requirements for captains or crew of commercial fishing vessels under 200 gross tons—the vast majority of domestic fishing vessels. "John Doe" crew licenses also make it impossible to track or contact crew members, which increases the difficulty of conducting outreach and education campaigns.

Even the most skilled crew can be affected by fatigue and lack of sleep. Fisheries management measures that require captains to drive long distances or compete in "derby" fisheries can lead to levels of fatigue that compromise safety. An analysis of marine vessel casualties by the National Transportation Safety Board cites fatigue as a cause in 16% of accidents (NTSB 1999).

Lastly, because many safety measures are currently voluntary, "competence" must include a willingness to be educated and comply with these measures.

Safety-conscious Resource and Industry Management Regimes

Management decisions can have a strong impact on safety. For example, measures that increase competition or restrict people to limited seasons and catch quotas can force people to venture out in extreme weather or take other undue risks. Intense harvesting effort concentrated in limited areas can cause safety problems by increasing the chance of collisions. Management measures such as inshore closures can force boats into areas where they are unsafe or far from assistance.

Other Factors Affecting Safety

On the West Coast as elsewhere, weather and ocean conditions pose a significant safety risk to fishing operations—both commercial and recreational. Groundfish vessels mainly operate from coastal ports that have potentially hazardous bar crossings, and fishing grounds are in ocean waters primarily three miles to 50 miles offshore. Wind and sea state conditions can be dangerous and bar conditions extremely hazardous. Numerous marine advisories are issued by the National Weather Service each year. While icing, hurricanes,

16/ Stearns Immersion Suit with Harness, $490.99 at MARSARS Water Rescue Systems, Inc.

and other extreme weather conditions are rarely factors off the West Coast, water temperatures are low enough to quickly cause hypothermia when people who are not wearing survival suits fall overboard or have a boat sink under them.

New Safety Advances

The Coast Guard's "Rescue 21" system is expected to improve the safety of marine vessels. This system, which has yet to go into effect on the West Coast, will serve as a "911" system for coastal waters. By increasing detection and localization of distress calls and eliminating known VHF radio coverage gaps, it will minimize the time search and rescue teams spend looking for people in distress. This system will be implemented first in the Northeast, then nationwide. Among other things, it increases channel capacity and uses Global Positioning System (GPS) technology to help locate distressed vessels.

TABLE 3.5.2-1. Numbers of vessels most involved in West Coast fisheries and the groundfish (GF) fishery and total exvessel revenue for each group (November 2000 through October 2001)--to produce this table vessels were ranked from highest to lowest producer (by value), the first ranking (columns) was based on revenue from all species and a second ranking (rows) was based on revenue from groundfish. (Page 1 of 1)

	Percent of Landings (All Species) by Vessels Ranked from Highest to Lowest Production (By Value)									
Percent of Groundfish Landings (All Species) by Vessels Ranked from Highest to Lowest Production (By Value)	Top 50% of Total Value	Next 20% of Total Value	Next 10% of Total Value	Next 10% of Total Value	Final 10% of Total Value	Total	Percent of All Vessels	Cum Percent	Percent of Groundfish Vessels	Cum Percent
Number of Vessels Making The Indicated Amount of Landings										
Top 50% of GF Value	93	0	0	0	0	93	2%	2%	5%	5%
Next 20% of GF Value	50	30	0	0	0	80	2%	4%	5%	10%
Next 10% of GF Value	11	32	21	0	0	64	1%	5%	4%	14%
Next 10% of GF Value	12	16	27	64	4	123	3%	8%	7%	21%
Final 10% of GF Value	55	116	87	149	934	1,341	29%	37%	79%	100%
No Groundfish Landings	176	205	197	343	1,957	2,878	63%	100%		
Column Total	397	399	332	556	2895	4579				
Percent of All Vessels	9%	9%	7%	12%	63%					
Cum Percent of All Vessels	9%	17%	25%	37%	100%					
Total Groundfish Vessels in Column	221	194	135	213	938	1,701				
GF Vessels as % of Total for Col	56%	49%	41%	38%	32%					
GF Vessels in Column as % of Total Groundfish Vessels	13%	11%	8%	13%	55%					
Cumulative Total	13%	24%	32%	45%	100%					
Exvessel Value of All Landings Made by the Vessels ($)										
Top 50% of GF Value	33,745,500	0	0	0	0	33,745,500	14%	14%	29%	29%
Next 20% of GF Value	10,988,899	4,078,778	0	0	0	15,067,678	6%	20%	13%	42%
Next 10% of GF Value	2,468,990	3,753,095	1,826,571	0	0	8,048,655	3%	23%	7%	49%
Next 10% of GF Value	2,507,196	1,756,437	1,823,832	2,800,173	124,397	9,012,036	4%	27%	8%	57%
Next 10% of GF Value	14,092,789	14,038,413	6,359,434	6,581,151	8,701,188	49,772,974	20%	47%	43%	100%
No Groundfish Landings	57,721,771	25,176,821	14,518,513	15,046,383	15,669,022	128,132,510	53%	100%		
Column Total	121,525,145	48,803,544	24,528,350	24,427,708	24,494,607	243,779,354				
Revenue of All Species Landed by Groundfish Vessels	63,803,374	23,626,723	10,009,837	9,381,325	8,825,585	115,646,844				
Revenue of Groundfish Vessels as Percent of Total for Column	53%	48%	41%	38%	36%					
Revenue of Groundfish Vessels as a Percent of Total Fishing Revenue	26%	10%	4%	4%	4%					
Cumulative Total	26%	36%	40%	44%	47%					

NOTE: Catch by catcher-processors and tribal vessels are not included in this table. Catcher vessels delivering to motherships are included and all other landings for which landing receipts were filled out are included. Groundfish includes only the landings of groundfish species caught under the jurisdiction of the Council's groundfish FMP.

TABLE 3.5.2-2. Catch and bycatch in the gillnet fishery, 1996-2000, by depth strata, number of fish or number of pounds (information on average weight per fish is required to sum the number of fish and pounds rows, generating a single number to represent bycatch). (Page 1 of 2)

		Species Caught (in thousands of the specified unit)																												
Year	Unit	Bocaccio	California halibut	California sheephead	Canary rockfish	Chilipepper rockfish	Cowcod	CPS	Dungeness crab	Gillnet complex	HMS	HMS shark	Lingcod	Monitored HMS	Nearshore rockfish	Ocean whitefish	Other crustacean	Other fish	Other flatfish	Other nearshore sp.	Other shark	Other shelf flatfish	Other shelf sp.	Pacific whiting	Petrale sole	Sablefish	Shelf rockfish	Slope rockfish	Unspecified rockfish	Widow rockfish
No Depth Reported																														
'96	Number	1.7	36.2	0.0	_	_	_	1.6	0.0	0.2	_	0.0	8.9	0.3	0.2	_	0.6	0.4	0.4	0.0	3.3	_	_	_	0.0	0.1	0.3	_	3.2	_
	Lbs	0.0	10.4	_	_	_	_	2.8	_	0.3	_	0.1	0.0	0.4	0.2	_	0.4	0.9	0.1	_	12.7	_	_	_	_	_	1.4	_	1.4	_
'97	Number	0.0	10.5	0.0	_	_	_	0.2	0.0	1.0	_	0.1	0.0	0.0	0.1	_	0.2	1.1	0.3	0.0	2.7	_	0.1	_	0.0	_	_	_	0.1	_
	Lbs	_	_	4.5	_	_	_	0.5	0.3	0.0	_	0.5	_	0.1	0.4	_	0.0	0.2	10.0	0.3	10.1	_	_	_	0.0	_	_	_	0.2	_
'99	Number	_	3.6	0.0	_	_	_	0.0	_	0.8	0.0	0.3	0.0	0.0	0.2	0.0	0.0	4.0	0.1	0.0	1.4	_	_	_	_	_	_	_	0.0	_
	Lbs	_	12.7	0.0	_	_	_	4.4	_	10.2	_	0.4	0.0	0.2	0.0	_	0.5	0.2	0.1	_	5.3	_	_	_	_	_	_	_	_	_
'00	Number	_	2.9	0.0	_	_	_	_	_	0.3	_	0.0	_	0.0	0.1	_	_	_	0.3	0.0	0.7	_	0.1	_	_	_	_	_	_	_
	Lbs	_	1.9	_	_	_	_	2.1	_	6.5	_	_	_	_	_	_	0.0	0.2	_	_	0.6	_	2.2	_	_	_	_	_	_	_
1-20 fathoms																														
'96	Number	_	6.3	0.0	_	_	_	0.0	_	0.2	_	0.1	0.0	5.6	0.3	_	0.0	0.3	0.1	0.0	1.5	_	_	0.0	_	_	_	_	0.1	_
	Lbs	_	1.7	0.0	_	_	_	4.9	_	15.4	_	_	_	0.4	0.0	_	0.2	0.7	0.1	_	8.9	_	_	0.0	_	_	_	_	_	_
'97	Number	0.5	13.2	0.1	_	5.6	_	1.8	0.1	1.4	_	0.2	1.1	0.6	0.6	0.0	0.4	1.1	0.4	0.1	3.3	_	0.1	_	0.1	_	_	_	0.1	0.8
	Lbs	_	0.0	_	_	_	_	11.8	_	25.2	_	_	_	_	0.2	_	0.2	0.7	0.0	_	17.3	_	_	_	_	_	_	_	_	_
'98	Number	_	7.8	0.1	_	_	_	_	0.1	1.0	_	0.2	0.0	0.5	0.3	0.0	0.2	1.7	0.1	0.0	2.4	_	1.1	_	_	_	_	_	0.1	_
	Lbs	_	5.9	0.0	_	_	_	_	_	0.5	_	0.2	_	1.2	0.5	_	0.8	0.6	_	_	8.6	_	_	_	_	_	_	_	0.0	_
'99	Number	_	18.4	0.1	_	_	_	2.6	_	2.8	_	0.6	_	1.1	0.7	0.0	0.6	1.0	0.2	0.0	3.5	_	0.3	_	0.0	_	_	_	0.1	_
	Lbs	_	7.3	_	_	_	_	6.1	_	9.5	_	3.1	0.0	0.9	0.4	_	0.3	0.5	0.0	_	6.6	_	_	_	_	_	_	_	0.2	_
'00	Number	_	4.8	0.0	_	_	_	0.7	_	0.6	_	0.0	_	0.1	0.0	_	_	0.0	0.1	_	1.8	_	0.0	_	_	_	_	_	0.0	_
	Lbs	_	1.3	_	_	_	_	0.6	_	2.8	_	_	_	0.1	0.0	_	_	0.1	_	_	1.1	_	_	_	_	_	_	_	_	_
20-150 fathoms																														
'96	Number	2.3	13.6	0.0	_	0.0	0.0	2.1	0.1	2.4	_	0.4	0.8	3.1	0.3	0.0	0.0	3.8	0.4	0.1	3.2	0.0	_	0.0	0.0	0.0	_	_	15.8	_
	Lbs	6.3	21.3	0.0	_	2.7	0.1	25.9	_	20.8	_	0.7	2.2	0.7	0.3	0.0	0.3	4.5	0.5	_	2.8	0.3	_	0.1	0.1	0.3	0.2	_	183.7	0.2
'97	Number	8.9	29.9	0.1	_	14.5	_	7.6	0.5	10.1	_	0.8	11.0	3.5	3.9	0.1	0.1	7.5	0.8	0.0	2.6	0.1	0.0	_	0.0	0.4	1.4	_	9.4	10.5
	Lbs	2.4	_	0.0	_	0.1	_	6.1	0.1	4.4	_	_	0.0	0.0	1.5	0.1	0.0	0.9	2.0	_	0.2	_	_	_	_	_	_	_	112.2	0.0
'98	Number	4.9	17.0	0.1	0.0	2.1	0.2	1.3	0.1	2.7	_	0.7	0.4	1.9	0.3	0.1	0.6	10.7	0.4	0.0	4.2	_	4.5	0.0	0.0	0.1	9.1	_	17.2	_
	Lbs	8.4	0.1	_	_	0.5	_	1.6	_	1.7	_	0.1	_	2.0	0.8	0.0	0.3	8.5	0.2	_	1.6	_	_	_	_	_	0.1	0.3	105.3	_
'99	Number	0.4	20.2	0.0	_	1.0	_	5.5	0.4	3.2	_	0.8	0.1	3.4	0.5	0.0	0.5	3.5	0.7	0.0	3.8	_	4.0	0.3	0.0	_	_	_	0.6	_
	Lbs	0.8	39.0	_	_	1.3	0.2	0.7	_	12.4	_	0.5	0.1	2.4	0.2	_	0.2	5.8	0.0	_	2.9	_	0.0	_	_	_	0.6	0.8	11.0	_
'00	Number	_	4.9	0.0	_	_	_	0.1	0.1	1.9	_	0.1	_	0.3	0.0	_	0.3	0.1	0.4	_	1.5	_	0.0	0.0	_	_	_	_	0.0	_
	Lbs	_	_	_	_	_	_	0.1	_	27.6	_	_	_	_	_	_	0.0	_	_	_	_	_	_	_	_	_	_	_	_	_

TABLE 3.5.2-2. Catch and bycatch in the gillnet fishery, 1996-2000, by depth strata, number of fish or number of pounds (information on average weight per fish is required to sum the number of fish and pounds rows, generating a single number to represent bycatch). (Page 2 of 2)

		Species Caught (in thousands of the specified unit)																												
Year	Unit	Bocaccio	California halibut	California sheephead	Canary rockfish	Chilipepper rockfish	Cowcod	CPS	Dungeness crab	Gillnet complex	HMS	HMS shark	Lingcod	Monitored HMS	Nearshore rockfish	Ocean whitefish	Other crustacean	Other fish	Other flatfish	Other nearshore sp.	Other shark	Other shelf flatfish	Other shelf sp.	Pacific whiting	Petrale sole	Sablefish	Shelf rockfish	Slope rockfish	Unspecified rockfish	Widow rockfish
														1-50 fathoms																
'96	Number	0.8	19.8	0.0	_	0.0	0.0	1.7	0.1	2.5	_	0.4	0.4	6.3	0.5	0.0	0.0	3.0	0.4	0.1	4.5	_	_	0.0	0.0	0.0	_	_	0.2	_
	Lbs	0.6	22.9	0.0	_	_	_	30.8	_	36.2	_	0.5	0.5	1.1	0.3	0.0	0.6	4.0	0.5	_	11.7	0.0	_	0.1	_	_	0.0	_	0.6	_
'97	Number	0.5	43.0	0.2	_	5.6	_	9.2	0.6	11.5	_	0.9	1.2	1.9	4.6	0.1	0.5	4.1	1.0	0.1	5.7	_	0.1	_	0.1	_	_	_	0.4	0.8
	Lbs	_	0.0	_	_	_	_	17.8	0.1	29.7	_	_	_	_	1.6	0.1	0.3	1.6	2.0	_	17.5	_	_	_	_	_	_	_	_	_
'98	Number	_	24.7	0.2	_	_	_	1.3	0.2	3.6	_	0.8	0.0	1.6	0.6	0.0	0.8	11.9	0.5	0.0	6.5	_	5.6	0.0	0.0	0.0	_	_	0.4	_
	Lbs	_	6.0	0.0	_	_	_	1.6	_	2.2	_	0.2	_	2.0	1.3	_	1.1	8.8	0.1	_	9.9	_	_	_	_	_	_	_	0.2	_
'00	Number	_	9.7	0.0	_	_	_	0.7	0.1	2.5	_	0.1	_	0.3	0.1	_	0.3	0.2	0.5	_	3.3	_	0.0	0.0	_	_	_	_	0.0	_
	Lbs	_	1.3	_	_	_	_	0.7	_	30.3	_	_	_	0.1	0.0	_	0.0	0.1	_	_	1.1	_	_	_	_	_	_	_	_	_
														50-150 fathoms																
'96	Number	1.5	0.1	_	_	_	0.0	0.4	_	0.0	_	0.1	0.4	2.4	0.1	_	_	1.0	0.1	_	0.2	0.0	_	_	_	_	_	_	15.6	_
	Lbs	5.7	_	_	_	2.7	0.1	0.0	_	0.0	_	0.2	1.7	0.0	_	_	_	1.2	_	_	0.1	0.2	_	_	0.1	0.3	0.2	_	183.2	0.2
'97	Number	8.9	0.1	_	_	14.5	_	0.1	_	_	_	0.1	10.9	2.2	0.0	0.0	_	4.5	0.1	_	0.1	0.1	_	_	_	0.4	1.4	_	9.2	10.5
	Lbs	2.4	_	0.0	_	0.1	_	0.1	_	_	_	_	0.0	0.0	_	0.0	_	_	0.0	_	0.0	_	_	_	_	_	_	_	112.2	0.0
'98	Number	4.9	0.1	_	0.0	2.1	0.2	_	_	0.1	_	0.1	0.4	0.8	0.0	0.0	_	0.4	0.1	_	0.1	_	_	_	_	0.1	9.1	_	17.0	_
	Lbs	8.4	_	_	_	0.5	_	_	_	_	_	0.1	_	1.2	_	0.0	_	0.3	0.0	_	0.3	_	_	_	_	_	0.1	0.3	105.1	_
'99	Number	0.4	0.2	_	_	1.0	_	_	_	0.1	_	0.1	0.0	1.7	0.0	_	_	0.0	_	_	0.0	_	0.8	_	_	_	_	_	0.4	_
	Lbs	0.8	_	_	_	1.3	0.2	_	_	_	_	0.1	0.1	1.1	_	_	0.2	2.4	_	_	0.1	_	_	_	_	_	0.6	0.8	11.0	_
'00	Number	_	0.0	_	_	_	_	_	_	_	_	_	_	0.0	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
	Lbs	_	_	_	_	_	_	_	_	0.2	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
														150+ fathoms																
'96	Number	0.7	_	_	_	0.5	_	_	_	_	_	0.0	0.5	0.0	_	_	_	0.2	0.0	_	0.0	0.0	_	_	_	0.3	_	_	0.6	_
	Lbs	0.9	_	_	_	0.4	_	_	_	_	_	_	_	_	_	_	_	0.0	0.0	_	0.0	0.1	_	_	_	1.1	_	_	5.4	_
'97	Number	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	3.0	1.4	_
	Lbs	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	25.4	_
'98	Number	_	0.0	_	_	_	_	_	_	0.0	_	0.0	0.0	_	_	_	_	_	_	_	0.0	_	_	_	_	_	_	_	_	_
	Lbs	1.1	_	_	_	0.4	_	_	_	_	_	_	_	_	_	_	_	3.3	_	_	_	_	_	_	_	_	_	0.7	_	_
'99	Number	_	0.0	_	_	_	_	0.4	_	_	_	0.0	_	0.0	0.0	_	_	0.0	_	_	0.1	_	_	_	_	_	_	_	_	_
	Lbs													0.2																

NOTE: "0.0" indicates more than one but less than fifty.

TABLE 3.5.2-3. Summary of pink shrimp Log CPUE for south of Cape Mendocino. (Page 1 of 1)

	Number of boats	Pounds	Hours	Avg. CPUE
Depth <=20 Fathoms				
1996	0	0	0.0	0
1997	0	0	0	0
1998	0	0	0	0
1999	0	0	0.0	0
2000	0	0	0.0	0
Depth between 20 - 150 Fathoms				
1996	10	527,410	1317.8	434.4
1997	15	408,769	827.1	464.6
1998	13	204,693	466.3	322.9
1999	6	89,740	262.9	223.9
2000	2	5,325	44.9	234.7
Depth <=50 Fathoms				
1996	0	0	0.0	0
1997	2	3,235	13.0	194.1
1998	0	0	0.0	0
1999	0	0	0.0	0
2000	0	0	0.0	0
Depth between 50 - 150 Fathoms				
1996	10	527,410	1317.8	434.4
1997	15	405,534	814.1	465.2
1998	13	204,693	466.3	322.9
1999	6	89,740	262.9	223.9
2000	2	5,325	44.9	234.7
Depth > 150 Fathoms				
1996	1	0	1.50	0
1997	2	3,900	7.22	571.85
1998	1	1,715	8.78	202.33
1999	0	0	0.00	0
2000	0	0	0.00	0

TABLE 3.5.2-4. Summary of Spot Prawn Trawl Log CPUE. (Page 1 of 1)

	Number of boats	Pounds	Hours	Avg. CPUE
Depth <=20 Fathoms				
1996	0	0	0.0	0
1997	0	0	0.0	0
1998	0	0	0.0	0
1999	2	160	7.1	19.2
2000	0	0	0.0	0
Depth <=50 Fathoms				
1996	1	0	1.0	0
1997	1	0	5.5	0
1998	0	0	0.0	0
1999	4	225	12.1	11.1
2000	2	15	1.8	8.6
Depth between 20 – 150 Fathoms				
1996	18	213,468	4953.0	44.1
1997	29	278,113	6021.2	44.1
1998	28	275,377	6611.9	35.8
1999	26	221,878	7542.5	37.9
2000	18	100,447	3355.6	31.4
Depth between 50 – 150 Fathoms				
1996	18	213,468	4952.0	49.2
1997	29	278,113	6015.7	44.1
1998	28	275,377	6611.9	35.8
1999	26	221,813	7537.5	37.9
2000	18	100,432	3353.8	31.4
Depth > 150 Fathoms				
1996	14	12,689	234.3	38.4
1997	26	102,278	1793.2	48
1998	21	181,914	3797.3	46.9
1999	21	87,947	2582.5	32.7
2000	10	17,904	556.8	33.5

Notes: No bycatch data is available from the logbooks, because bycatch is generally not recorded on the logs. See the spot prawn bycatch report by Paul Reilly (sent under a separate cover) for information on bycatch in spot prawn trawls.

The use of excluders is not recorded on the logs. All tows in the CDFG bycatch study were with nets that had some type of excluder, either a fisheye or a double-walled codend. Beginning on July 14, 2000, all spot prawn trawl were required to have excluders in California.

TABLE 3.5.2-5. Spot Prawn Trap Log CPUE. (Page 1 of 1)
(effort is totaled in Trap-Days = number of traps fished *x* number of days soaked)

	Number of boats	Pounds	Trap-Days	Avg. CPUE
Depth between 50 and 150 Fathoms				
1996	22	83845	309,762	0.265
1997	26	122,184	377,167	0.397
1998	29	180,730	647,690	0.359
1999	33	165,500	941,967	0.237
2000	32	134,251	791,121	0.525
Depth > 150 Fathoms				
1996	6	5,560	27,554	8.038
1997	4	5,793	32,627	0.267
1998	13	13,331	76,256	0.343
1999	8	23,104	122,231	0.285
2000	9	10898	71454	0.207

NOTES:
- No bycatch data is available from either logbooks or landing receipts. The law provides that any species other than shrimp and prawn taken incidentally with prawn or shrimp traps must be immediately released.
- Prawn and shrimp traps are prohibited in waters less than 50 fm south of Point Conception. During the time period covered in this analysis (1996-2000), only one boat recorded sets in waters less than 50 fm. Therefore, the depth strata were adjusted: four strata were deleted (# 20 fm, > 20 - # 150 fm, # 10 fm, and > 10 - # 150 fm) and one strata was added (> 50 - # 150 fm).
- South of Point Arguello the take of spot prawns in traps is prohibited from November 1 through January 31, and north of Point Arguello the take of spot prawns in traps is prohibited from May 1 through July 31. See the spot prawn bycatch report by Paul Reilly (sent under a separate cover) for information on bycatch in spot prawn traps; this report covers 262 observed trap strings.

TABLE 3.5.2-6. Summary of Ridgeback Prawn Trawl Log CPUE. (Page 1 of 1)

	Number of Boats	Pounds	Hours	Avg. CPUE
Depth <=20 Fathoms				
1996	4	886	16.5	55.7
1997	0	0	0.0	0.0
1998	0	0	0.0	0.0
1999	1	2,050	10.7	194.5
2000	1	1,700	5.0	340
Depth between 20 - 150 Fathoms				
1996	224	405,092	4,666.6	99.8
1997	19	281,755	3,867.5	73.0
1998	19	333,741	3,274.3	115.8
1999	26	1,247,104	5,837.7	225.1
2000	34	1,296,475	8,057.2	168.1
Depth <=50 Fathoms				
1996	20	139,127	1,603.7	107.4
1997	9	8,112	339.4	25.2
1998	7	1,333	43.6	47.5
1999	16	52,610	279.3	205.2
2000	28	212,888	1,724.0	123.8
Depth between 50 - 150 Fathoms				
1996	24	266,851	3,079.4	99.3
1997	18	273,643	3,528.1	77.1
1998	19	332,408	3,230.7	117.3
1999	26	1,196,544	5,569.1	226.3
2000	34	1,085,287	6,338.2	176.3
Depth > 150 Fathoms				
1996	1	0	2.0	0.0
1997	2	41	6.7	6.3
1998	3	10	19.3	0.3
1999	1	260	2.0	130.0
2000	2	553	19.4	158.3

Information on bycatch and whether or not an excluder was used is not recorded in logbooks.

TABLE 3.5.2-7. Catch and bycatch in the market squid fishery from vessel logbooks. (Page 1 of 1)

			Fleet Average CPUE																	
						Pounds of Bycatch						Pounds of Bycatch per Pound of Targeted Species								
Geographic Area	Depth	Year	Number of Sets	Pounds of Targeted Species Landed	Catch Per Set of Targeted Species	Bocaccio	Canary	Cowcod	Yelloweye	Lingcod	Unspecified Rockfish	Bocaccio	Canary	Cowcod	Yelloweye	Lingcod	Unspecified Rockfish			
North	<20 fm	1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
		2000	386	5,288,000	13,699	0	0	0	0	0	500	0	0	0	0	0	0			
		2001	356	9,362,000	26,298	0	0	0	0	0	0	0	0	0	0	0	0			
		2002	645	14,598,000	22,633	0	0	0	0	0	0	0	0	0	0	0	0			
	>20 and <150 fm	1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
		2000	8	226,000	28,250	0	0	0	0	0	0	0	0	0	0	0	0			
		2001	31	700,000	22,581	0	0	0	0	0	0	0	0	0	0	0	0			
		2002	246	5,436,000	22,098	0	0	0	0	0	0	0	0	0	0	0	0			
		1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
		2000	7	120,000	17,143	0	0	0	0	0	0	0	0	0	0	0	0			
		2001	18	412,000	22,889	0	0	0	0	0	0	0	0	0	0	0	0			
		2002	15	550,000	36,667	0	0	0	0	0	0	0	0	0	0	0	0			
	>10 and <150 fm	1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
		2000	387	5,394,000	13,938	0	0	0	0	0	500	0	0	0	0	0	0			
		2001	369	9,650,000	26,152	0	0	0	0	0	0	0	0	0	0	0	0			
		2002	876	19,484,000	22,242	0	0	0	0	0	0	0	0	0	0	0	0			
South	<20 fm	1999	6	496,000	82,667	0	0	0	0	0	0	0	0	0	0	0	0			
		2000	1,512	58,664,000	38,799	0	0	0	0	0	0	0	0	0	0	0	0			
		2001	1,159	44,280,000	38,205	0	0	0	0	0	0	0	0	0	0	0	0			
		2002	497	15,498,000	31,183	0	0	0	0	0	0	0	0	0	0	0	0			
	>20 and <150 fm	1999	27	2,168,000	80,296	0	0	0	0	0	0	0	0	0	0	0	0			
		2000	1,085	48,262,000	44,481	0	0	0	0	0	0	0	0	0	0	0	0			
		2001	1,020	42,486,000	41,653	0	0	0	0	0	0	0	0	0	0	0	0			
		2002	554	20,946,000	37,809	0	0	0	0	0	0	0	0	0	0	0	0			
	<10 fm	1999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
		2000	19	692,000	36,421	0	0	0	0	0	0	0	0	0	0	0	0			
		2001	26	796,000	30,615	0	0	0	0	0	0	0	0	0	0	0	0			
		2002	3	36,000	12,000	0	0	0	0	0	0	0	0	0	0	0	0			
	>10 and <150 fm	1999	33	2,664,000	80,727	0	0	0	0	0	0	0	0	0	0	0	0			
		2000	2,578	106,234,000	41,208	0	0	0	0	0	0	0	0	0	0	0	0			
		2001	2,153	85,970,000	39,930	0	0	0	0	0	0	0	0	0	0	0	0			
		2002	1,048	36408000	34740	0	0	0	0	0	0	0	0	0	0	0	0			

TABLE 3.5.2-8. Annual coastwide and area participation in the Highly Migratory Species gillnet fishery by open-access vessels, with associated groundfish on the same landing day, 1990-2001. (Page 1 of 1)

Area/Landings	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
CA: N of C. Mendocino											
Metric tons											
HMS gillnet		1	11	28	1	5	5	14	4	12	1
Groundfish		0	0	0	0	0	0	0	0	0	0
% of HMS gillnet		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
# of vessels											
HMS gillnet		1	13	15	2	9	8	13	6	5	2
with GF		0	0	0	0	0	0	0	0	0	0
% of HMS gillnet		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
# of trips											
HMS gillnet		3	17	27	3	16	13	25	11	14	4
with GF		0	0	0	0	0	0	0	0	0	0
% of HMS gillnet		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CA: C. Mendocino - Pt Conception											
Metric tons											
HMS gillnet	1	2	14	40	58	93	89	67	62	25	73
Groundfish	0	0	0	0	0	0	0	0	0	0	0
% of HMS gillnet	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
# of vessels											
HMS gillnet	6	12	31	43	52	54	54	45	34	26	20
with GF	0	0	0	0	1	1	3	2	0	0	3
% of HMS gillnet	0%	0%	0%	0%	2%	2%	6%	4%	0%	0%	15%
# of trips											
HMS gillnet	6	15	51	82	148	160	204	149	101	68	52
with GF	0	0	0	0	1	1	3	2	0	0	4
% of HMS gillnet	0%	0%	0%	0%	1%	1%	1%	1%	0%	0%	8%
CA: S of Pt Conception											
Metric tons											
HMS gillnet	0	0	3	11	79	24	55	110	73	75	75
Groundfish	0	0	0	1	0	1	4	10	12	6	3
% of HMS gillnet	0%	0%	8%	13%	0%	4%	6%	9%	16%	8%	4%
# of vessels											
HMS gillnet	3	3	24	56	71	75	74	101	88	78	64
with GF	0	0	4	6	8	17	24	32	30	38	16
% of HMS gillnet	0%	0%	17%	11%	11%	23%	32%	32%	34%	49%	25%
# of trips											
HMS gillnet	3	4	37	115	219	251	412	769	499	548	223
with GF	0	0	7	6	13	38	110	228	129	116	47
% of HMS gillnet	0%	0%	19%	5%	6%	15%	27%	30%	26%	21%	21%
Coastwide											
Metric tons											
HMS gillnet	1	3	27	79	138	122	150	192	141	113	149
Groundfish	0	0	0	1	0	1	4	10	12	6	3
% of HMS gillnet	0%	0%	1%	2%	0%	1%	3%	5%	8%	5%	2%
# of vessels											
HMS gillnet	9	14	53	84	95	104	103	110	105	86	71
with GF	0	0	4	6	9	18	27	34	31	38	19
% of HMS gillnet	0%	0%	8%	7%	9%	17%	26%	31%	30%	44%	27%
# of trips											
HMS gillnet	9	22	105	224	371	430	631	953	615	630	279
with GF	0	0	7	6	14	39	113	230	130	116	51
% of HMS gillnet	0%	0%	7%	3%	4%	9%	18%	24%	21%	18%	18%

TABLE 3.5.2-9. Annual coastwide and area participation in the Highly Migratory Species seine fishery by open-access vessels, with associated groundfish on the same landing day, 1990-2001. (Page 1 of 1)

Area/Landings	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
CA: C. Mendocino - Pt Conception												
Metric tons												
HMS seine			0					0		98		110
Groundfish			0					0		0		0
% of HMS seine			0%					0%		0%		0%
# of vessels												
HMS seine			1					1		3		4
with GF			0					0		0		0
% of HMS seine			0%					0%		0%		0%
# of trips												
HMS seine			1					1		10		13
with GF			0					0		0		0
% of HMS seine			0%					0%		0%		0%
CA: S of Pt Conception												
Metric tons												
HMS seine	9977	5938	3804	3145	5713	9014	12448	12742	11085	5175	2167	776
Groundfish	0	0	0	0	0	0	0	0	0	0	0	0
% of HMS seine	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
# of vessels												
HMS seine	30	17	27	26	25	21	23	33	35	12	18	13
with GF	0	0	1	1	0	0	0	0	0	0	0	0
% of HMS seine	0%	0%	4%	4%	0%	0%	0%	0%	0%	0%	0%	0%
# of trips												
HMS seine	151	70	119	95	129	150	192	148	127	38	52	40
with GF	0	0	1	1	0	0	0	0	0	0	0	0
% of HMS seine	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Coastwide												
Metric tons												
HMS seine	9977	5938	3804	3145	5713	9014	12448	12742	11085	5273	2167	885
Groundfish	0	0	0	0	0	0	0	0	0	0	0	0
% of HMS seine	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
# of vessels												
HMS seine	30	17	28	26	26	21	23	35	35	14	18	15
with GF	0	0	1	1	0	0	0	0	0	0	0	0
% of HMS seine	0%	0%	4%	4%	0%	0%	0%	0%	0%	0%	0%	0%
# of trips												
HMS seine	151	70	120	95	130	150	192	150	127	48	52	53
with GF	0	0	1	1	0	0	0	0	0	0	0	0
% of HMS seine	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%

TABLE 3.5.2-10. Annual landings (mt) of "other" rockfish species for hook-and-line (HKL) and pot gear by price interval and PacFIN disposition code ("live" or "other"), 1994-2001. (Page 1 of 2)

	Upper end of interval	Metric tons of "other" rockfish landings 1994 Live	1994 Other	1995 Live	1995 Other	1996 Live	1996 Other	1997 Live	1997 Other	1998 Live	1998 Other	1999 Live	1999 Other	2000 Live	2000 Other	2001 Live	2001 Other
HKL																	
	$ 1.00	9.8	1,861.7	8.9	1,535.7	8.7	1,344.3	11.7	1,105.3	15.5	964.2	8.8	521.5	4.0	234.7	2.7	294.0
	$ 1.25	2.4	146.9	0.5	102.4	1.0	124.6	2.5	76.3	3.5	96.4	1.7	63.4	3.7	31.0	19.2	23.5
	$ 1.50	14.3	111.8	11.6	142.0	9.2	143.9	9.5	183.9	13.0	106.3	3.5	65.2	12.6	26.8	15.8	23.4
	$ 1.75	5.7	45.4	0.3	46.9	1.1	53.1	1.8	56.5	2.5	28.4	3.1	41.0	1.1	9.8	12.1	8.0
	$ 2.00	23.5	15.2	19.9	20.3	25.4	35.2	26.7	40.0	20.6	37.3	11.2	21.3	5.1	18.8	5.4	16.2
	$ 2.25	6.9	2.0	3.9	1.1	10.9	2.1	8.7	5.3	23.0	14.8	2.8	4.8	1.5	8.5	1.5	9.7
	$ 2.50	21.1	3.5	36.7	4.4	33.4	2.3	29.8	2.1	24.0	3.4	21.1	7.2	6.9	4.0	7.0	3.9
	$ 2.75	5.0	0.3	3.5	1.0	15.7	0.5	7.8	0.2	8.2	0.2	5.1	1.9	1.0	0.7	4.2	1.3
	$ 3.00	14.3	4.2	16.7	5.9	34.2	3.9	16.6	1.3	8.9	2.7	12.4	3.8	5.1	4.7	4.8	5.0
	$ 3.25	0.2	0.0	0.6	0.0	1.8	0.1	7.0	0.5	11.4	1.0	21.2	1.1	0.7	0.2	0.7	0.2
	$ 3.50	2.9	0.9	6.0	0.3	9.3	0.1	10.1	0.3	7.0	0.4	18.8	2.6	2.9	1.6	4.7	3.1
	$ 3.75	1.0	0.2	0.0	0.1	0.7		2.6	0.1	1.9	0.0	4.4	0.3	3.2	0.5	0.7	3.7
	$ 4.00	5.5	0.5	0.2	0.3	2.1	0.1	3.7	0.4	9.1	0.4	29.1	1.5	16.0	4.1	13.8	1.0
	$ 4.25	2.4	1.6	0.2	0.0	3.2	0.0	5.6	0.3	7.2	0.6	2.3	0.0	5.9	0.2	19.3	0.3
	$ 4.50	12.0	0.8	15.6	0.3	3.8	0.1	5.6	0.4	7.6	0.4	13.4	2.2	6.9	0.9	9.7	0.1
	$ 4.75	3.1	1.1	0.1	0.0	0.7	0.0	0.4	0.1	1.4	0.2	1.8	0.1	4.8	0.0	2.9	0.1
	$ 5.00	6.9	0.3	14.4	0.8	19.0	0.4	5.0	0.2	14.1	0.5	16.3	1.2	20.9	0.9	11.2	0.9
	> $ 5.00	2.4	0.2	12.8	0.2	10.5		16.5		14.7	0.1	18.4	0.4	63.5	4.3	71.9	2.5
Gear total																	
	Mts	139.3	2,196.6	152.1	1,861.7	190.8	1,710.7	171.5	1,473.2	193.6	1,257.4	195.4	739.3	165.9	351.7	207.7	396.8
	$1,000s	822.6	3,469.0	1,023.8	3,125.5	1,241.3	2,974.1	1,092.7	2,669.6	1,253.0	2,223.0	1,515.8	1,521.9	1,626.2	880.4	1,901.4	918.6
	Avg. price	$2.68	$0.72	$3.05	$0.76	$2.95	$0.79	$2.89	$0.82	$2.94	$0.80	$3.52	$0.93	$4.45	$ 1.14	$ 4.15	$ 1.05

TABLE 3.5.2-10. Annual landings (mt) of "other" rockfish species for hook-and-line (HKL) and pot gear by price interval and PacFIN disposition code ("live" or "other"), 1994-2001. (Page 2 of 2)

Upper end of interval	1994 Live	Other	1995 Live	Other	1996 Live	Other	1997 Live	Other	1998 Live	Other	1999 Live	Other	2000 Live	Other	2001 Live	Other
	Metric tons of "other" rockfish landings															
POT																
$ 1.00	1.3	10.4	0.9	10.3	1.2	9.5	1.3	11.7	0.4	8.4	0.1	5.9	0.3	6.9	0.1	4.0
$ 1.25	0.2	1.1	0.7	1.3	0.1	0.7	0.2	0.5	0.4	1.7	0.0	0.2	0.0	0.1	0.1	0.3
$ 1.50	0.9	0.4	1.2	0.5	0.1	0.4	0.6	0.5	0.5	0.5	0.1	0.2	0.0	0.2	0.0	0.0
$ 1.75	0.0	0.0		0.3	0.2	0.1	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
$ 2.00	4.6	0.8	1.7	0.7	1.2	0.2	0.8	0.2	2.7	1.0	0.2	0.0	0.3	0.1	0.2	0.8
$ 2.25	0.2		0.1		0.7	0.0	0.1	0.0	1.6	0.1	0.1		0.1			0.0
$ 2.50	0.5	0.0	4.2	1.0	3.3	1.0	3.0	0.5	2.0	0.1	0.4	0.2	0.2	0.3	0.1	0.0
$ 2.75	0.0	0.0	0.5		0.8	0.0	0.9		1.5	0.2	0.2		0.0	0.0	0.2	0.0
$ 3.00	0.3	0.0	0.2	0.1	1.9	0.0	1.6	0.2	1.8	0.2	0.5	0.2	0.4	0.1	0.2	0.0
$ 3.25	0.1	0.0	0.0		0.0		0.0		0.4		0.9	0.0	0.0			0.0
$ 3.50	0.2	0.0	0.3	0.4	0.1	0.0	0.6		0.9	0.0	2.7	0.1	0.0		0.2	0.1
$ 3.75	0.0		0.3		0.1		0.1		0.0		1.1		0.9	0.0	0.1	0.0
$ 4.00	0.2	0.0	0.0	0.0	0.1	0.0	0.5	0.0	5.3	0.2	0.9	0.0	0.9	0.0	1.0	0.0
$ 4.25	0.2	0.0			0.1		0.1		0.0		0.2		1.6	0.0	1.5	0.0
$ 4.50	0.4	0.0	1.7	0.2	0.9		0.5		1.0		6.0	0.0	0.4	0.0	0.4	0.0
$ 4.75	0.1				0.0				0.2		0.2		1.4		1.4	0.0
$ 5.00	0.0		1.0	0.3	0.4	0.0	0.5	0.0	2.1	0.1	0.9	0.0	1.4	0.0	0.3	0.0
> $ 5.00	0.0		1.4		1.8	0.0	1.4		3.0		3.2	0.0	5.7	0.3	3.1	0.2
Gear total																
Mts	9.4	12.8	14.2	15.2	12.9	12.0	12.1	14.0	23.8	12.5	17.8	7.0	13.6	8.0	8.9	5.6
$1,000s	44.5	21.5	93.3	37.9	86.4	23.0	78.7	24.1	183.0	27.6	166.2	14.3	146.9	16.7	99.7	14.1
Avg. price	$ 2.15	$0.76	$2.99	$ 1.13	$3.04	$0.87	$2.95	$0.78	$3.48	$ 1.00	$4.23	$0.93	$4.90	$0.95	$5.06	$ 1.13

TABLE 3.5.2-11 Estimated Open Access Fishery Landings in 1996 and 2001, by state, weight and value. (Page 1 of 1)

Open Access Sector	1996 landings by weight	2001 landings by weight
Coastwide Directed	3,291 mt	1,086 mt
Coastwide Incidental	802 mt	197 mt
Washington Directed	225 mt	66 mt
Washington Incidental	296 mt	28 mt
Oregon Directed	458 mt	237 mt
Oregon Incidental	384 mt	98 mt
California Directed	2,608 mt	776 mt
California Incidental	122 mt	70 mt

TABLE 3.5.2-12a. Number of vessels by fleet category, level of dependence and level of gross income (November 2000 through October 2001). (Page 1 of 1)

	Category of Gross Income From West Coast Landings				
	<$5,000	$5,000-$50,000	$50,000-200,000	>$200,000	Total
Limited Entry Trawl	**Number of Vessels**				
>0% & <5%	0	0	4	1	5
>5% & <35%	0	0	11	6	17
>35% & <65%	0	0	18	27	45
>65% & <95%	0	4	26	40	70
>95% & <100%	2	7	53	37	99
No Groundfish Landing In Base Period	1	0	9	1	11
Total	3	11	121	112	247
Limited Entry Longline and Fishpot					
>0% & <5%	1	6	7	3	17
>5% & <35%	0	4	19	9	32
>35% & <65%	0	6	29	14	49
>65% & <95%	0	14	11	1	26
>95% & <100%	4	29	21	0	54
No Groundfish Landing In Base Period	1	10	7	1	19
Total	6	69	94	28	197
Open Access with >5% From Groundfish					
>5% & <35%	52	101	44	0	197
>35% & <65%	47	50	8	0	105
>65% & <95%	63	55	6	0	124
>95% & <100%	200	138	7	0	345
Total	362	344	65	0	771
Open Access with <5% of Revenue from Groundfish					
>0% & <5%	45	268	169	34	516
No Groundfish Landing In Base Period	1,027	1,181	510	130	2,848
Total	1,072	1,449	679	164	3,364
Groundfish Vessel Total	416	692	449	174	1,731
Grand Total	1,443	1,873	959	304	4,579

Source: Derived from PacFIN monthly vessel summary files.

TABLE 3.5.2-12b. Exvessel revenue by fleet category, level of dependence and level of gross income (November 2000 through October 2001). (Page 1 of 2)

	Category of Gross Income From West Coast Landings				
	<$5,000	$5,000-$50,000	$50,000-200,000	>$200,000	Total
Limited Entry Trawl	**Total Exvessel Revenue ($)**				
>0% & <5%	0	0	441301	275289	716,590
>5% & <35%	0	0	1,216,708	1,691,721	2,908,429
>35% & <65%	0	0	2,231,773	8,269,118	10,500,891
>65% & <95%	0	81,105	3,755,128	14,133,342	17,969,576
>95% & <100%	2673	136,997	6,684,899	12,134,494	18,959,063
No Groundfish Landing In Base Period	2273	0	756161	210743	969177
Total	4946	218103	15085970	36714707	52023726
Limited Entry Longline and Fishpot					
>0% & <5%	3311	126,194	644,914	1,163,527	1,937,946
>5% & <35%	0	110,820	1,997,638	3,286,281	5,394,739
>35% & <65%	0	196,026	3,159,960	4,498,529	7,854,515
>65% & <95%	0	407,988	1,017,071	201,429	1,626,488
>95% & <100%	9741	797,807	1,611,208	0	2,418,756
No Groundfish Landing In Base Period	2533	195966	549980	304489	1052968
Total	15585	1834801	8980771	9454255	20285412
Open Access with >5% From Groundfish					
>5% & <35%	111738	2,148,676	3,999,350	0	6,259,764
>35% & <65%	75358	956,712	546,317	0	1,578,387
>65% & <95%	108372	996853	486,934	0	1,592,159
>95% & <100%	261318	2589685	508585	0	3359588
Total	556786	6691926	5541186	0	12789898
Open Access with <5% of Revenue from Groundfish					
>0% & <5%	112103	6,003,259	17,085,952	9,368,639	32569953
No Groundfish Landing In Base Period	1873962	24420868	50680628	49134907	126110365
Total	1986065	30,424,127	67,766,580	58,503,546	158,680,318
Groundfish Vessel Total	689420	14748089	46693879	55537601	117668989
Grand Total	2563382	39168957	97,374,507	104,672,508	243779354
Limited Entry Trawl	**Total Groundfish Revenue ($)**				
>0% & <5%	0	0	4,136	6,339	10,475
>5% & <35%	0	0	182,248	339,166	521,414
>35% & <65%	0	0	1,355,987	5,180,446	6,536,433
>65% & <95%	0	60,235	3,149,194	12,457,556	15,666,985
>95% & <100%	2,673	213,445	6,580,010	11,423,415	18,219,543
No Groundfish Landing In Base Period	0		0	0	0
Total	2,673	273,680	11,271,575	29,406,922	40,954,850
Limited Entry Longline and Fishpot					
>0% & <5%	50	1,933	7,738	20,066	29,787
>5% & <35%	0	17,374	419,268	807,674	1,244,316
>35% & <65%	0	96,624	1,631,259	2,257,878	3,985,761
>65% & <95%	0	352,893	858,841	161,731	1,373,465
>95% & <100%	9741	789,014	1,579,821		2,378,576

TABLE 3.5.2-12b. Exvessel revenue by fleet category, level of dependence and level of gross income (November 2000 through October 2001). (Page 2 of 2)

		Category of Gross Income From West Coast Landings				
		<$5,000	$5,000-$50,000	$50,000-200,000	>$200,000	Total
No Groundfish Landing In Base Period		0	0	0	0	0
	Total	9791	1,257,838	4496927	3247349	9011905
Open Access with >5% From Groundfish						
>5% & <35%		16965	358,000	423,529	0	798,494
>35% & <65%		40741	516,414	267,690	0	824,845
>65% & <95%		91691	851,945	407,877	0	1,351,513
>95% & <100%		259602	2563176	503827	0	3,326,605
	Total	408999	4289535	1602923	0	6301457
Open Access with <5% of Revenue from Groundfish						
>0% & <5%		1374	52,149	157,140	123,129	333,792
No Groundfish Landing In Base Period		0	0	0	0	0
	Total	1374	52,149	157,140	123,129	333,792
Groundfish Vessel Total		422837	5,873,202	17,528,565	32,777,400	56602004
Grand Total		422837	5873202	17528565	32777400	56602004

Source: Derived from PacFIN monthly vessel summary files.

TABLE 3.5.2-13a. Number of vessels by fleet category, level of dependence and vessel size category (November 2000 through October 2001). (Page 1 of 1)

	Vessel Size Category						
	<40'	40'-50'	50'-60'	60'-70'	70'-150'	Unspecified	Total
Limited Entry Trawl	**Number of Vessels**						
>0% & <5%	0	3	1	0	1	0	5
>5% & <35%	1	4	7	3	2	0	17
>35% & <65%	1	7	14	7	16	0	45
>65% & <95%	0	10	17	24	19	0	70
>95% & <100%	2	3	21	21	46	6	99
No Groundfish Landing In Base Period	1	4	4	2	0	0	11
Total	5	31	64	57	84	6	247
Limited Entry Longline and Fishpot							
>0% & <5%	7	8	2	0	0	0	17
>5% & <35%	8	15	5	2	2	0	32
>35% & <65%	15	19	7	7	1	0	49
>65% & <95%	14	10	2	0	0	0	26
>95% & <100%	31	14	6	1	1	1	54
No Groundfish Landing In Base Period	10	5	3	1	0	0	19
Total	85	71	25	11	4	1	197
Open Access with >5% From Groundfish							
>5% & <35%	154	32	6	4	1	0	197
>35% & <65%	96	8	1	0	0	0	105
>65% & <95%	115	5	0	0	1	3	124
>95% & <100%	310	21	5	2	0	7	345
Total	675	66	12	6	2	10	771
Open Access with <5% of Revenue from Groundfish							
>0% & <5%	324	109	29	28	25	1	516
No Groundfish Landing In Base Period	1967	432	254	80	101	14	2848
Total	2,291	541	283	108	126	15	3364
Groundfish Vessel Total	1,089	277	130	102	115	18	1,731
Grand Total	3,056	709	384	182	216	32	4,579

Source: Derived from PacFIN monthly vessel summary files.

TABLE 3.5.2-13b Exvessel revenue by fleet category, level of dependence and vessel size category (November 2000 through October 2001). (Page 1 of 2)

	Vessel Size Category						
	<40'	40'-50'	50'-60'	60'-70'	<150'	No Length	Total
Limited Entry Trawl	**Total Exvessel Revenue ($)**						
>0% & <5%	0	325,964	275,289	0	115,337	0	716,590
>5% & <35%	181,153	430,674	953,215	825,043	518,344	0	2,908,429
>35% & <65%	27,962	871,383	2,490,768	1,888,811	5,221,968	0	10,500,891
>65% & <95%	0	1,165,761	3,136,028	6,765,312	6,902,474	0	17,969,576
>95% & <100%	106,771	242,804	3,151,177	4,266,877	10,613,452	577982	18,959,063
No Groundfish Landing In Base Period	56941	414389	303085	194762	0	0	969177
Total	372,827	3,450,975	10,309,561	13,940,805	23,371,575	577982	52023726
Limited Entry Longline and Fishpot							
>0% & <5%	305,169	1,246,090	386,687	0	0	0	1937946
>5% & <35%	672,139	1,800,168	1,041,194	1,033,560	847,678	0	5394739
>35% & <65%	1,476,118	2,312,510	1,756,501	2,058,800	250,586	0	7854515
>65% & <95%	789,669	598,901	237,918	0	0	0	1626488
>95% & <100%	1,271,340	679,096	420,250	19,026	23,686	5,358	2418756
No Groundfish Landing In Base Period	215379	266313	488684	82592	0	0	1052968
Total	4,729,814	6,903,078	4,331,234	3,193,978	1,121,950	5,358	20285412
Open Access with >5% From Groundfish							
>5% & <35%	4,321,362	1,568,644	135,567	230,097	4,094	0	6259764
>35% & <65%	1,385,880	182,777	9,730	0	0	0	1578387
>65% & <95%	1,386,170	199,754	0	0	2,501	3,734	1592159
>95% & <100%	2752570	460004	47124	2287	0	97603	3359588
Total	9,845,982	2,411,179	192,421	232,384	6,595	101,337	12,789,898
Open Access with <5% of Revenue from Groundfish							
>0% & <5%	12,215,985	6,261,870	3,492,986	5,359,397	5,236,348	3,367	32,569,953
No Groundfish Landing In Base Period	38231406	22436667	26343670	12444865	26130590	523167	126110365
Total	50,447,391	28,698,537	29,836,656	17,804,262	31,366,938	526,534	158,680,318
Groundfish Vessel Total	27,164,608	19,027,102	18,326,202	22,726,564	29,736,468	688,044	117,668,989
Grand Total	65,396,014	41,463,769	44,669,872	35,171,429	55,867,058	1,211,211	243779354

TABLE 3.5.2-13b Exvessel revenue by fleet category, level of dependence and vessel size category (November 2000 through October 2001). (Page 2 of 2)

	Vessel Size Category						
	<40'	40'-50'	50'-60'	60'-70'	<150'	No Length	Total
Limited Entry Trawl	**Total Groundfish Exvessel Revenue ($)**						
>0% & <5%	0	2,711	6,339	0	1,425	0	10,475
>5% & <35%	19,428	43,784	157,768	253,150	47,284	0	521414
>35% & <65%	29,954	455,343	1,150,602	728,615	2,391,219	0	4755733
>65% & <95%	0	977,218	3,240,980	6,428,795	6,800,692	0	17,447,685
>95% & <100%	106,787	273,082	3,097,003	4,278,678	9,886,011	577,982	18,219,543
No Groundfish Landing In Base Period	0	0	0	0	0	0	0
Total	156,169	1,752,138	7,652,692	11,689,238	19,126,631	577,982	40,954,850
Limited Entry Longline and Fishpot							
>0% & <5%	4,354	12,410	13,019	4	0	0	29,787
>5% & <35%	161,449	311,302	206,628	275,907	289,030	0	1,244,316
>35% & <65%	616,385	674,807	851,658	765,290	95,876	0	3,004,016
>65% & <95%	806,958	1,124,427	195,606	228,219	0	0	2,355,210
>95% & <100%	1,260,140	663,360	407,616	19,026	23,076	5,358	2,378,576
No Groundfish Landing In Base Period	0	0	0	0	0	0	0
Total	2,849,286	2,786,306	1,674,527	1,288,446	407,982	5,358	9,011,905
Open Access with >5% From Groundfish							
>5% & <35%	572,972	181,882	27,222	16,095	323	0	798,494
>35% & <65%	638,089	79,881	4,062	0	0	0	722,032
>65% & <95%	1,291,863	157,323	0	0	1,777	3,363	1,454,326
>95% & <100%	2,722,871	456,863	47,124	2,287	0	97,460	3,326,605
Total	5,225,795	875,949	78,408	18,382	2,100	100,823	6,301,457
Open Access with <5% of Revenue from Groundfish							
>0% & <5%	130,599	42,398	35,227	56,911	68,603	54	333,792
No Groundfish Landing In Base Period	0	0	0	0	0	0	0
Total	130,599	42,398	35,227	56,911	68,603	54	333,792
Groundfish Vessel Total	8,361,849	5,456,791	9,440,854	13,052,977	19,605,316	684,217	56,602,004
Grand Total	8,361,849	5,456,791	9,440,854	13,052,977	19,605,316	684,217	56602004

Source: Derived from PacFIN monthly vessel summary files.

TABLE 3.5.2-14 Number of vessels by length class, INPFC area, gear and species groups for November 2000 through October 2001. (Page 1 of 6)

Gear and Species	<40'	40'-50'	50'-60'	60'-70'	70'-150'	>150'	Unspecified	Total
			Vessel Length Category					
			Vancouver INPFC Area					
Limited Entry Trawl								
Whiting	0	0	1	3	13	0	0	17
Sablefish	1	10	17	22	31	0	0	81
Nearshore Species	1	6	10	9	9	0	0	35
Shelf Species	1	10	16	23	31	0	0	81
Slope Species	1	10	16	22	30	0	0	79
Limited Entry Fixed Gear								
Sablefish	9	17	6	1	3	0	0	36
Nearshore Species	1	2	1	0	0	0	0	4
Shelf Species	10	14	5	0	2	0	0	31
Slope Species	8	16	5	1	3	0	0	33
Open Access >5% Revenue from Groundfish								
Sablefish	13	3	1	0	0	0	1	18
Nearshore Species	7	0	0	0	0	0	0	7
Shelf Species	19	5	0	0	0	0	1	25
Slope Species	7	4	0	0	0	0	1	12
Open Access <5% Revenue from Groundfish								
Sablefish	0	1	2	1	1	0	0	5
Nearshore Species	2	11	3	1	1	0	0	18
Shelf Species	0	1	0	0	0	0	0	1
Slope Species	13	26	7	0	3	0	0	49
Nongroundfish Fisheries								
Shrimps and Prawns	0	0	2	3	3	0	0	8
Crabs	7	11	26	7	6	0	0	57
Salmon	13	20	2	1	4	0	0	40
HMS	2	3	2	3	5	0	0	15
CPS	0	2	6	1	15	0	0	24
Other	3	12	13	13	27	0	0	68

TABLE 3.5.2-14 Number of vessels by length class, INPFC area, gear and species groups for November 2000 through October 2001. (Page 2 of 6)

Gear and Species	<40'	40'-50'	50'-60'	60'-70'	70'-150'	>150'	Unspecified	Total
			Vessel Length Category					
			Columbia INPFC Area					
Limited Entry Trawl								
Whiting	-	2	1	8	35	0	6	52
Sablefish	3	10	21	38	51	0	4	127
Nearshore Species	1	10	17	19	15	0	0	62
Shelf Species	3	12	21	38	60	0	6	140
Slope Species	3	10	20	38	54	0	4	129
Limited Entry Fixed Gear								
Sablefish	12	27	14	6	2	0	1	62
Nearshore Species	3	3	2	0	0	0	0	8
Shelf Species	14	24	8	5	0	0	0	51
Slope Species	8	20	8	5	1	0	0	42
Open Access >5% Revenue from Groundfish								
Sablefish	25	12	4	2	1	0	2	46
Nearshore Species	55	5	1	0	0	0	0	61
Shelf Species	57	8	2	1	0	0	1	69
Slope Species	8	4	2	1	0	0	2	17
Open Access <5% Revenue from Groundfish								
Sablefish	19	16	10	17	17	0	0	79
Nearshore Species	35	7	2	4	3	0	0	51
Shelf Species	120	47	15	22	18	0	0	222
Slope Species	16	6	7	12	11	0	0	52
Nongroundfish Fisheries								
Halibut	104	73	24	8	12	0	1	222
Shrimps and Prawns	0	2	17	43	36	0	0	98
Crabs	167	135	90	42	32	0	0	466
Salmon	340	123	20	7	30	0	5	525
HMS	162	223	117	57	37	0	1	597
CPS	2	10	16	10	41	0	6	85
Other	51	32	40	42	58	0	7	230

TABLE 3.5.2-14 Number of vessels by length class, INPFC area, gear and species groups for November 2000 through October 2001. (Page 3 of 6)

	Vessel Length Category							
Gear and Species	<40'	40'-50'	50'-60'	60'-70'	70'-150'	>150'	Unspecified	Total
				Eureka INPFC Area				
Limited Entry Trawl								
Whiting	0	2	0	2	12	0	0	16
Sablefish	1	14	29	27	28	0	0	99
Nearshore Species	1	11	21	13	7	0	0	53
Shelf Species	2	14	29	25	30	0	0	100
Slope Species	2	14	31	28	29	0	0	104
Limited Entry Fixed Gear								
Sablefish	19	8	3	0	0	0	0	30
Nearshore Species	19	3	2	0	0	0	0	24
Shelf Species	22	6	2	0	0	0	0	30
Slope Species	20	4	1	0	0	0	0	25
Open Access >5% Revenue from Groundfish								
Sablefish	24	2	0	0	0	0	0	26
Nearshore Species	138	3	1	0	0	0	1	143
Shelf Species	133	3	1	0	0	0	0	137
Slope Species	76	1	0	0	0	0	0	77
Open Access <5% Revenue from Groundfish								
Sablefish	2	1	0	0	0	0	0	3
Nearshore Species	23	1	1	0	2	0	0	27
Shelf Species	20	4	1	5	3	0	0	33
Slope Species	5	0	0	2	1	0	0	8
Nongroundfish Fisheries								
Halibut	10	9	6	1	2	0	0	28
Shrimps and Prawns	1	6	10	12	8	0	0	37
Crabs	160	74	38	9	11	0	0	292
Salmon	74	23	1	0	3	0	0	101
HMS	39	33	27	9	7	1	0	116
CPS	1	0	1	2	11	0	0	15
Other	154	23	33	23	23	0	1	257

TABLE 3.5.2-14 Number of vessels by length class, INPFC area, gear and species groups for November 2000 through October 2001. (Page 4 of 6)

Gear and Species	<40'	40'-50'	50'-60'	60'-70'	70'-150'	>150'	Unspecified	Total
			Vessel Length Category					
			Monterey INPFC Area					
Limited Entry Trawl								
Whiting	0	0	0	1	1	0	0	2
Sablefish	1	5	22	17	11	0	0	56
Nearshore Species	1	7	12	8	5	0	0	33
Shelf Species	1	7	23	18	12	0	0	61
Slope Species	1	7	24	18	12	0	0	62
Limited Entry Fixed Gear								
Sablefish	15	12	3	1	0	0	0	31
Nearshore Species	12	4	1	0	0	0	0	17
Shelf Species	16	8	3	0	0	0	0	27
Slope Species	17	10	3	1	0	0	0	31
Open Access >5% Revenue from Groundfish								
Sablefish	62	20	3	0	0	0	0	85
Nearshore Species	218	12	5	1	0	0	7	243
Shelf Species	207	13	4	2	0	0	5	231
Slope Species	59	12	3	0	0	0	0	74
Open Access <5% Revenue from Groundfish								
Sablefish	8	3	0	0	0	0	1	12
Nearshore Species	31	3	0	0	0	0	0	34
Shelf Species	35	12	0	1	0	0	0	48
Slope Species	7	3	1	1	0	0	0	12
Nongroundfish Fisheries								
Halibut	152	16	11	3	3	0	0	185
Shrimps and Prawns	5	1	8	4	4	0	0	22
Crabs	138	65	22	8	4	0	0	237
Salmon	505	141	24	1	0	0	0	671
HMS	112	72	40	9	9	0	0	242
CPS	13	10	10	4	6	0	1	44
Other	361	35	22	16	11	0	4	449

TABLE 3.5.2-14 Number of vessels by length class, INPFC area, gear and species groups for November 2000 through October 2001. (Page 5 of 6)

Gear and Species	<40'	40'-50'	50'-60'	60'-70'	70'-150'	>150'	Unspecified	Total
			Vessel Length Category					
			Conception INPFC Area					
Limited Entry Trawl								
Whiting	0	0	0	0	1	0	0	1
Sablefish	0	0	5	6	2	0	0	13
Nearshore Species	0	0	4	1	0	0	0	5
Shelf Species	0	0	5	7	2	0	0	14
Slope Species	0	0	4	7	2	0	0	13
Limited Entry Fixed Gear								
Sablefish	15	4	0	0	0	0	0	19
Nearshore Species	10	3	1	0	0	0	0	14
Shelf Species	15	4	1	0	0	0	0	20
Slope Species	16	4	0	0	0	0	0	20
Open Access >5% Revenue from Groundfish								
Sablefish	6	4	0	0	0	0	0	10
Nearshore Species	208	22	1	2	0	0	1	234
Shelf Species	170	16	1	1	1	0	0	189
Slope Species	57	14	0	2	1	0	0	74
Open Access <5% Revenue from Groundfish								
Sablefish	4	2	1	0	0	0	0	7
Nearshore Species	95	26	4	0	0	0	0	125
Shelf Species	62	17	3	2	3	0	0	87
Slope Species	36	9	3	3	2	0	0	53
Halibut	157	33	5	6	0	0	0	201
Shrimps and Prawns	39	19	8	8	5	0	0	79
Crabs	238	36	7	2	1	0	0	284
HMS	221	78	34	17	50	0	0	400
CPS	69	37	41	12	20	0	0	179
Other	487	83	24	9	33	0	1	637

TABLE 3.5.2-14 Number of vessels by length class, INPFC area, gear and species groups for November 2000 through October 2001. (Page 6 of 6)

Gear and Species	<40'	40'-50'	50'-60'	60'-70'	70'-150'	>150'	Unspecified	Total
			Vessel Length Category					
			All Ocean Areas (Council Managed 0-200 Miles)					
Limited Entry Trawl								
Whiting	0	4	1	10	40	0	6	61
Sablefish	4	26	61	54	73	0	4	222
Nearshore Species	3	28	48	36	31	0	0	146
Shelf Species	4	30	61	54	80	0	6	235
Slope Species	4	27	60	54	76	0	4	225
Limited Entry Fixed Gear								
Sablefish	61	61	23	8	4	0	1	158
Nearshore Species	39	13	5	0	0	0	0	57
Shelf Species	65	50	16	5	2	0	0	138
Slope Species	63	48	15	7	3	0	0	136
Open Access >5% Revenue from Groundfish								
Sablefish	128	39	7	2	1	0	2	179
Nearshore Species	566	39	7	3	0	0	8	623
Shelf Species	542	41	7	4	1	0	6	601
Slope Species	207	34	5	3	1	0	2	252
Open Access <5% Revenue from Groundfish								
Sablefish	33	23	11	18	17	0	1	103
Nearshore Species	183	37	7	4	5	0	0	236
Shelf Species	234	84	20	28	22	0	0	388
Slope Species	64	19	11	17	14	0	0	125
Nongroundfish Fisheries								
Halibut	431	149	49	18	20	0	1	668
Shrimps and Prawns	44	28	38	58	45	0	0	213
Crabs	692	302	147	59	46	0	0	1,246
Salmon	855	252	43	8	31	0	5	1,194
HMS	511	324	160	75	94	1	1	1,666
CPS	85	51	60	23	63	0	7	289
Other	1,005	165	107	67	111	0	13	1,468

Source: Derived from PacFIN monthly vessel summary files.

TABLE 3.5.2-15. Coastwide annual and bi-monthly commercial landings of overfished species by fleet, metric tons 1999-2001. (Page 1 of 2)

Species/Fleet	1999	2000	2001	1999						2000						2001					
	All	All	All	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Bocaccio																					
LE Trawl	30.3	16.1	13.9	5.5	5.1	5.8	6.3	5.6	2.0	0.8	2.3	3.3	2.7	3.8	3.2	2.0	2.2	3.1	3.8	2.7	0.0
LE Fixed-gear	5.0	2.4	2.4	0.5	1.0	1.0	0.7	1.6	0.1	0.0	0.1	0.8	0.6	0.6	0.3	0.3	0.1	0.4	1.2	0.5	
LE Shrimp-trawl	0.3	0.1	0.0	0.3	0.0			0.0		0.0	0.1		0.0	0.0					0.0		
OA Non-shrimp	22.8	5.9	6.4	3.7	5.1	3.4	4.7	4.0	1.9	0.8	0.1	1.4	0.8	1.3	1.6	1.6	0.3	0.5	2.0	2.0	
OA Shrimp-trawl	0.2	0.0	0.1	0.0	0.0	0.1	0.1	0.0			0.0	0.0			0.0		0.0	0.1			
Total	58.5	24.6	22.8	10.0	11.2	10.2	11.8	11.4	4.0	1.6	2.6	5.4	4.1	5.8	5.2	3.9	2.7	4.1	6.9	5.2	0.0
Canary																					
LE Trawl	494.6	33.4	25.6	25.5	67.8	179.0	153.0	66.9	2.4	0.2	2.1	10.3	10.3	8.9	1.6	0.9	1.8	8.2	11.1	3.5	0.1
LE Fixed-gear	55.4	5.9	5.1	2.0	8.0	24.2	15.4	5.8	0.0	0.2	0.5	2.2	1.3	1.2	0.4	0.6	0.7	1.5	1.3	1.0	
LE Shrimp-trawl	14.2	4.3	0.7		0.9	5.3	4.8	3.3			0.0	0.9	2.7	0.7		0.0	0.0	0.5	0.2	0.0	
OA Non-shrimp	56.6	5.0	2.8	0.4	11.1	19.8	19.0	5.8	0.4	0.3	0.4	1.8	1.2	1.0	0.3	0.2	0.5	1.1	0.7	0.3	
OA Shrimp-trawl	21.3	7.2	2.0		1.2	9.2	7.0	4.0	0.0		0.0	1.6	3.9	1.6			0.1	0.8	1.0	0.0	
Total	642.2	55.8	36.2	28.0	88.9	237.5	199.2	85.8	2.8	0.6	3.0	16.9	19.5	13.5	2.3	1.7	3.1	12.2	14.3	4.8	0.1
Cowcod																					
LE Trawl	3.8	1.4	0.8	0.5	1.2	0.1	0.8	1.2	0.0	0.1	0.2	0.1	0.3	0.3	0.3	0.4	0.2	0.0	0.1	0.1	0.1
LE Fixed-gear	0.3	0.5		0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0						
LE Shrimp-trawl		0.0									0.0	0.0	0.0	0.0							
OA Non-shrimp	2.2	0.4	0.0	0.4	0.8	0.3	0.4	0.0	0.2	0.0	0.0	0.1	0.1	0.1	0.1			0.0			
OA Shrimp-trawl	0.2	0.1		0.0	0.0	0.0	0.1	0.0			0.0	0.0	0.0								
Total	6.5	2.4	0.8	1.0	2.1	0.5	1.4	1.2	0.2	0.2	0.3	0.2	0.8	0.6	0.4	0.4	0.2	0.0	0.1	0.1	0.1
Darkblotched																					
LE Trawl	280.2	216.5	141.0	34.1	56.8	96.1	64.1	26.8	2.3	28.7	25.3	52.5	42.7	41.7	25.7	22.2	24.9	33.8	31.5	26.4	2.4
LE Fixed-gear		1.7	1.8							0.0	0.7	0.3	0.4	0.3	0.0	0.0	0.1	0.0	0.6	1.0	
LE Shrimp-trawl	2.0		0.0		0.0	0.0	1.5	0.4										0.0	0.0		
OA Non-shrimp	0.1	0.5	0.2		0.0		0.0	0.1		0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.1	0.0	0.0		0.1
OA Shrimp-trawl	2.0	0.0	0.0		0.0	0.3	1.3	0.4				0.0						0.0	0.0	0.0	
Total	284.3	218.8	143.1	34.1	56.8	96.5	67.0	27.6	2.3	28.7	26.2	52.9	43.3	42.0	25.8	22.2	25.1	33.8	32.1	27.4	2.4
Lingcod																					
LE Trawl	204.3	61.8	58.5	12.1	30.9	59.2	59.8	32.4	9.9	0.0	0.1	18.3	24.8	18.1	0.5	0.2	0.0	21.1	18.8	18.3	0.1
LE Fixed-gear	33.1	17.2	18.8	2.1	4.4	7.3	12.2	6.6	0.5			4.8	6.4	5.8	0.1		0.0	5.1	7.8	5.8	0.1
LE Shrimp-trawl	14.9	6.4	1.6		1.0	5.8	5.9	2.2				3.6	2.5	0.3				0.9	0.4	0.2	
OA Non-shrimp	84.7	49.0	63.5	0.6	11.7	25.3	34.0	12.7	0.4	0.1	1.1	26.9	20.2	0.6	0.1	0.0	0.0	19.3	25.0	19.0	0.1
OA Shrimp-trawl	17.5	9.1	5.5		0.5	6.1	7.2	3.8				4.8	4.4				0.0	3.2	2.2	0.0	
Total	354.5	143.5	147.8	14.9	48.5	103.6	119.1	57.7	10.8	0.1	1.2	58.3	58.4	24.8	0.7	0.2	0.1	49.6	54.2	43.5	0.2

TABLE 3.5.2-15. Coastwide annual and bi-monthly commercial landings of overfished species by fleet, metric tons 1999-2001. (Page 2 of 2)

Species/Fleet	1999	2000	2001	1999						2000						2001					
	All	All	All	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Pacific Ocean Perch																					
LE Trawl	481.4	139.7	187.5	28.3	75.9	122.6	138.6	88.0	28.0	6.9	6.5	38.8	40.1	35.5	11.9	24.3	22.7	45.5	54.5	40.6	
LE Fixed-gear	0.1	0.7	0.0			0.1						0.5	0.1	0.0				0.0	0.0	0.0	0.0
LE Shrimp-trawl	0.0	0.2	0.0			0.0	0.0	0.0				0.2	0.0	0.0				0.0			
OA Non-shrimp	0.2	0.0	0.0		0.0	0.1	0.0	0.1			0.0		0.0	0.0					0.0		0.0
OA Shrimp-trawl	0.1	0.1	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0			0.0	0.0			
Total	481.8	140.6	187.6	28.3	75.9	122.8	138.6	88.2	28.0	6.9	6.6	39.5	40.3	35.5	11.9	24.3	22.7	45.5	54.5	40.6	0.0
Widow																					
LE Trawl	3,836.3	3,761.8	1,750.4	882.0	843.6	309.0	345.6	694.7	761.5	374.0	487.1	404.6	601.1	1,069.0	826.1	387.9	456.1	189.6	53.6	15.5	647.7
LE Fixed-gear	16.1	5.3	0.5	1.7	1.9	2.4	3.9	5.7	0.4	0.1	0.7	1.8	0.9	1.5	0.3	0.1	0.1	0.0	0.1	0.2	
LE Shrimp-trawl	5.2	1.0	0.5		0.7	1.6	2.3	0.5			0.0	0.2	0.5	0.2			0.0	0.4	0.0	0.0	
OA Non-shrimp	41.4	17.7	13.0	4.5	4.9	2.8	8.4	14.9	5.8	2.0	0.1	1.6	2.7	6.4	4.9	5.1	1.2	1.9	3.1	1.6	0.1
OA Shrimp-trawl	4.6	1.7	0.6		0.5	1.6	1.5	0.9	0.0		0.1	0.7	0.7	0.2			0.2	0.3	0.0		
Total	3,903.5	3,787.5	1,765.0	888.2	851.6	317.6	361.6	716.7	767.7	376.2	487.9	408.9	605.9	1,077.4	831.3	393.2	457.7	192.2	56.8	17.3	647.8
Yelloweye																					
LE Trawl	20.5	1.0	2.2	0.4	1.6	4.3	9.7	4.5	0.0	0.0	0.0	0.2	0.5	0.2	0.0	0.0	0.1	0.5	1.2	0.5	
LE Fixed-gear	47.7	5.0	6.9	0.5	2.5	5.1	34.5	5.1		0.0	0.4	1.3	1.5	1.6	0.1	0.7	1.0	2.0	1.7	1.4	
OA Non-shrimp	15.4	2.9	2.9	0.1	0.6	1.8	10.1	2.6	0.1	0.2	0.1	0.6	1.1	0.6	0.2	0.2	0.5	0.7	1.1	0.5	0.0
Total	83.5	8.9	12.0	1.0	4.7	11.3	54.3	12.2	0.1	0.3	0.6	2.1	3.1	2.5	0.4	0.9	1.6	3.2	4.0	2.3	0.0

TABLE 3.5.2-16. Annual and bi-monthly commercial landings of overfished species by area and fleet, metric tons, 1999-2001. (Page 1 of 6)

Species/Fleet	1999	2000	2001	1999						2000						2001					
	All	All	All	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Bocaccio																					
CA: Ft. Bragg-Avila																					
LE Trawl	30.3	16.1	13.9	5.5	5.1	5.8	6.3	5.6	2.0	0.8	2.3	3.3	2.7	3.8	3.2	2.0	2.2	3.1	3.8	2.7	0.0
LE Fixed-gear	3.6	1.6	1.5	0.3	0.8	0.5	0.6	1.4	0.1	0.0	0.0	0.5	0.5	0.5	0.1	0.3			0.9	0.4	
LE Shrimp-trawl	0.1	0.1	0.0	0.1	0.0			0.0		0.0	0.1		0.0	0.0					0.0		
OA Non-shrimp	19.4	4.9	4.2	2.8	3.9	2.6	4.6	3.7	1.8	0.7	0.0	1.1	0.7	1.2	1.1	1.6	0.0	0.0	1.6	1.0	
OA Shrimp-trawl	0.2	0.0		0.0	0.0	0.1	0.1	0.0				0.0									
Total	53.6	22.8	19.7	8.6	9.8	8.9	11.6	10.8	3.9	1.6	2.4	4.9	3.9	5.6	4.4	3.9	2.2	3.1	6.3	4.1	0.0
CA: S. of Avila																					
LE Fixed-gear	1.3	0.8	0.8	0.3	0.2	0.5	0.1	0.3	0.0		0.1	0.3	0.1	0.1	0.2	0.0	0.1	0.4	0.3	0.1	
LE Shrimp-trawl	0.1			0.1																	
OA Non-shrimp	3.4	1.0	2.2	0.9	1.2	0.8	0.1	0.3	0.1	0.0	0.1	0.2	0.1	0.1	0.5		0.3	0.5	0.3	1.0	
OA Shrimp-trawl	0.0	0.0	0.1	0.0	0.0			0.0			0.0	0.0			0.0		0.0	0.1			
Total	4.9	1.9	3.1	1.3	1.4	1.3	0.2	0.6	0.1	0.0	0.1	0.5	0.2	0.2	0.8	0.0	0.5	0.9	0.7	1.1	
Canary																					
Washington																					
LE Trawl	116.2	6.5	6.1	1.3	6.6	49.0	42.3	16.8	0.2		0.3	1.4	2.0	2.2	0.5	0.3	0.3	1.4	3.1	1.1	
LE Fixed-gear	3.0	1.6	1.2		0.0	0.6	1.4	1.0		0.1	0.2	0.9	0.3	0.1	0.1	0.0	0.1	0.6	0.5	0.1	
LE Shrimp-trawl	0.4	0.4			0.0	0.2	0.2	0.1				0.2	0.1	0.2							
OA Non-shrimp	2.6	0.9	0.3	0.0	0.5	1.6	0.3	0.2			0.0	0.6	0.1	0.1	0.0		0.0	0.3	0.0	0.0	
OA Shrimp-trawl	0.8	0.9	0.3		0.1	0.2	0.4	0.2				0.1	0.2	0.6			0.0	0.2	0.1		
Total	123.1	10.2	7.9	1.3	7.2	51.7	44.5	18.2	0.2	0.1	0.5	3.1	2.7	3.2	0.6	0.3	0.4	2.4	3.6	1.2	
OR: N. of Yachats																					
LE Trawl	218.5	14.2	8.1	6.7	48.9	75.5	55.3	32.0	0.1	0.0	0.2	6.5	3.5	3.5	0.4	0.2	0.6	2.8	3.5	1.0	0.0
LE Fixed-gear	13.2	0.7	0.3		2.0	7.5	3.0	0.7		0.0	0.0	0.4	0.1	0.1			0.0	0.0	0.0	0.2	
LE Shrimp-trawl	5.1	2.1	0.3		0.0	2.2	2.0	0.8				0.6	1.2	0.3			0.0	0.2	0.1		
OA Non-shrimp	18.4	0.9	0.4	0.0	6.7	10.3	1.1	0.3	0.0	0.0	0.1	0.5	0.2	0.1	0.0	0.0	0.0	0.2	0.1	0.0	
OA Shrimp-trawl	17.8	4.8	1.5		0.4	8.5	5.8	3.0	0.0		0.0	1.4	2.5	0.8			0.1	0.6	0.7	0.0	
Total	272.9	22.6	10.5	6.7	58.0	104.1	67.2	36.8	0.1	0.0	0.3	9.5	7.6	4.9	0.4	0.3	0.7	3.8	4.5	1.2	0.0
OR: S. of Yachats																					
LE Trawl	73.9	2.2	3.3	5.5	4.3	38.0	16.5	9.2	0.3	0.0	0.2	0.7	0.4	0.7	0.2	0.1	0.3	1.2	1.2	0.4	
LE Fixed-gear	35.6	3.1	3.5	2.0	5.0	15.2	11.0	2.4	0.0	0.1	0.3	0.7	0.8	0.9	0.2	0.6	0.5	0.9	0.9	0.7	
LE Shrimp-trawl	7.0	1.7	0.3		0.3	2.5	1.9	2.3				0.1	1.5	0.1				0.3	0.0		
OA Non-shrimp	32.9	1.7	1.6	0.2	3.7	7.6	16.2	5.0	0.3	0.0	0.2	0.6	0.5	0.3	0.0	0.1	0.4	0.7	0.3	0.1	
OA Shrimp-trawl	2.1	1.2	0.1		0.6	0.4	0.6	0.6				0.1	0.9	0.2			0.0	0.0	0.0	0.0	
Total	151.6	9.9	8.8	7.7	13.9	63.8	46.1	19.5	0.6	0.1	0.7	2.2	4.1	2.3	0.4	0.8	1.2	3.1	2.5	1.2	

TABLE 3.5.2-16. Annual and bi-monthly commercial landings of overfished species by area and fleet, metric tons, 1999-2001. (Page 2 of 6)

Species/Fleet	1999	2000	2001	1999						2000						2001					
	All	All	All	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
CA: N. of Ft. Bragg																					
LE Trawl	58.3	8.1	5.6	4.8	3.3	9.8	33.6	6.0	0.8	0.0	0.8	1.0	3.9	2.1	0.3	0.1	0.5	2.0	2.4	0.7	
LE Fixed-gear	0.0	0.1	0.1			0.0				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0			
LE Shrimp-trawl	1.4	0.0	0.1		0.2	0.4	0.6	0.1				0.0	0.0	0.0		0.0		0.0	0.0	0.0	
OA Non-shrimp	0.5	0.4	0.2		0.0		0.5	0.0		0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.1	0.1	0.0	0.0	
OA Shrimp-trawl	0.5	0.4	0.2		0.1	0.1	0.2	0.2				0.0	0.3						0.2		
Total	60.8	9.0	6.2	4.8	3.6	10.3	34.9	6.4	0.8	0.0	0.8	1.1	4.4	2.3	0.4	0.1	0.6	2.1	2.6	0.7	
CA: Ft. Bragg-Avila																					
LE Trawl	27.7	2.4	2.4	7.3	4.7	6.7	5.2	2.9	0.9	0.1	0.5	0.6	0.5	0.5	0.2	0.2	0.2	0.8	0.8	0.4	0.0
LE Fixed-gear	3.6	0.5			1.0	0.8	0.1	1.7		0.0	0.0	0.1	0.1	0.1	0.1						
LE Shrimp-trawl	0.4	0.0			0.4		0.0	0.0			0.0										
OA Non-shrimp	2.1	1.1	0.4	0.2	0.2	0.2	1.0	0.4	0.2	0.3	0.0	0.2	0.2	0.3	0.2	0.1			0.2	0.1	
OA Shrimp-trawl	0.1	0.0					0.1					0.0		0.0							
Total	33.8	4.1	2.8	7.5	6.2	7.7	6.3	4.9	1.1	0.4	0.6	0.9	0.9	0.9	0.5	0.2	0.2	0.8	1.0	0.5	0.0
Cowcod																					
CA: Ft. Bragg-Avila																					
LE Trawl	3.8	1.4	0.8	0.5	1.2	0.1	0.8	1.2	0.0	0.1	0.2	0.1	0.3	0.3	0.3	0.4	0.2	0.0	0.1	0.1	0.1
LE Fixed-gear	0.0	0.5					0.0			0.0	0.0	0.0	0.3	0.1	0.0						
LE Shrimp-trawl		0.0									0.0	0.0	0.0	0.0							
OA Non-shrimp	0.4	0.2	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1			0.0			
OA Shrimp-trawl	0.1	0.1		0.0	0.0	0.0	0.1	0.0			0.0	0.0	0.0								
Total	4.3	2.1	0.8	0.5	1.2	0.3	1.0	1.2	0.1	0.2	0.3	0.2	0.7	0.5	0.4	0.4	0.2	0.0	0.1	0.1	0.1
CA: S. of Avila																					
LE Fixed-gear	0.3	0.0		0.1	0.0	0.1	0.1	0.0	0.0		0.0	0.0	0.0	0.0							
OA Non-shrimp	1.8	0.3		0.4	0.8	0.2	0.3	0.0	0.2		0.0	0.1	0.1	0.1	0.0						
OA Shrimp-trawl	0.1						0.1														
Total	2.2	0.3		0.4	0.9	0.2	0.5	0.1	0.2		0.0	0.1	0.1	0.1	0.0						
Darkblotched																					
Washington																					
LE Trawl	10.3	8.6	8.2	1.5	2.6	2.9	2.2	1.0	0.1	0.5	0.7	1.0	3.1	1.8	1.5	0.8	1.2	1.2	1.6	3.3	
LE Fixed-gear			0.0																0.0	0.0	
OA Non-shrimp	0.0	0.0	0.0					0.0					0.0						0.0		
Total	10.3	8.7	8.2	1.5	2.6	2.9	2.2	1.1	0.1	0.5	0.7	1.0	3.2	1.8	1.5	0.8	1.2	1.2	1.6	3.3	
OR: N. of Yachats																					
LE Trawl	68.5	57.1	32.7	1.0	10.0	22.7	28.3	6.3	0.3	6.4	6.7	13.0	9.9	13.5	7.5	5.9	3.9	7.6	8.7	6.7	
LE Fixed-gear		0.1	0.0										0.1	0.0						0.0	
LE Shrimp-trawl	0.2					0.0		0.1													
OA Non-shrimp	0.0						0.0														
OA Shrimp-trawl	1.1		0.0			0.3	0.5	0.3										0.0	0.0	0.0	
Total	69.8	57.2	32.7	1.0	10.0	23.1	28.8	6.6	0.3	6.4	6.7	13.0	9.9	13.6	7.5	5.9	3.9	7.6	8.7	6.7	
OR: S. of Yachats																					
LE Trawl	120.7	53.6	31.0	28.2	27.1	40.9	14.8	8.3	1.4	13.0	7.5	15.8	4.5	8.3	4.5	6.1	6.0	7.0	7.8	3.9	0.1
LE Fixed-gear		0.0	0.2										0.0	0.0		0.0		0.0		0.2	
LE Shrimp-trawl	1.8		0.0		0.0	0.0	1.5	0.3										0.0			
OA Non-shrimp	0.0	0.0	0.1		0.0									0.0			0.1	0.0			
OA Shrimp-trawl	0.9	0.0	0.0		0.0	0.0	0.8	0.1				0.0						0.0			
Total	123.4	53.7	31.3	28.2	27.2	40.9	17.1	8.7	1.4	13.0	7.5	15.8	4.5	8.4	4.5	6.1	6.1	7.1	7.8	4.1	0.1
CA: N. of Ft. Bragg																					

TABLE 3.5.2-16. Annual and bi-monthly commercial landings of overfished species by area and fleet, metric tons, 1999-2001. (Page 3 of 6)

Species/Fleet	1999	2000	2001	1999						2000						2001					
	All	All	All	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
LE Trawl	75.8	59.9	24.9	2.3	17.0	27.4	18.5	10.1	0.4	5.3	6.6	18.6	19.8	8.4	1.0	3.3	6.0	11.2	3.0	1.5	0.0
LE Fixed-gear		0.0	0.1								0.0						0.1	0.0	0.0	0.0	
LE Shrimp-trawl			0.0																0.0		
OA Non-shrimp	0.1	0.2	0.0				0.0	0.0		0.0			0.2						0.0		
OA Shrimp-trawl			0.0															0.0			
Total	75.8	60.1	25.1	2.3	17.0	27.4	18.5	10.1	0.4	5.3	6.7	18.6	20.0	8.4	1.0	3.3	6.1	11.2	3.0	1.5	0.0
CA: Ft. Bragg-Avila																					
LE Trawl	4.9	37.3	44.2	1.1	0.1	2.2	0.3	1.1	0.1	3.5	3.7	4.1	5.3	9.5	11.2	6.1	7.8	6.7	10.4	11.0	2.2
LE Fixed-gear		1.6	1.4							0.0	0.7	0.3	0.3	0.3	0.0				0.6	0.8	
OA Non-shrimp	0.0	0.3	0.1					0.0		0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0		0.0		0.1
Total	5.0	39.2	45.7	1.1	0.1	2.2	0.3	1.1	0.1	3.5	4.5	4.4	5.7	9.9	11.2	6.1	7.8	6.7	11.0	11.8	2.3
Lingcod																					
Washington																					
LE Trawl	21.9	9.1	8.9	1.0	2.7	7.5	8.3	1.6	0.9			3.2	3.2	2.7				3.2	3.1	2.6	
LE Fixed-gear	8.2	4.5	6.1		0.1	2.1	4.8	1.2				1.5	2.1	0.8	0.1			1.6	3.1	1.4	
LE Shrimp-trawl	0.5	0.5	0.0			0.3	0.2	0.0				0.4	0.1					0.0	0.0		
OA Non-shrimp	9.2	10.0	5.0		2.9	3.5	2.0	0.8			1.1	5.9	2.6	0.4	0.0			2.5	1.7	0.8	
OA Shrimp-trawl	1.8	1.8	1.0		0.1	0.3	1.1	0.4				0.9	0.9					0.6	0.5		
Total	41.7	25.9	21.2	1.0	5.8	13.7	16.3	4.1	0.9		1.1	11.8	9.0	3.9	0.1			7.9	8.4	4.8	
OR: N. of Yachats																					
LE Trawl	64.3	16.9	13.4	2.9	14.1	18.9	17.5	9.8	1.1		0.1	3.6	9.5	3.6	0.1	0.0		4.8	5.0	3.6	
LE Fixed-gear	1.6	1.7	3.3		0.0	0.2	1.0	0.5				0.6	1.0	0.1				0.3	1.6	1.4	
LE Shrimp-trawl	3.6	3.9	0.8		0.0	1.7	1.3	0.6				2.1	1.5	0.3				0.5	0.3	0.1	
OA Non-shrimp	9.1	8.0	8.0		1.4	3.2	3.7	0.8				5.6	2.5	0.0				3.9	3.1	1.0	0.0
OA Shrimp-trawl	11.5	6.1	3.9		0.2	4.2	4.6	2.5				3.2	2.9				0.0	2.3	1.6	0.0	
Total	90.1	36.7	29.5	2.9	15.7	28.2	28.0	14.2	1.1		0.1	15.2	17.3	3.9	0.1	0.0	0.0	11.8	11.4	6.2	0.0
OR: S. of Yachats																					
LE Trawl	32.7	8.0	9.2	1.9	4.1	10.5	8.3	5.9	1.9			3.5	1.8	2.5	0.2			3.4	2.6	3.2	
LE Fixed-gear	13.4	6.1	5.8	1.5	3.2	3.3	3.9	1.3	0.1			1.5	1.8	2.7	0.0			2.3	1.7	1.8	
LE Shrimp-trawl	9.8	1.6	0.3		0.9	3.6	3.9	1.4				0.9	0.7					0.0	0.2	0.1	
OA Non-shrimp	24.9	10.9	21.5		3.3	6.7	12.1	2.8	0.0			6.5	4.4	0.0	0.0			10.0	6.0	5.5	
OA Shrimp-trawl	3.0	1.0	0.5		0.2	1.2	1.1	0.6				0.6	0.4					0.3	0.2	0.0	
Total	83.8	27.6	37.3	3.4	11.7	25.3	29.3	12.0	2.1			13.0	9.1	5.3	0.2			16.0	10.6	10.6	
CA: N. of Ft. Bragg																					
LE Trawl	42.2	17.0	16.9	1.6	4.3	13.8	14.0	6.8	1.8			5.1	6.3	5.4	0.1			6.3	5.0	5.6	
LE Fixed-gear	4.4	2.3	1.8	0.0	0.3	1.3	1.3	1.5				0.8	0.6	0.9			0.0	0.8	0.8	0.2	
LE Shrimp-trawl	0.9	0.0	0.3		0.1	0.1	0.6	0.1				0.0		0.0				0.3		0.0	
OA Non-shrimp	10.8	6.9	9.7	0.0	0.5	2.6	5.4	2.3		0.1		3.4	3.4					2.8	3.7	3.2	
OA Shrimp-trawl	0.9	0.2	0.0		0.0	0.4	0.2	0.3				0.1	0.1							0.0	
Total	59.2	26.4	28.6	1.6	5.2	18.1	21.5	11.0	1.8	0.1		9.4	10.5	6.4	0.1		0.0	10.2	9.5	8.9	
CA: Ft. Bragg-Avila																					
LE Trawl	43.3	10.8	10.0	4.8	5.7	8.6	11.7	8.3	4.2	0.0	0.0	2.9	4.0	3.9	0.1	0.2	0.0	3.3	3.0	3.4	0.1
LE Fixed-gear	5.5	2.6	1.8	0.6	0.7	0.4	1.2	2.2	0.3			0.5	0.8	1.3	0.0				0.7	1.0	0.1
LE Shrimp-trawl	0.1	0.3	0.1			0.0	0.0					0.1	0.2					0.1		0.0	
OA Non-shrimp	30.8	13.1	19.3	0.6	3.6	9.4	10.8	5.9	0.4	0.0	0.0	5.5	7.4	0.1	0.1	0.0	0.0	0.2	10.5	8.5	0.0
OA Shrimp-trawl	0.3	0.0	0.0			0.0	0.3					0.0	0.0							0.0	
Total	79.9	26.8	31.2	6.0	10.0	18.4	24.1	16.3	4.9	0.0	0.0	8.9	12.4	5.2	0.2	0.2	0.1	3.6	14.2	13.0	0.2

TABLE 3.5.2-16. Annual and bi-monthly commercial landings of overfished species by area and fleet, metric tons, 1999-2001. (Page 4 of 6)

Species/Fleet	1999	2000	2001	1999						2000						2001					
	All	All	All	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Pacific Ocean Perch																					
Washington																					
LE Trawl	144.8	34.9	50.6	9.1	17.4	40.5	33.5	33.6	10.7	1.3	1.9	11.3	10.7	7.6	2.2	6.4	5.2	10.0	16.2	12.7	
LE Fixed-gear		0.5	0.0									0.5						0.0		0.0	
LE Shrimp-trawl		0.0										0.0									
OA Non-shrimp	0.1	0.0	0.0					0.1					0.0						0.0		
OA Shrimp-trawl	0.0	0.0	0.0				0.0					0.0	0.0				0.0				
Total	144.9	35.5	50.6	9.1	17.4	40.5	33.6	33.7	10.7	1.3	1.9	11.8	10.7	7.6	2.2	6.4	5.2	10.0	16.2	12.7	
OR: N. of Yachats																					
LE Trawl	303.9	95.7	129.8	15.7	48.7	73.1	98.5	52.6	15.1	4.7	3.9	24.0	27.6	26.5	8.9	16.0	15.2	34.1	37.2	27.4	
LE Fixed-gear		0.0	0.0										0.0						0.0	0.0	
LE Shrimp-trawl	0.0	0.0	0.0			0.0	0.0	0.0				0.0	0.0	0.0				0.0			
OA Non-shrimp	0.0						0.0														
OA Shrimp-trawl	0.1	0.1	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0				0.0			
Total	304.0	95.8	129.9	15.7	48.8	73.2	98.5	52.7	15.1	4.7	3.9	24.1	27.7	26.5	8.9	16.0	15.2	34.1	37.2	27.4	
OR: S. of Yachats																					
LE Trawl	21.1	6.0	6.5	3.1	4.2	4.9	5.0	1.7	2.3	0.8	0.2	2.8	0.5	0.8	0.9	1.8	2.1	1.1	1.0	0.4	
LE Fixed-gear	0.1	0.0	0.0			0.1							0.0	0.0							0.0
LE Shrimp-trawl		0.1										0.1									
OA Non-shrimp	0.1	0.0			0.0	0.1					0.0			0.0							
OA Shrimp-trawl		0.0										0.0									
Total	21.3	6.1	6.5	3.1	4.2	5.1	5.0	1.7	2.3	0.8	0.2	2.9	0.5	0.8	0.9	1.8	2.1	1.1	1.0	0.4	0.0

TABLE 3.5.2-16. Annual and bi-monthly commercial landings of overfished species by area and fleet, metric tons, 1999-2001. (Page 5 of 6)

Species/Fleet	1999	2000	2001	1999						2000						2001					
	All	All	All	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
CA: N. of Ft. Bragg																					
LE Trawl	10.6	3.1	0.3	0.4	4.6	4.0	1.5	0.1		0.1	0.5	0.7	1.2	0.6			0.0	0.2	0.1	0.0	
OA Non-shrimp			0.0																0.0		
Total	10.6	3.1	0.4	0.4	4.6	4.0	1.5	0.1		0.1	0.5	0.7	1.2	0.6			0.0	0.2	0.1	0.0	
CA: Ft. Bragg-Avila																					
LE Trawl	1.0		0.3		1.0											0.1	0.2	0.0			
LE Fixed-gear		0.1											0.1								
OA Non-shrimp			0.0																		0.0
Total	1.0	0.1	0.3		1.0								0.1			0.1	0.2	0.0			0.0
Widow																					
Washington																					
LE Trawl	513.4	373.0	289.8	146.0	137.9	29.2	43.1	93.9	63.3	30.6	26.6	13.7	36.6	143.0	122.4	67.7	75.6	17.5	16.5	9.1	103.4
LE Fixed-gear	0.0		0.0				0.0	0.0											0.0		
LE Shrimp-trawl		0.0	0.0										0.0							0.0	
OA Non-shrimp	0.5	0.9	0.0			0.0	0.0	0.2	0.3		0.0	0.4	0.4	0.1				0.0	0.0		
OA Shrimp-trawl	0.0		0.1					0.0									0.1	0.1			
Total	514.0	373.9	289.9	146.0	137.9	29.2	43.2	94.1	63.6	30.6	26.6	14.1	37.1	143.1	122.4	67.7	75.6	17.6	16.5	9.2	103.4
OR: N. of Yachats																					
LE Trawl	2,156.7	2,008.0	846.5	452.6	387.2	137.3	193.9	432.6	553.2	244.9	215.5	230.0	340.1	533.8	443.8	210.2	212.9	85.1	29.1	1.1	308.2
LE Fixed-gear	0.1	0.0	0.0		0.0	0.0	0.1	0.0				0.0	0.0						0.0	0.0	
LE Shrimp-trawl	0.4	0.3	0.1			0.1	0.1	0.2				0.1	0.1	0.2			0.0	0.0	0.0		
OA Non-shrimp	1.4	0.3	0.0		1.2	0.0	0.0	0.2				0.0	0.2	0.0			0.0				
OA Shrimp-trawl	2.3	1.0	0.4		0.4	0.5	0.6	0.8			0.0	0.6	0.3	0.1			0.2	0.2	0.0		
Total	2,161.0	2,009.6	847.1	452.6	388.7	137.9	194.8	433.8	553.2	244.9	215.5	230.7	340.8	534.0	443.8	210.2	213.0	85.3	29.2	1.1	308.2
OR: S. of Yachats																					
LE Trawl	583.8	698.1	296.1	146.0	171.8	78.1	47.7	82.5	57.7	43.5	121.7	87.3	108.5	172.7	164.4	55.0	88.3	28.8	3.4	0.5	120.1
LE Fixed-gear	9.0	1.0	0.3	1.1	0.7	2.1	3.3	1.9		0.1	0.7	0.2		0.0	0.0	0.1	0.1	0.0	0.0	0.0	
LE Shrimp-trawl	1.9	0.5	0.1		0.3	0.7	0.6	0.3				0.1	0.3	0.1				0.1			
OA Non-shrimp	4.2	1.2	0.5		1.4	0.9	1.2	0.7			0.1	0.5	0.0	0.6	0.0	0.2	0.2	0.0	0.0	0.0	
OA Shrimp-trawl	0.9	0.4	0.0		0.1	0.1	0.5	0.1				0.0	0.2	0.2			0.0	0.0	0.0		
Total	599.8	701.1	296.9	147.1	174.3	81.8	53.4	85.5	57.7	43.6	122.4	88.1	109.0	173.6	164.4	55.3	88.5	29.0	3.4	0.5	120.1
CA: N. of Ft. Bragg																					
LE Trawl	221.5	413.3	255.9	57.2	53.3	42.4	34.0	20.5	14.1	13.6	64.8	26.8	81.5	165.4	61.3	38.3	77.9	44.7	1.7	0.4	92.8
LE Fixed-gear	0.7	2.7		0.1		0.1	0.5	0.1				1.3	0.1	1.2	0.0						
LE Shrimp-trawl	2.8	0.1	0.3		0.4	0.9	1.5	0.0				0.0	0.1					0.3			
OA Non-shrimp	2.0	2.4	1.1	0.0	0.2	0.2	0.7	0.9	0.0	0.0	0.0	0.2	1.0	1.2	0.1	0.0	0.1	0.9	0.1	0.1	0.0
OA Shrimp-trawl	1.4	0.2	0.0		0.0	1.0	0.3	0.0				0.1	0.1					0.0			
Total	228.4	418.7	257.3	57.3	53.9	44.6	37.0	21.6	14.2	13.7	64.8	28.4	82.8	167.7	61.3	38.3	78.0	45.9	1.8	0.5	92.8

TABLE 3.5.2-16. Annual and bi-monthly commercial landings of overfished species by area and fleet, metric tons, 1999-2001. (Page 6 of 6)

Species/Fleet	1999	2000	2001	1999						2000						2001					
	All	All	All	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
CA: Ft. Bragg-Avila																					
LE Trawl	360.8	269.5	62.2	80.2	93.5	22.1	26.8	65.1	73.1	41.4	58.6	46.6	34.5	54.1	34.3	16.8	1.5	13.5	2.8	4.4	23.1
LE Fixed-gear	6.2	1.7	0.2	0.6	1.2	0.3	0.1	3.7	0.4	0.0		0.3	0.7	0.3	0.3	0.0			0.1	0.2	
LE Shrimp-trawl	0.0	0.0			0.0			0.0			0.0			0.0							
OA Non-shrimp	33.2	12.8	11.4	4.5	2.1	1.7	6.5	13.0	5.5	2.0		0.5	1.0	4.5	4.8	4.9	1.0	0.9	3.0	1.5	0.1
OA Shrimp-trawl	0.0	0.1					0.0		0.0		0.0	0.0	0.1								
Total	400.3	284.1	73.8	85.3	96.8	24.0	33.3	81.8	79.0	43.4	58.7	47.5	36.3	58.9	39.4	21.7	2.5	14.4	5.9	6.0	23.2
Yelloweye																					
Washington																					
LE Trawl	9.9	0.2	0.8	0.3	0.3	0.9	4.7	3.8			0.0	0.1	0.0	0.0			0.0	0.0	0.5	0.3	
OA Non-shrimp	0.0	0.0						0.0					0.0								
Total	9.9	0.2	0.8	0.3	0.3	0.9	4.7	3.8			0.0	0.1	0.0	0.0			0.0	0.0	0.5	0.3	
OR: N. of Yachats																					
LE Trawl	1.2		0.2	0.0	0.2	0.4	0.4	0.2	0.0								0.0	0.0	0.1	0.0	
LE Fixed-gear	17.2				0.3	0.9	14.2	1.8													
OA Non-shrimp	1.1				0.3	0.5	0.1	0.1	0.0												
Total	19.5		0.2	0.0	0.8	1.8	14.7	2.1	0.0								0.0	0.0	0.1	0.0	
OR: S. of Yachats																					
LE Trawl	1.5	0.1	0.4	0.0	0.2	1.1	0.1	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.1	0.2	0.1	0.1	
LE Fixed-gear	26.4	3.3	5.2	0.2	1.9	3.8	19.3	1.2			0.3	0.9	1.2	0.9		0.6	0.7	1.4	1.2	1.3	
OA Non-shrimp	9.0	0.9	1.1		0.1	0.6	6.7	1.5	0.0		0.0	0.2	0.4	0.2		0.1	0.2	0.2	0.3	0.2	
Total	36.9	4.3	6.6	0.2	2.3	5.6	26.0	2.8	0.1		0.4	1.2	1.7	1.1	0.0	0.8	0.9	1.7	1.7	1.6	
CA: N. of Ft. Bragg																					
LE Trawl	6.7	0.7	0.8	0.0	0.0	1.7	4.5	0.5			0.0	0.0	0.4	0.2	0.0	0.0		0.3	0.4	0.1	
LE Fixed-gear	1.7	1.0	1.5		0.2	0.4	0.6	0.6		0.0	0.1	0.3	0.1	0.5		0.1	0.3	0.6	0.5	0.1	
OA Non-shrimp	3.7	1.3	1.7		0.0	0.5	2.3	0.8	0.0	0.1	0.1	0.3	0.5	0.3	0.1	0.0	0.3	0.5	0.6	0.2	
Total	12.1	3.0	4.0	0.0	0.2	2.6	7.4	1.9	0.0	0.1	0.1	0.7	1.0	1.0	0.1	0.1	0.6	1.4	1.5	0.3	
CA: Ft. Bragg-Avila																					
LE Trawl	1.2	0.1	0.1	0.0	0.9	0.2	0.1	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0		
LE Fixed-gear	2.3	0.6	0.2	0.4	0.1	0.0	0.4	1.5		0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.1		0.0	0.0	
OA Non-shrimp	1.6	0.7	0.2	0.1	0.2	0.2	1.0	0.1	0.0	0.2	0.0	0.1	0.2	0.1	0.1	0.0			0.1	0.1	0.0
Total	5.1	1.4	0.4	0.5	1.1	0.4	1.5	1.6	0.0	0.2	0.0	0.1	0.3	0.5	0.3	0.1	0.1	0.0	0.2	0.1	0.0

TABLE 3.5.2-17. Recreational catch of overfished groundfish, 1999-2001 (landed catch in mt). (Page 1 of 1)

Year/Species	S. California	N. California	Oregon	Washington	Total
1999					
Bocaccio	71	53	N/A	N/A	124
Canary	2	63	43	4	112
Cowcod	4	2	-	-	6
Widow	<0.1	30	2	-	32
Yelloweye	2	11	27	18	58
Lingcod	30	306	112	34	482
2000					
Bocaccio	52	59	N/A	N/A	111
Canary	<0.1	77	31	3	111
Cowcod	4	2	-	-	6
Widow	<0.1	12	15	-	27
Yelloweye	-	8	10	9	27
Lingcod	5	175	124	31	335
2001					
Bocaccio	60	49	N/A	N/A	109
Canary	-	33	16	3	52
Cowcod	N/A	N/A	N/A	N/A	N/A
Widow	<0.1	9	1	-	10
Yelloweye	-	5	3	20	28
Lingcod	23	130	111	32	296

TABLE 3.5.2-18. Bycatch rates of overfished species observed by sector and year in the whiting fishery, 1998-2003. (Page 1 of 2)

	1998		1999		2000		2001		2002		2003 [a/]		Average 98-03	
Species	Catch	Bycatch Rate	Catch	Bycatch Rate	Catch	Bycatch Rate	Catch	Bycatch Rate	Catch	Bycatch Rate	Catch	Bycatch Rate	Catch	Bycatch Rate [b/]
Tribal														
Whiting	24,509		25,846		6,251		6,080		21,793		19,371		17,308	
Yellowtail	158.91	0.6484%	450.94	1.7447%	99.89	1.5980%	86.98	1.4306%	176.45	0.8097%	34.15	0.1763%	167.89	1.0679%
Widow	14.47	0.0590%	36.76	0.1422%	9.81	0.1569%	3.28	0.0539%	19.06	0.0875%	2.16	0.0111%	14.26	0.0851%
Canary	2.76	0.0113%	4.42	0.0171%	0.93	0.0149%	2.44	0.0401%	2.83	0.0130%	0.67	0.0035%	2.34	0.0166%
Darkblotched	0.01	0.0000%	0	0.0000%	0	0.0000%	0	0.0000%	0.07	0.0003%	0.02	0.0001%	0.02	0.0001%
POP	0.4	0.0016%	1.24	0.0048%	0.03	0.0005%	0.72	0.0118%	0.21	0.0010%	1.09	0.0056%	0.62	0.0042%
Lingcod	0.33	0.0013%	0.19	0.0007%	0.06	0.0010%	0.35	0.0058%	0.23	0.0011%	0.05	0.0003%	0.20	0.0017%
Motherships														
Whiting	50,087		47,580		46,840		35,823		26,593		26,021		38,824	
Yellowtail	313.26	0.6254%	253.26	0.5323%	285.54	0.6096%	91.82	0.2563%	1.42	0.0053%	0.57	0.0022%	157.65	0.3385%
Widow	171.84	0.3431%	47.7	0.1003%	150.65	0.3216%	29.19	0.0815%	20.5	0.0771%	0.69	0.0026%	70.09	0.1544%
Canary	2.46	0.0049%	0.19	0.0004%	0.56	0.0012%	0.95	0.0027%	0.81	0.0030%	0.08	0.0003%	0.84	0.0021%
Darkblotched	11.27	0.0225%	4.84	0.0102%	5.15	0.0110%	0.57	0.0016%	0.93	0.0035%	0.10	0.0004%	3.81	0.0082%
POP	6.50	0.0130%	4.44	0.0093%	3.03	0.0065%	0.05	0.0001%	2.17	0.0082%	0.10	0.0004%	2.71	0.0062%
Lingcod	0.11	0.0002%	0.39	0.0008%	0.25	0.0005%	0.48	0.0013%	0.11	0.0004%	0.09	0.0004%	0.24	0.0006%
Catcher-Processors														
Whiting	70,379		67,679		67,815		58,628		36,341		36,953		56,299	
Yellowtail	63.72	0.0905%	430.87	0.6366%	270.02	0.3982%	33.16	0.0566%	12.86	0.0354%	1.70	0.0046%	135.39	0.2036%
Widow	120.92	0.1718%	101.25	0.1496%	69.97	0.1032%	139.71	0.2383%	115.1	0.3167%	11.48	0.0311%	93.07	0.1684%
Canary	0.25	0.0004%	1.03	0.0015%	0.86	0.0013%	0.65	0.0011%	1.59	0.0044%	0.17	0.0005%	0.76	0.0015%
Darkblotched	6.94	0.0099%	6.94	0.0103%	3.81	0.0056%	11.5	0.0196%	2.19	0.0060%	4.14	0.0112%	5.92	0.0104%
POP	14.78	0.0210%	9.71	0.0143%	6.57	0.0097%	19.69	0.0336%	1.45	0.0040%	5.02	0.0136%	9.54	0.0160%
Lingcod	0.00	0.0000%	0.02	0.0000%	0.16	0.0002%	0.18	0.0003%	0.16	0.0004%	0.40	0.0011%	0.15	0.0003%

TABLE 3.5.2-18. Bycatch rates of overfished species observed by sector and year in the whiting fishery, 1998-2003. (Page 2 of 2)

	1998		1999		2000		2001		2002		2003 [a/]		Average 98-03	
Species	Catch	Bycatch Rate	Catch	Bycatch Rate	Catch	Bycatch Rate	Catch	Bycatch Rate	Catch	Bycatch Rate	Catch	Bycatch Rate	Catch	Bycatch Rate [b/]
Shoreside														
Whiting	87,626		83,272		85,652		73,326		45,276		50,965		71,019	
Yellowtail	501.06	0.5718%	481.39	0.5781%	189.81	0.2216%	95.86	0.1307%	41.37	0.0914%	48.60	0.0954%	226.35	0.2815%
Widow	366	0.4177%	192	0.2306%	76	0.0887%	42	0.0573%	5.32	0.0117%	8.97	0.0198%	115.05	0.1373%
Canary	0.38	0.0004%	0.61	0.0007%	0.52	0.0006%	0.45	0.0006%	0.21	0.0005%	0.11	0.0002%	0.38	0.0005%
Darkblotched	3.97	0.0045%	0.42	0.0005%	1.21	0.0014%	0.81	0.0011%	0.00	0.0000%	0.26	0.0005%	1.11	0.0013%
POP	27.26	0.0311%	7.47	0.0090%	0.22	0.0003%	0.04	0.0001%	0.22	0.0005%	0.30	0.0006%	5.92	0.0069%
Lingcod	0.44	0.0005%	0.61	0.0007%	0.83	0.0010%	0.76	0.0010%	0.22	0.0005%	0.40	0.0008%	0.54	0.0008%
Yelloweye	0.05	0.0001%	0.02	0.0000%	0.00	0.0000%	0.00	0.0000%	0.00	0.0000%	0.00	0.0000%	0.01	0.0000%
Total All Sectors														
Whiting	232,601		224,377		206,558		173,857		130,004		133,310		183,451.10	
Yellowtail	1,036.95	0.4458%	1,616.46	0.7204%	845.26	0.4092%	307.82	0.1771%	232.10	0.1785%	85.02	0.0638%	687.27	0.3746%
Widow	673.23	0.2894%	377.71	0.1683%	306.43	0.1484%	214.18	0.1232%	159.98	0.1231%	23.30	0.0175%	292.47	0.1450%
Canary	5.85	0.0025%	6.25	0.0028%	2.87	0.0014%	4.49	0.0026%	5.44	0.0042%	1.03	0.0008%	4.32	0.0024%
Darkblotched	22.19	0.0095%	12.20	0.0054%	10.17	0.0049%	12.88	0.0074%	3.19	0.0025%	4.53	0.0034%	10.86	0.0055%
POP	48.94	0.0210%	22.86	0.0102%	9.85	0.0048%	20.50	0.0118%	4.05	0.0031%	6.51	0.0049%	18.78	0.0093%
Lingcod	0.88	0.0004%	1.21	0.0005%	1.30	0.0006%	1.77	0.0010%	0.72	0.0006%	0.95	0.0007%	1.14	0.0006%
Yelloweye	0.05	0.0000%	0.02	0.0000%	0.00	0.0000%	0.00	0.0000%	0.00	0.0000%	0.00	0.0000%	0.01	0.0000%

a/ Preliminary. Catch estimates for the at-sea sector through September 25, 2003. These data incomplete since all at-sea sectors still fishing after this date.
b/ Average bycatch rates calculated using average annual bycatch rates in 1998-2003.

TABLE 3.5.2-19. Landings (mt) of target species and estimated discard mortality (mt) of overfished West Coast groundfish species in incidental open access fisheries in 2001. (Page 1 of 1)

Fishery	Total Target Species	Total GF	Total RF	Bocaccio	Canary	Cowcod	Dark-blotched	Lingcod	POP	Whiting	Widow	Yellow-eye
North of 40°10' N latitude												
Dungeness Crab	10,090			NA		NA						
Pacific Halibut	149			NA		NA						
Pink Shrimp	17,482			NA		NA						
Salmon Troll	1,788			NA	0.79	NA	UR	UR	UR	UR	0.11	0.10
Spot Prawn (trawl)	TR	UR	UR	NA	UR	NA	UR	UR	UR	UR	UR	UR
Spot Prawn (trap)	TR	UR	UR	NA	UR	NA	UR	UR	UR	UR	UR	UR
South of 40°10' N latitude												
CA Halibut	241	293.42	40.97	1.84	0.22	UR	0.70	UR	UR	UR	0.35	UR
CPS- squid	85,929											
CPS- wetfish	81,549											
Dungeness Crab	842											
Gillnet Complex	264											
HMS	6,072											
Pink shrimp	113	1.65	1.19	0.03	0.02	UR	0.02	UR	UR	UR	TR	UR
Ridgeback prawn	161	2.71	0.21	0.07	UR	UR	UR	UR	UR	UR	UR	UR
Salmon troll	1,192			0.01	0.05	UR	UR	0.25	UR	UR	0.01	0.01
Sea Cucumber	323	0.60	0.10	0.00	0.00	0.00	0.00	UR	UR	UR	UR	UR
Spot Prawn (trawl)	91	50.84	7.97	4.58	TR	1.07	0.68	14.86	UR	214.68	2.27	0.03
Spot Prawn (trap)	95			0.26	UR	0.17	TR	11.30	UR	UR	TR	TR

TR- Trace amount (<0.01 mt); NA- Not applicable, UR- Unreported

TABLE 3.5.2-20. Incidental overfished groundfish landings (lbs) in non-Indian commercial salmon troll fisheries by salmon management area for 2000 and 2001. [a/] (Page 1 of 1)

Port Area/Year	Species						All
	Lingcod	Bocaccio	Canary	Darkblotched	Widow	Yelloweye[b/]	Groundfish [c/]
Neah Bay-La Push							
2000	NA	NA	469	NA	65	205	5,788
2001	NA	NA	175	NA	40	101	5,900
Westport-Astoria							
2000	NA	NA	119	NA	15	-	2,399
2001	NA	NA	97	NA	-	-	835
Central Oregon							
2000	NA	NA	2,332	NA	102	132	18,250
2001	NA	NA	1,264	NA	136	99	18,274
Oregon KMZ							
2000	NA	NA	167	NA	9	4	1,693
2001	NA	NA	185	NA	70	9	1,867
California KMZ							
2000	-	NA	-	-	-	-	249
2001	40	NA	-	-	-	-	64
Fort Bragg							
2000	50	12	91	-	-	NA	711
2001	121	9	61	-	22	NA	470
San Francisco							
2000	455	106	115	-	6	NA	2,971
2001	439	2	51	-	-	NA	807
Monterey-Conception							
2000	183	311	65	-	-	NA	2,308
2001	-	16	8	-	-	NA	166
Total							
2000	688	429	3,357	-	197	341	34,369
2001	600	27	1,841	-	268	209	28,382
Total (mt)							
2000	0.31	0.20	1.53	0.00	0.09	0.16	15.62
2001	0.27	0.01	0.84	0.00	0.12	0.10	12.90

a/ Salmon troll landings are defined as those for which salmon represents at least 50% by weight of the total ticketed landing. N/A indicates that individual species estimates were not made. Data from PacFIN.

b/ Yelloweye rockfish were not separated on landing tickets, so a proxy of shelf rockfish with an exvessel value of >$1.00/lb was used for areas north of Cape Mendocino. For areas south of Cape Mendocino yelloweye catch was not estimated, however landings are assumed negligible because of species distribution, the absence of commercial landings in the area between Cape Mendocino and the Oregon/California border, and the scarcity of recreational landings in California.

c/ All Groundfish category includes species where individual estimates were not available.

TABLE 3.5.2-21. Expanded logbook data from the sea cucumber trawl fishery, by depth strata, 1996-2000 (includes overfished species bycatch). (Page 1 of 1)

Depth strata	Number of boats					Pounds targeted spp landed				
	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
#20 fm	5	1	1	3	0	1,504	810	2,061	2,129	0
#50 fm	15	7	16	12	9	120,001	60,630	134,149	104,345	57,495
>20 - #150 fm	16	9	21	13	12	221,305	60,004	162,507	148,066	59,585
>50 - #150 fm	13	2	14	10	7	102,808	184	30,419	45,850	2,090
>150 fm	0	0	2	1	0	0	0	2,745	235	0
0 or no depths	5	0	2	5	1	317	0	562	1,899	0
	Total hours					Fleet average CPUE for targeted spp				
	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
#20 fm	37.6	4.7	34.6	11	0	33.7	173.5	43.3	19.2	0
#50 fm	1054.1	369.5	1557.2	1026	426	112.8	180.8	109.2	102.7	134.1
>20 - #150 fm	1875.6	395.7	2137.4	1857.9	582.8	113.7	141.8	108.4	95.1	100.5
>50 - #150 fm	859.2	30.8	614.8	824.9	156.8	91.8	5	53.1	40.5	41.7
>150 fm	0	0	78.4	17.8	0	0	0	33.1	13.2	0
	Pounds bycatch of bocaccio					Pounds bycatch of canary rockfish				
	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
#20 fm	0	0	0	0	0	0	0	0	0	0
#50 fm	0	0	0	0	0	0	0	0	0	0
>20 - #150 fm	10	0	0	20	0	0	0	0	0	0
>50 - #150 fm	10	0	0	20	0	0	0	0	0	0
>150 fm	0	0	0	0	0	0	0	0	0	0
	Pounds bycatch of cowcod					Pounds bycatch of yelloweye rockfish				
	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
#20 fm	0	0	0	0	0	0	0	0	0	0
#50 fm	0	0	0	0	0	0	0	0	0	0
>20 - #150 fm	0	0	0	0	0	0	0	0	0	0
>50 - #150 fm	0	0	0	0	0	0	0	0	0	0
>150 fm	0	0	0	0	0	0	0	0	0	0
	Pounds bycatch of lingcod					Pounds bycatch of unspecified rockfish				
	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
#20 fm	0	0	0	0	0	30	0	0	0	0
#50 fm	52	0	0	0	0	2341	0	168	325	16
>20 - #150 fm	82	0	0	0	0	3824	0	207	390	16
>50 - #150 fm	30	0	0	0	0	1513	0	39	65	0
>150 fm	0	0	0	0	0	0	0	0	0	0
	Pounds bycatch of CA halibut					Bycatch rate (lbs bocaccio/lbs target spp)				
	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
#20 fm	502	74	93	0	0	0	0	0	0	0
#50 fm	3461	1081	4518	195	262	0	0	0	0	0
>20 - #150 fm	3783	1007	5458	368	262	tr	0	0	tr	0
>50 - #150 fm	824	0	1033	173	0	tr	0	0	tr	0
>150 fm	0	0	367	0	0		0	0	0	0
0 or no depths			33							
	Bycatch rate (lbs canary/lbs target spp)					Bycatch rate (lbs cowcod/lbs target spp)				
	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
#20 fm	0	0	0	0	0	0	0	0	0	0
#50 fm	0	0	0	0	0	0	0	0	0	0
>20 - #150 fm	0	0	0	0	0	0	0	0	0	0
>50 - #150 fm	0	0	0	0	0	0	0	0	0	0
>150 fm	0	0	0	0	0	0	0	0	0	0

TABLE 3.5.2-22. Expanded logbook data from the spot prawn trawl and trap fisheries south of Cape Mendocino, by depth strata, 1996-2000 (includes overfished species bycatch). (Page 1 of 1)

Trawls

Depth strata	Number of boats					Pounds targeted spp landed				
	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
#20 fm	0	0	0	2	0	0	0	0	160	0
#50 fm	1	1	0	4	2	0	0	0	225	15
>20 - #150 fm	18	29	28	26	18	213468	278113	275377	221878	100447
>50 - #150 fm	18	29	28	26	18	213468	278113	275377	221813	100432
>150 fm	14	26	21	21	10	12689	102278	181914	87947	17904

	Total hours					Fleet average CPUE for targeted spp				
	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
#20 fm	0.0	0.0	0.0	7.1	0.0	0.0	0.0	0.0	19.2	0.0
#50 fm	1.0	5.5	0.0	12.1	1.8	0.0	0.0	0.0	11.1	8.6
>20 - #150 fm	4953.0	6021.2	6611.9	7542.5	3355.6	44.1	44.1	35.8	37.9	31.4
>50 - #150 fm	4952.0	6015.7	6611.9	7537.5	3353.8	49.2	44.1	35.8	37.9	31.4
>150 fm	234.3	1793.2	3797.3	2582.5	556.8	38.4	48.0	46.9	32.7	33.5

Traps

Depth strata	Number of boats					Pounds targeted spp landed				
	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
>50 - #150 fm	22	26	29	33	32	83845	122184	180730	165500	134251
>150 fm	6	4	13	8	9	5560	5793	13331	23104	10898

	Trap days					Fleet average CPUE for targeted spp				
	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
>50 - #150 fm	309762	377167	647690	941967	791121	0.265	0.397	0.359	0.237	0.525
>150 fm	27554	32627	76256	122231	71454	8.038	0.267	0.343	0.285	0.207

TABLE 3.5.2-23. Estimated bycatch of overfished groundfish species in spot prawn trawl and trap fisheries south of Cape Mendocino. Estimates from Reilly and Geibel (2002) for the October 2000-September 2001 period. (Page 1 of 1)

Species	Pounds of Bycatch/1,000 Pounds of Prawns	Estimated Total Catch (lbs)
	Trawls	
South of Pt. Conception		
Bocaccio	0.8	1,223
Cowcod	< 0.1	62
Darkblotched	0.2	249
Pacific Whiting	4,569	209,260
North of Pt. Conception		
Bocaccio	31.11	4,381
Canary	0.32	45
Cowcod	6.95	978
Darkblotched	99.86	14,060
Lingcod	212.63	29,938
Pacific Whiting	1,741	267,813
Widow	33.03	4,651
Yelloweye	0.64	90
	Traps	
South of Pt. Conception		
Bocaccio	4.0	574
Cowcod	3.0	370
Lingcod	37.0	4,982
North of Pt. Conception		
Cowcod	0.20	5
Darkblotched	0.10	2
Lingcod	4.40	104
Widow	0.30	7
Yelloweye	0.60	15

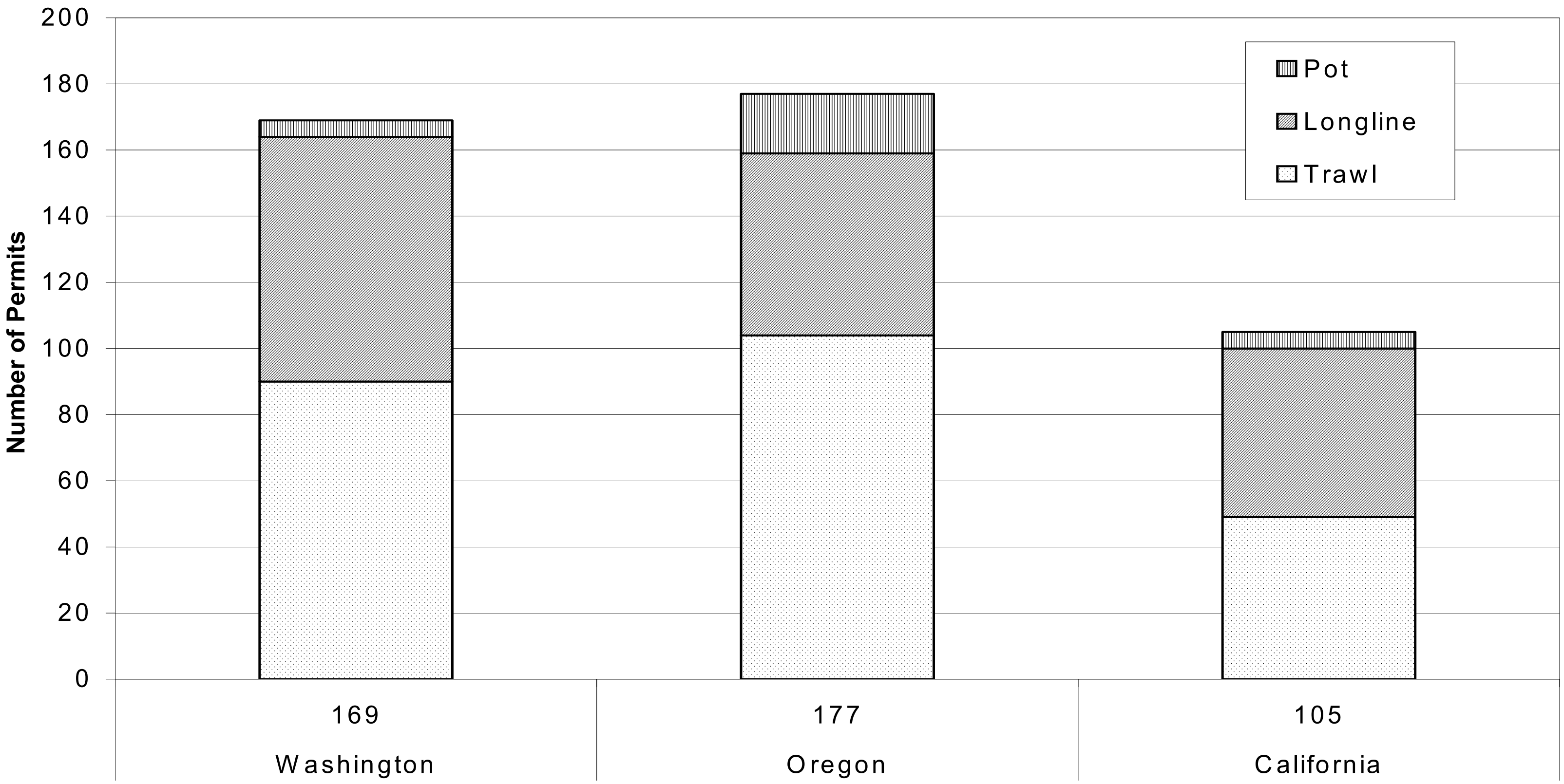

FIGURE 3.5.2-1. Limited Entry Permits, by State and Gear

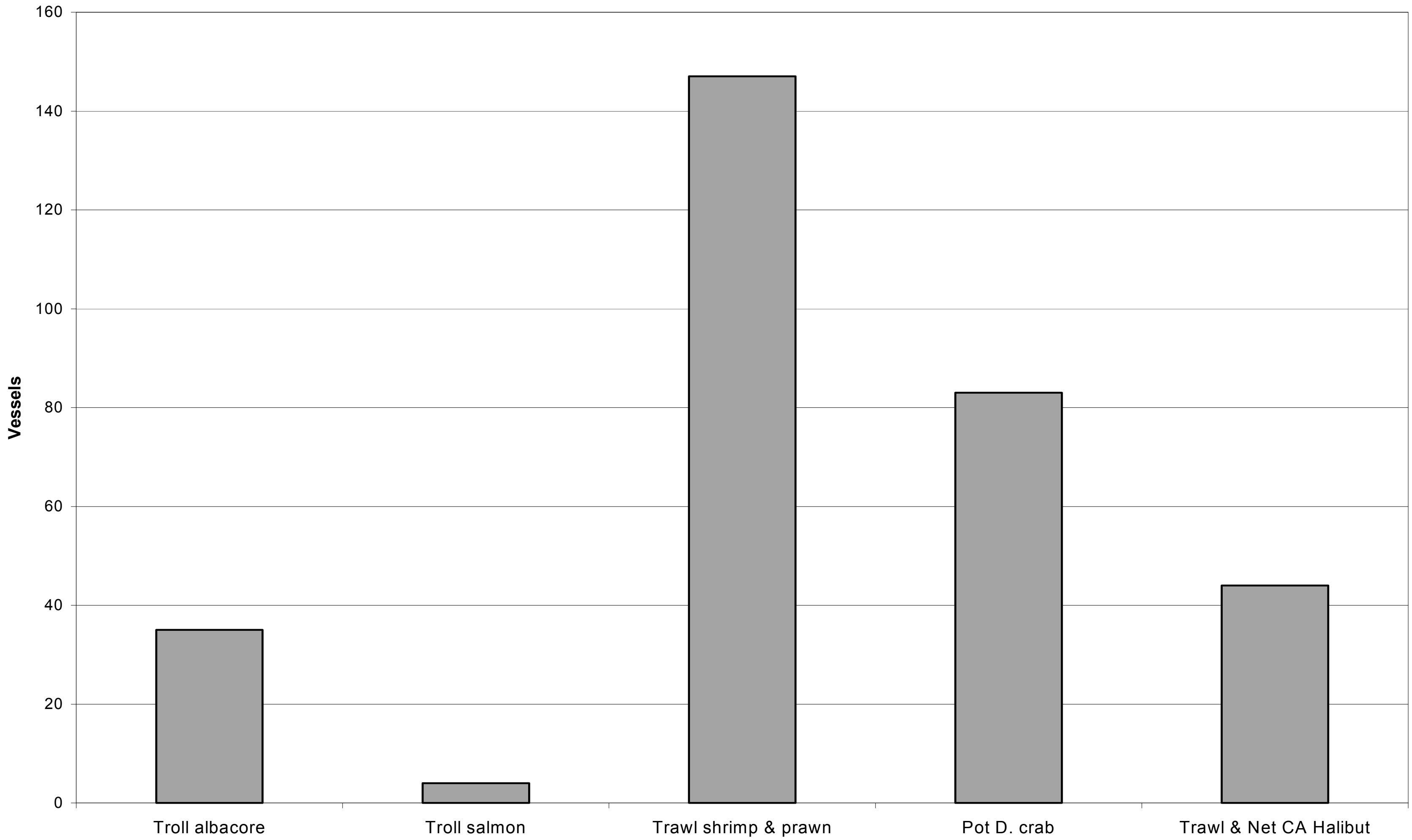

FIGURE 3..5.2-2a. Groundfish trawl vessel participation in nongroundfish fisheries.

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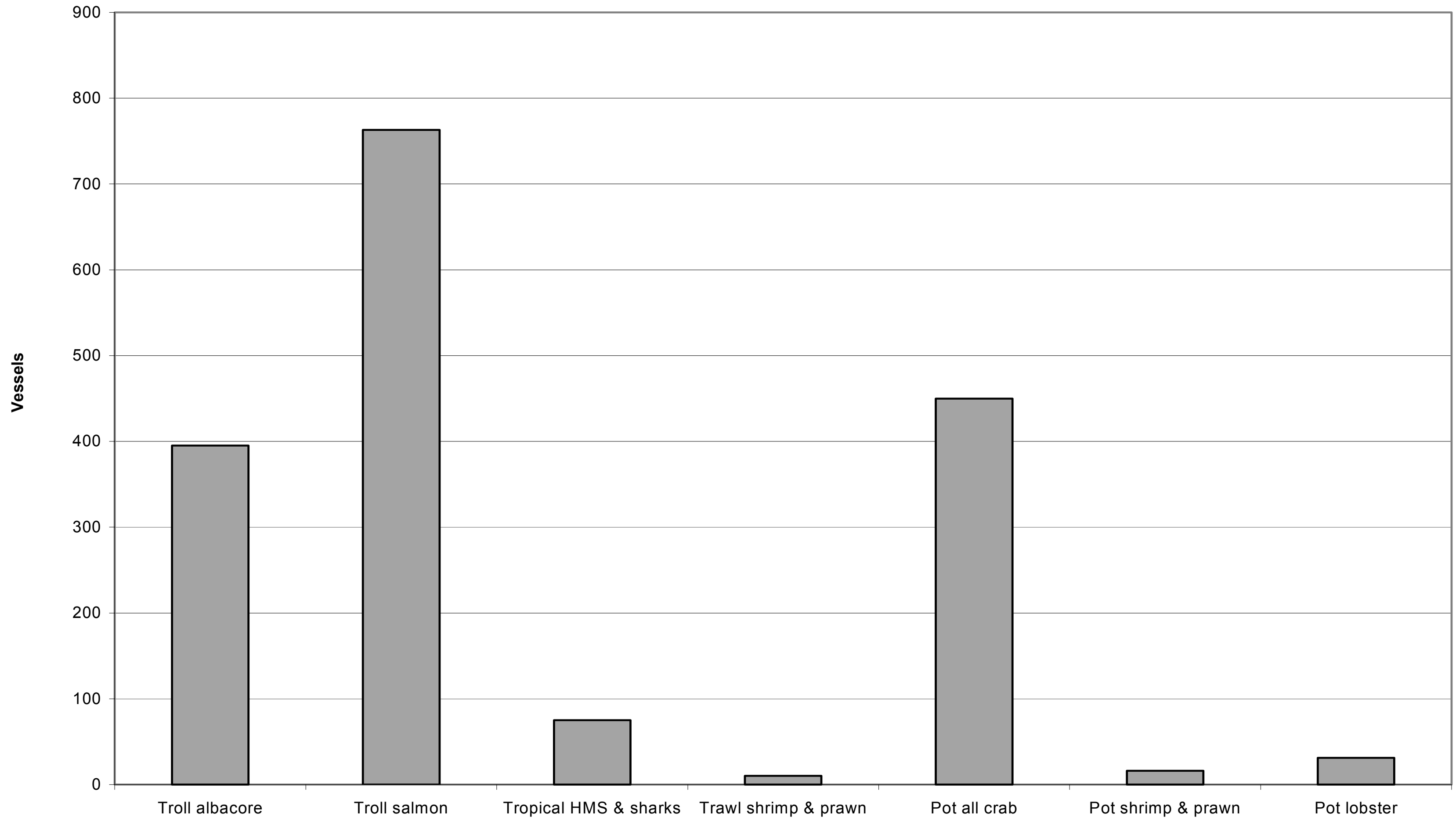

IGURE 3.5.2-2b. Groundfish hook-and-line (includes open access) vessel participation in nongroundfish fisheries.

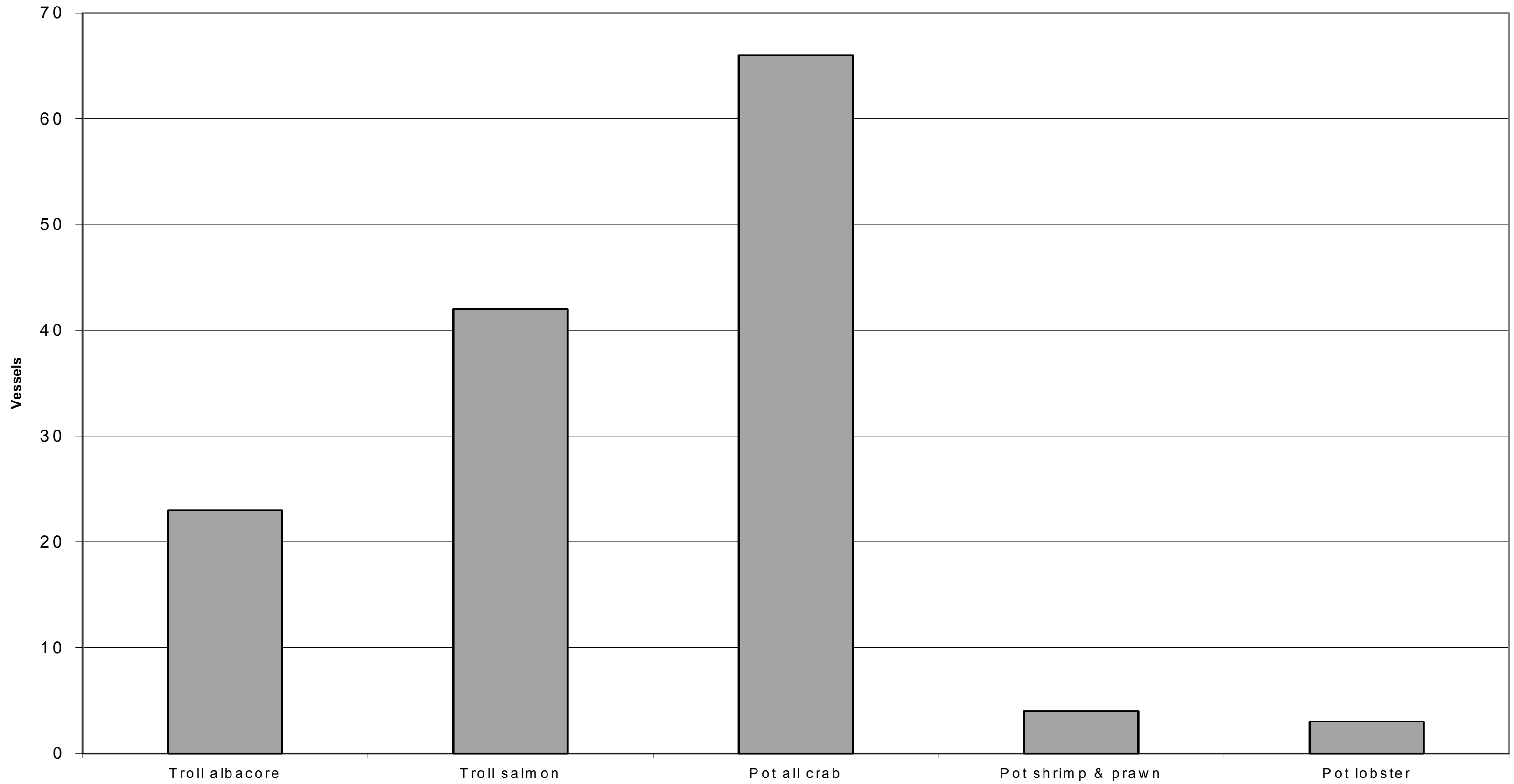

FIGURE 3.5.2-2c. Groundfish pot (including open access) vessel participation in nongroundfish fisheries.

3.5.3 Buyers, Processors, and Seafood Markets

The seafood distribution chain begins with deliveries by the harvesters (exvessel landings) to the shoreside networks of buyers and processors, and includes the linkage between buyers and processors and seafood markets. In addition to shoreside activities, processing of certain species (e.g. Pacific whiting and pollock) also occurs offshore on factory ships.

3.5.3.1 Buyers and Processors

Several thousand entities have permits to buy fish on the West Coast. Of these 1,780[17/] purchased fish caught in the ocean area and landed on Washington, Oregon, or California state fishtickets in the year 2000 (excluding tribal catch) and 732 purchased groundfish (Table 3.5.3-1).[18/]

Larger buyers tend to handle groundfish more than smaller buyers. Of the 546 buyers purchasing in excess of $20,000 of West Coast landings, 59% bought groundfish. These 546 buyers bought 99% of all Council-managed groundfish (Table 3.5.3-2). Of the 1,234 buyers purchasing less than $20,000 from West Coast vessels, only 33% bought groundfish.

The number of buyers handling groundfish from trawl vessels is substantially lower than those handling groundfish. Only 17% (125) of all groundfish buyers handled fish from trawl vessels (Table 3.5.3-3). These 125 represent only 7% of all buyers. Buyers of trawl-caught groundfish are important to nontrawl vessels as well, handling 60% (by value) of the groundfish caught by nontrawl vessels.

The largest buyers tend to handle trawl vessels more than smaller buyers. Of the 38 largest buyers of groundfish (those with purchases in excess of $1 million), 73% (28) bought from trawl vessels (Table 3.5.3-1). Seventy-eight percent of all groundfish purchases from trawl vessels go to these 28 buyers (Table 3.5.3-3). These 28 buyers also handle 39% of the exvessel value of the nontrawl purchases. Mid-size buyers tend to have greater importance for nontrawl vessels than for trawl vessels. Fifty percent of all nontrawl sales went to buyers with total purchases of between $20 thousand and $1 million, as compared to 22% for trawl vessels (Table 3.5.3-3).

Absent data on processor revenue and costs, gross exvessel value of purchases is used as a rough indicator of processor dependence on groundfish purchases. Large buyers of groundfish tend to have a lesser percentage of their overall purchases from groundfish than smaller buyers (Table 3.5.3-4). In the table, buyers are categorized by the proportion of purchases that are groundfish. By this measure, the distribution of large buyers has a single mode (a single peak) in the 5% to 35% range. The distribution of smaller buyers tends to be bimodal with peaks in the 0% to 5% range and the 95% to 100% range. For smaller buyers this may indicate that groundfish are purchased as part of the incidental catch from fisheries targeting other species (the buyers with 0% to 5% of their purchases from groundfish), or that the buyers are specialty buyers or handling their own catch (the small buyers with 95% to 100% of their purchases from groundfish).

17/ For this analysis a "buyer" was defined as a unique combination of Pacific Coast Fisheries Information Network (PacFIN) port code and state buyer code on the fishticket. For California, a single company may have several buying codes that vary only by the last two digits. In PacFIN, these last two digits are truncated, and so were treated as separate buying units only if they appear for different ports.

18/ Unless otherwise noted, this section provides quantitative information on nontribal landings or fish caught in the ocean area and landed on West Coast fishtickets.

3.5.3.2 Live Fish Fishery

An important and growing share of groundfish harvest is delivered live. These deliveries help feed the growing trade in live seafood consumed in restaurants. Table 3.5.3-5 shows the distribution of selected groundfish species delivered to fresh (dead) and live markets on the West Coast in 2000. Groundfish delivered live were primarily nearshore rockfish and perch, but also included thornyheads, sablefish and lingcod. The table shows about 86% of live fish landings were in California with the remainder in Oregon. There were no recorded live fish landings in Washington. Significantly higher exvessel price was paid for live product. The coastwide average price for live product was nearly $4 per lb., compared with under $1 for other deliveries of the same species.

3.5.3.3 Seasonality

Groundfish buyers (particularly larger buyers) tend to have more of a year-round presence in the fishery than nongroundfish buyers. Eighty percent of the groundfish buyers with over $1 million in purchases made purchases in every month in the year 2000, while only 31% of the nongroundfish buyers made purchases in every month (Table 3.5.3-6). For the 75 processors active 10 or 11 months of the year, the most common months to be inactive are November (22 buyers inactive), followed by February, January, March, and December (with between 10 and 14 buyers inactive in each month) (Table 3.5.3-7).

3.5.3.4 Processing Costs and Capacity

The main processing costs are payments for raw materials and processing labor. Information on processing costs is being collected by the Pacific States Marine Fisheries Commission Economic Fishery Information Network project. It is hoped some of this information will be available soon for economic analysis. In an effort to collect data for the 2002 fishery, port biologists were asked to report their observations on the number of fillet and cutting stations in the plants from which they sampled. While the partial data collected in this initial effort is not sufficient for analysis, it does provide something of a baseline for certain areas of the coast. The survey found that in 2001 there were 44 fillet stations and two cutting tables in the Puget Sound region, 27 fillet stations (and an additional 26 in storage) on the Southern and Central Washington Coast, and 130 fillet stations between Crescent City and Fort Bragg in Northern California.

3.5.3.5 West Coast Groundfish and the World Market

West Coast groundfish compete in a global market, not only with similar species produced in other regions of the world, but also with other fish species such as salmon and tuna. In addition, fish compete with other sources of protein in consumers' budgets. More than 4.7 million metric tons (mt) of fish and other seafood were landed in the U.S. in 2000, approximately the same amount landed in each of the prior two years (DOC 2001). West Coast groundfish contributed about 0.14 million mt, 0.13 million mt, and 0.12 million mt to this total in 1998, 1999 and 2000, respectively. Pacific Whiting, a relatively abundant but low value species, comprises about two thirds of West Coast groundfish landings by weight, but only around 10% of groundfish exvessel revenue.

Production of farm-raised fish has increased rapidly in recent years. In 2000, more than 0.4 million mt of cultured fishery products were produced in the U.S., and more than 45 million mt were raised worldwide. An example of the emerging importance of farmed species is demonstrated by salmon. While commercial salmon harvest is still near the 1980 to 1997 annual average, world salmon supply has tripled since 1980 due to a ninefold increase in farmed salmon to 1.5 million mt in 2000.

An objective of groundfish management has been to spread harvest of the annual OY over as much of the year as possible. Consequently, harvest of West Coast groundfish occurs in every month, although in the late 1990s through 2000, it took on increased importance during the summer months when sablefish harvest peaked during the primary limited entry fixed gear fishery. (Table 3.5.3-8).

Groundfish has historically provided West Coast commercial fisheries participants with a relatively steady source of income over the year, supplementing the other more seasonal fisheries. Although groundfish contributed only about 17% of total annual exvessel revenue during 2000, seasonally groundfish played a more significant role, providing one-fifth to one-third of monthly exvessel revenue coastwide during April and the three summer months. The peak contribution by the groundfish fishery in 2000 was sablefish during August (20% of exvessel revenue). Flatfish harvest supplied between 3% and 9% of monthly exvessel revenue throughout the year, and rockfish contributed an additional 2.5% to 6.8% to monthly exvessel revenue. For northern parts of the coast, groundfish is particularly important just before the start of the December crab fishery.

Exvessel Prices

Table 3.5.3-9 shows annual exvessel prices for major West Coast commercial fisheries between 1997 and 2001. In 2001, exvessel prices for most species groups were in the middle of their five year ranges, except for non-whiting groundfish and California halibut, which were at five-year highs in 2001, and shrimp/prawns and shellfish, which were at five-year lows.

Exprocessor and Wholesale Prices

While producer prices for groundfish products have not fared quite as badly as for other frozen fish (including salmon), they still are significantly below recent highs. The trend may be flat or still lower in the future (Table 3.5.3-10). Increasing production of farmed salmon is partly responsible for a continuing slump in salmon commodity prices. Producer prices for meat products in general have been relatively weak, thereby helping to hold down prices for competitive fish protein.

Trade

In 2000 the U.S. imported 1.8 million mt of edible fishery products (17% from Canada and 14% from Thailand), and exported about one million mt of edible fishery products, one third of this to Japan (DOC 2001). Japan is the world's largest importer of fish, and Japanese demand drives much of the trade in world markets (Wessells 1992). Altogether Japan imported more than $14 billion of fishery products from the rest of the world in 1999. The U.S. is the second largest importer of fishery products in 1999 at $9.4 billion. While the (current) dollar value of U.S. edible fishery product exports remained fairly flat from 1995 to 1999 at approximately $3 billion, the (current) dollar cost of imports increased by one third over the same period to $9 billion. In 1999 the U.S. was the fourth largest exporter by value of fishery products after Thailand, Norway, and China (DOC 2001).

Imports

Most West Coast groundfish compete in the fresh and frozen fish product markets. In 2000 the U.S. imported 1.5 million mt of edible fresh and frozen fish products (DOC 2001). One hundred seventy one thousand mt (11%) consisted of flatfish and groundfish. An additional 283 thousand mt of canned and cured edible fishery products were also imported. Fresh and frozen shrimp was by far the largest edible fishery import item in 2000, both in terms of tonnage (343 thousand mt) and value ($3.7 billion). Thailand supplied one half of this tonnage, earning $1.5 billion. In terms of value, U.S. imports of non-edible fishery products are almost as important as edible products. In 2000, nearly $9 billion of non-edible fishery products were imported along with $10 billion in edible products.

Exports

In 2000 the U.S. exported 190,000 mt of edible, fresh or frozen flatfish and groundfish products, about 22% of total edible fresh or frozen fishery exports by weight, or 19% by value (DOC 2001). Surimi was the single largest component of total fresh and frozen imports by weight, accounting for another 150 thousand mt. However, salmon was the most valuable export, generating $353 million on the 100 thousand mt of fresh and frozen product shipped, and another $146 million from exports of canned product. Asia was the largest export region, absorbing 61% of U.S. fishery exports by volume. Japan alone bought 34% of total fishery exports, and South Korea and China took 11% and 10%, respectively.

Domestic Demand

From 1910 through the early 1970s, annual per-capita fish consumption in the U.S. generally ran between 10 pounds and 12 pounds edible weight (DOC 2001). Beginning in the early 1970s, per-capita consumption increased to 12 pounds to 13 pounds. In the mid 1980s, it began shifting upward again to the 15-pound to 16-pound range where it has generally remained since 1985. In 2000 annual per-capita U.S. fish consumption was estimated to be 15.6 pounds. Internationally the U.S. ranks just above average in terms of per-capita fish consumption along with countries like the United Kingdom, Italy, Russia, and Canada, and not far below China, but less than half the level of Japan and South Korea.

TABLE 3.5.3-1. Number of buyers on the West Coast in the year 2000 (excluding at-sea whiting deliveries). (Page 1 of 1)

Buyers' Total Expenditures on West Coast Harvest (Groundfish and Nongroundfish)	All Buyers	Nongroundfish Buyers	Groundfish Buyers	Groundfish Buyers as % of Category	Trawl-Caught Groundfish Buyers	Nontrawl-Only Groundfish Buyers
>$2 Million	21	2	19	90%	17	2
$1-$2 Million	33	14	19	58%	11	8
$300 Thousand - $1 Million	98	36	62	63%	33	29
$100-$300 Thousand	121	49	72	60%	23	49
$20-$100 Thousand	273	123	150	55%	19	131
$5 Thousand-$20 Thousand	372	224	148	40%	11	137
<$5 Thousand	862	600	262	30%	11	251
Total	1,780	1,048	732	41%	125	607

Source: Data for West Coast ocean area landings made to West Coast ports derived from PacFIN monthly vessel summary files.

TABLE 3.5.3-2. Value of purchases ($1,000) by West Coast buyers (groundfish and nongroundfish) in the year 2000. (Page 1 of 1)

	All Buyers	Groundfish Buyers					
		All Species (All West Coast Purchases by All Groundfish Buyers)			Groundfish (All West Coast Purchases)		
	Total Purchases	Total Purchases	As % of All West Coast Purchases	Cumulative Percent of All West Coast Purchases	Groundfish Purchases	Percent of Total Groundfish	Cumulative Percent of Total Groundfish
>$2 Million	95,742	90,762	38%	38%	28,680	53%	53%
$1-$2 Million	45,343	25,851	11%	49%	8,585	16%	68%
$300 Thousand-$1 Million	56,115	36,527	15%	65%	11,278	21%	89%
$100-$300 Thousand	21,427	12,543	5%	70%	3,269	6%	95%
$20-$100 Thousand	12,881	7,297	3%	73%	2,023	4%	99%
$5 Thousand-$ 20 Thousand	3,989	1,519	1%	74%	501	1%	100%
<$5 Thousand	1,278	426	0%	74%	218	0%	100%
Total	236,775	174,926			54,554		

Source: Derived from PacFIN monthly vessel summary files.

TABLE 3.5.3-3. Groundfish buyers' expenditures on all species and groundfish in the year 2000 (excludes at-sea whiting). (Page 1 of 1)

	Buying Groundfish from Limited Entry Trawl Vessels						Buying Groundfish from Nontrawl Only				All Buyers
			Trawl Expenditure		Nontrawl Expenditures						
	Number	Total Expenditures All Species ($,000)	($,000)	As a % of Grand Total Trawl Expenditures	($,000)	As a % of Grand Total Nontrawl Expenditures	Number	Total Expenditures ($,000)	Nontrawl Expenditures ($,000)	As a % of Grand Total Nontrawl Expenditures	Grand Total Nontrawl Expenditures ($,000)
>$2 Million	17	80,726	22,904	60%	5,773	35%	2	10,036	3	0%	5,776
$1-2 Million	11	15,874	6,898	18%	699	4%	8	9,976	988	6%	1,686
$300 Thousand-$1 Million	33	20,226	6,419	17%	2,957	18%	29	16,301	1,902	12%	4,859
$100-$300 Thousand	23	3,765	1,515	4%	235	1%	49	8,778	1,519	9%	1,754
$20-$100 Thousand	19	990	234	1%	249	2%	131	6,307	1,540	9%	1,789
$5 Thousand-$20 Thousand	11	132	80	0%	16	0%	137	1,386	405	2%	421
<$5 Thousand	11	24	20	0%	0	0%	251	402	197	1%	197
Total	125	121,739	38,071	100%	9,929	60%	607	53,187	6,554	40%	16,483

Source: Derived from PacFIN monthly vessel summary files.

TABLE 3.5.3-4. Number of buyers by amount and proportion of total purchases that are groundfish from trawl vessels and nontrawl vessels in the year 2000 (excludes at-sea whiting). (Page 1 of 1)

Buyers Total Expenditures on West Coast Harvest (Groundfish and Nongroundfish)	Number of: All Buyers	Number of: Groundfish Buyers	Groundfish: None	Groundfish: <5%	Groundfish: 5%-35%	Groundfish: 35%-65%	Groundfish: 65%-95%	Groundfish: >95%	Groundfish Caught with LE Trawl Gear: None	LE Trawl: <5%	LE Trawl: 5%-35%	LE Trawl: 35%-65%	LE Trawl: 65%-95%	LE Trawl: >95%	Groundfish Caught With Other Gear: None	Other Gear: <5%	Other Gear: 5%-35%	Other Gear: 35%-65%	Other Gear: 65%-95%	Other Gear: >95%
Number of Buyers (All)																				
>$2 Million	21	19	2	4	8	5	2	0	Same as below						2	9	10	0	0	0
$1-$2 Million	33	19	14	4	9	3	3	0							15	12	5	1	0	0
$300 Thousand-$1 Million	98	62	36	26	15	6	10	5							44	34	12	3	3	2
$100-$300 Thousand	121	72	49	37	12	10	6	7							56	41	12	6	3	3
$33-$100 Thousand	183	100	83	56	19	5	5	15							86	56	19	4	4	14
$5-$33 Thousand	462	198	264	80	43	16	21	38							274	81	43	16	18	30
<$5 Thousand	862	262	600	50	42	29	24	117							610	51	42	26	24	109
Total	1,780	732	1,048	257	148	74	71	182							1,087	284	143	56	52	158
Buyers Buying from Trawl Vessels																				
>$2 Million	17	17	0	2	8	5	2	0	-	3	10	4	0	0	0	7	10	0	0	0
$1-$2 Million	11	11	0	0	6	2	3	0	-	1	5	2	3	0	1	8	2	0	0	0
$300 Thousand-$1 Million	33	33	0	6	9	5	10	3	-	11	9	5	7	1	8	14	6	2	3	0
$100-$300 Thousand	23	23	0	6	4	5	4	4	-	10	2	4	3	4	7	10	4	1	1	0
$33-$100 Thousand	13	13	0	2	4	2	3	2	-	6	5	0	1	1	3	2	4	1	2	1
$5-$33 Thousand	17	17	0	1	4	1	3	8	-	2	4	1	4	6	10	2	4	1	0	0
<$5 Thousand	11	11	0	0	0	3	0	8	-	0	0	3	0	8	10	1	0	0	0	0
Buyers NOT Buying from Trawl Vessels																				
>$2 Million	4	2	2	2	0	0	0	0	4	-	-	-	-	-	Same as to far left					
$1-$2 Million	22	8	14	4	3	1	0	0	22	-	-	-	-	-						
$300 Thousand-$1 Million	65	29	36	20	6	1	0	2	65	-	-	-	-	-						
$100-$300 Thousand	98	49	49	31	8	5	2	3	98	-	-	-	-	-						
$33-$100 Thousand	170	87	83	54	15	3	2	13	170	-	-	-	-	-						
$5-$33 Thousand	445	181	264	79	39	15	18	30	445	-	-	-	-	-						
<$5 Thousand	851	251	600	50	42	26	24	109	851	-	-	-	-	-						

Note: Each unique combination of buyer license and PacFIN port is counted as a separate buyer. In some cases, a particular buyer may have a presence in a port (be buying through a port), but have no facilities at that port. Source: Derived from PacFIN monthly vessel summary files.

TABLE 3.5.3-5 Disposition of groundfish harvest to live and fresh (dead) catch markets on West Coast in 2000. (Page 1 of 2)

	Washington						Oregon						California						W-O-C Total					
	Live		Dead		Total		Live		Dead		Total		Live		Dead		Total		Live		Dead		Total	
Price Range	mts	%	mts	%	mts	%	mts	%	mts	%	mts	%	mts	%	mts	%	mts	%	mts	%	mts	%	mts	%
Sablefish																								
0 to <$1.00			5	0	5	0			6	0	6	0	0	1	294	16	294	16	0	1	304	5	305	5
$1.00 to $1.50			374	22	374	22	0	85	1,558	55	1,558	55	1	3	1,254	69	1,255	67	1	4	3,186	50	3,187	50
$1.50 to $2.00			1,149	67	1,149	67	0	15	1,162	41	1,162	41	11	30	263	14	274	15	11	30	2,574	40	2,585	40
$2.00 to $2.50			125	7	125	7			115	4	115	4	16	45	7	0	23	1	16	44	247	4	263	4
$2.50 to $3.00			60	4	60	4							5	13	6	0	11	1	5	13	66	1	70	1
>$3.00													3	9	1	0	4	0	3	8	1	0	4	0
Mean price ($/lb)			$1.74		$1.74		$1.24		$1.48		$1.48		$2.18		$1.24		$1.26		$2.16		$1.48		$1.49	
Sum of mts			1,713	100	1,713	100	0	100	2,840	100	2,840	100	36	100	1,825	100	1,861	100	36	100	6,378	100	6,414	100
Sum of revenue ($,000)			6,572		6,572		1		9,266		9,267		172		4,994		5,166		173		20,831		21,004	
Lingcod																								
0 to <$1.00			93	95	93	95			14	26	14	22	0	0	8	19	8	14	0	0	114	60	114	53
$1.00 to $1.50			4	5	4	5			40	72	40	62	2	11	28	72	30	55	2	7	73	38	74	34
$1.50 to $2.00							1	10	1	2	2	3	7	47	3	7	9	17	8	33	4	2	11	5
$2.00 to $2.50							8	90	0	0	8	13	4	31	1	2	5	9	13	54	1	0	13	6
$2.50 to $3.00													1	7	0	1	1	2	1	4	0	0	1	1
>$3.00													1	5			1	2	1	3			1	0
Mean price ($/lb)			$0.59		$0.59		$2.00		$0.97		$1.12		$1.87		$1.01		$1.24		$1.92		$0.78		$0.91	
Sum of mts			97	100	97	100	9	100	55	100	64	100	15	100	40	100	54	100	24	100	192	100	216	100
Sum of revenue ($,000)			125		125		41		118		158		60		88		147		100		331		431	
Thornyheads																								
0 to <$1.00			69	89	69	89			847	81	847	81	0	0	714	61	714	58	0	0	1,629	71	1,629	69
$1.00 to $1.50			8	11	8	11			203	19	203	19	4	5	436	38	440	35	4	5	648	28	652	28
$1.50 to $2.00			0	0	0	0			0	0	0	0	2	3	3	0	6	0	2	3	4	0	6	0
$2.00 to $2.50													13	17	5	0	18	1	13	17	5	0	18	1
$2.50 to $3.00													11	15	1	0	13	1	11	15	1	0	13	1
>$3.00													46	60	4	0	51	4	46	60	4	0	51	2
Mean price ($/lb)			$0.83		$0.83				$0.90		$0.90		$3.10		$0.98		$1.11		$3.10		$0.94		$1.01	
Sum of mts			77	100	77	100		0	1,050	100	1,050	100	77	100	1,164	100	1,241	100	77	100	2,291	100	2,368	100
Sum of revenue ($,000)			141		141				2,076		2,076		526		2,508		3,034		526		4,726		5,252	
Other rockfish and perch (excludes lingcod and thornyheads)																								
0 to <$1.00			2,968	99	2,968	99	1	1	5,469	100	5,469	99	2	1	1,877	91	1,878	80	2	1	10,313	98	10,315	95
$1.00 to $1.50			15	1	15	1	8	14	18	0	26	0	5	2	107	5	112	5	13	4	140	1	153	1
$1.50 to $2.00			0	0	0	0	0	1	5	0	6	0	10	3	36	2	46	2	10	3	41	0	52	0
$2.00 to $2.50							3	6	1	0	4	0	7	2	20	1	27	1	10	3	21	0	31	0
$2.50 to $3.00			0	0	0	0	16	29			16	0	12	4	7	0	19	1	28	8	7	0	35	0
>$3.00							27	49			27	0	256	88	22	1	278	12	282	82	23	0	305	3
Mean price ($/lb)			$0.44		$0.44		$3.29		$0.44		$0.47		$4.51		$0.58		$1.06		$4.32		$0.47		$0.59	
Sum of mts			2,984	100	2,984	100	54	100	5,493	100	5,547	100	292	100	2,068	100	2,360	100	346	100	10,545	100	10,891	100
Sum of revenue ($,000)			2,908		2,908		393		5,353		5,746		2,894		2,621		5,515		3,287		10,882		14,170	

TABLE 3.5.3-5 Disposition of groundfish harvest to live and fresh (dead) catch markets on West Coast in 2000. (Page 2 of 2)

	Washington						Oregon						California						W-O-C Total					
	Live		Dead		Total		Live		Dead		Total		Live		Dead		Total		Live		Dead		Total	
Price Range	mts	%	mts	%	mts	%	mts	%	mts	%	mts	%	mts	%	mts	%	mts	%	mts	%	mts	%	mts	%
Total Groundfish																								
0 to <$1.00			3,134	64	3,134	64	1	1	6,335	67	6,336	67	2	0	2,892	57	2,894	52	3	1	12,361	64	12,363	62
$1.00 to $1.50			402	8	402	8	8	13	1,820	19	1,828	19	11	3	1,825	36	1,837	33	19	4	4,047	21	4,066	20
$1.50 to $2.00			1,149	24	1,149	24	1	2	1,168	12	1,170	12	30	7	305	6	335	6	31	6	2,623	14	2,653	13
$2.00 to $2.50			125	3	125	3	12	18	116	1	127	1	41	10	32	1	73	1	52	11	273	1	326	2
$2.50 to $3.00			60	1	60	1	16	25	0	0	16	0	29	7	14	0	44	1	45	9	74	0	120	1
>$3.00			0	0	0	0	27	42	0	0	27	0	306	73	28	1	334	6	332	69	28	0	361	2
Mean price ($/lb)			$0.91		$0.91		$3.09		$0.81		$0.82		$3.96		$0.91		$1.14		$3.84		$0.86		$0.93	
Sum of mts			4,871	100	4,871	100	64	100	9,439	100	9,502	100	419	100	5,096	100	5,515	100	483	100	19,406	100	19,888	100
Sum of revenue ($,000)			9,747		9,747		434		16,813		17,248		3,652		10,210		13,862		4,087		36,770		40,857	

Source: PacFIN, September 2001 extraction.

TABLE 3.5.3-6. Number of buyers (groundfish and nongroundfish) by number of months buying and exvessel value of purchases in the year 2000 (excluding at-sea whiting). (Page 1 of 1)

	Number of Months During Which Purchases Were Made												
	1	2	3	4	5	6	7	8	9	10	11	12	Total
	Number of Buyers **NOT Buying Groundfish**												
>$2 Million	0	0	0	0	0	0	0	0	0	0	0	2	2
$1-$2 Million	0	0	0	0	0	0	1	0	1	3	6	3	14
$300 Thousand-$1 Million	0	0	3	3	2	3	3	4	3	3	5	7	36
$100-$300 Thousand	1	4	6	4	3	4	2	4	7	4	4	6	49
$20-$100 Thousand	15	23	21	10	11	14	3	2	7	8	4	5	123
$5 Thousand-$20 Thousand	54	45	36	25	19	11	5	7	7	5	4	6	224
<$5 Thousand	388	113	59	16	9	7	2	2	0	1	1	2	600
Total	458	185	125	58	44	39	16	19	25	24	24	31	1,048
	Groundfish Buyers that Buy from Groundfish Limited Entry Trawl Vessels												
>$2 Million	0	0	0	0	0	0	0	0	0	0	1	16	17
$1-$2 Million	0	0	0	0	0	0	0	0	0	1	2	8	11
$300 Thousand-$1 Million	0	0	0	2	0	3	1	4	1	0	7	15	33
$100-$300 Thousand	0	0	1	6	2	1	0	5	0	1	5	2	23
$20-$100 Thousand	0	4	4	2	0	1	0	1	0	1	2	4	19
$5 Thousand-$20 Thousand	2	3	0	1	1	2	0	0	0	0	0	2	11
<$5 Thousand	7	2	2	0	0	0	0	0	0	0	0	0	11
Total	9	9	7	11	3	7	1	10	1	3	17	47	125
	Groundfish Buyers that Do Not Buy from Groundfish Limited Entry Trawl Vessels												
>$2 Million	0	0	0	0	0	0	0	0	0	0	0	2	2
$1-$2 Million	0	0	0	0	0	0	0	0	0	2	2	4	8
$300 Thousand-$1 Million	0	2	0	0	2	0	3	1	2	1	5	13	29
$100-$300 Thousand	0	0	0	0	1	3	4	0	6	5	7	23	49
$20-$100 Thousand	3	6	10	7	9	18	12	9	10	7	12	28	131
$5 Thousand-$20 Thousand	8	21	22	14	13	11	15	12	6	4	8	3	137
<$5 Thousand	118	54	28	17	10	8	8	6	0	1	1	0	251
Total	129	83	60	38	35	40	42	28	24	20	35	73	607
Grand Total	596	277	192	107	82	86	59	57	50	47	76	151	1,780

Note: Each unique combination of buyer license and PacFIN port is counted as a separate buyer. In some cases, a particular buyer may have a presence in a port (be buying through a port), but have no facilities at that port. Source: Derived from PacFIN monthly vessel summary files.

TABLE 3.5.3-7. Number of groundfish buyers by seasonality of activity and amounts of purchases (exvessel value) for the year 2000 (excludes at-sea deliveries). (Page 1 of 2)

	Groundfish Buyers Total Expenditures on West Coast Landings							
Month During Which Any Species Was Purchased (Groundfish and Nongroundfish)	>$2 Million	$1-$2 Million	$300 Thousand - $1 Million	$100-$300 Thousand	$33-$100 Thousand	$5-$33 Thousand	<$5 Thousand	Totals
				Number of Processors				
Year Round	18	12	28	25	32	5	0	120
11 Month	1	4	12	12	14	8	1	52
10 Month	-	3	1	6	8	4	1	23
9 Month	-	-	3	6	10	6	0	25
7-8 Month	-	-	9	9	22	27	14	81
4-6 Month	-	-	7	13	37	42	35	134
1-3 Month	-	-	2	1	27	56	211	297
Total	19	19	62	72	150	148	262	732
Percent processing 10 or	100%	100%	66%	60%	36%	11%	1%	27%
				Number of 11 Month Buyers by Month Not Buying				
January			1	2	2			5
February				3	2	3		8
March		1		1	2			4
April			3	1				4
May								0
June						1		1
July				1	1			2
August						1		1
September			2		1	1		4
October		1			1	2		4
November	1	2	6	1	4			14
December				3	1		1	5
				Number of 10 Month Buyers by Months Not Buying				
January-February				1	1			2
January, March					2	1		3
January, November					1			1
January, July							1	1
January, October						1		1
February-March		1			1			2
February, December		1						1
February, September						1		1
March-April					1			1
March, May					1			1
August-September				1				1
October-November		1	1	1	1			4
November-December				3		1		4

TABLE 3.5.3-7. Number of groundfish buyers by seasonality of activity and amounts of purchases (exvessel value) for the year 2000 (excludes at-sea deliveries). (Page 2 of 2)

	Groundfish Buyers Total Expenditures on West Coast Landings							
Month During Which Any Species Was Purchased (Groundfish and Nongroundfish)	>$2 Million	$1-$2 Million	$300 Thousand - $1 Million	$100-$300 Thousand	$33-$100 Thousand	$5-$33 Thousand	<$5 Thousand	Totals
	Number of 10 and 11 Month Buyers Not Buying in Each Month							
January			1	3	6	2	1	13
February		2		4	4	4		14
March		2		1	7	2		12
April			3	1	1			5
May					1			1
June						1		1
July				1	1		1	3
August				1		1		2
September			2	1	1	2		6
October		2	1	1	2	3		9
November	1	3	7	5	6	1		22
December		1		6	1	1	1	10

Note: Each unique combination of buyer license and PacFIN port is counted as a separate buyer. In some cases, a particular buyer may have a presence in a port (be buying through a port), but have no facilities at that port. Source: Derived from PacFIN monthly vessel summary files.

TABLE 3.5.3-8. Percent of monthly exvessel value of all 2000 West Coast commercial fishery landings by month. (Page 1 of 1)

Species Group	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Sablefish	0.8	1.3	3.6	6.0	3.7	3.4	6.3	20.3	5.7	4.4	4.3	2.2	5.8
Whiting	0.0	0.0	0.0	0.2	1.9	3.5	7.6	6.7	4.4	0.0	0.0	0.0	2.3
Flatfish	8.9	5.5	5.4	7.1	4.1	3.2	3.2	2.7	2.7	3.0	3.2	3.0	4.2
Rockfish	2.5	3.3	5.6	6.5	5.6	4.7	5.6	3.3	5.9	5.0	6.8	3.2	4.6
Other GF	0.2	0.7	0.3	0.7	1.1	1.4	1.3	0.8	0.8	0.5	0.4	0.3	0.7
Shrimp/Prawns	1.6	2.7	3.8	6.8	7.1	16.2	14.3	8.2	8.3	5.0	1.6	1.3	6.2
Crab/Lobster	51.0	41.6	29.6	19.6	15.9	13.0	7.2	4.3	8.3	18.3	18.4	50.3	23.5
Salmon	0.2	0.3	0.2	0.7	17.1	13.7	10.0	13.6	13.3	8.2	2.0	0.4	6.9
HMS	1.2	6.5	2.6	4.7	1.1	1.4	7.3	16.3	19.8	19.6	8.6	6.7	8.9
CPS	13.5	13.3	11.3	10.6	8.1	6.1	7.8	4.9	6.5	11.6	25.0	15.4	11.0
Other	20.2	24.9	37.5	37.2	34.3	33.4	29.3	18.9	24.2	24.4	29.7	17.3	25.9
GF Total	12.3	10.9	14.9	20.4	16.5	16.1	24.0	33.8	19.5	12.8	14.7	8.7	17.5
Non GF Total	87.7	89.1	85.1	79.6	83.5	83.9	76.0	66.2	80.5	87.2	85.3	91.3	82.5
Region Total	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: PacFin

TABLE 3.5.3-9. Exvessel price per round weight pound ($). (Page 1 of 1)

Species	1997	1998	1999	2000	2001
All Groundfish	0.16	0.11	0.12	0.14	0.14
Non-whiting Groundfish	0.59	0.51	0.54	0.66	0.68
Whiting	0.05	0.04	0.04	0.04	0.04
Pacific Halibut	2.01	1.62	1.98	2.46	2.02
CA Halibut	2.48	2.33	2.47	2.84	2.91
CPS	0.13	0.06	0.11	0.09	0.08
HMS	0.70	0.61	0.84	1.02	0.96
Salmon	1.24	1.40	1.62	1.71	1.43
Shrimp/Prawn	0.55	1.10	0.64	0.57	0.41
Crab	1.86	1.76	1.92	2.11	2.03
Lobster	7.44	6.38	7.41	6.68	6.41
Shellfish	2.96	2.61	2.56	2.45	2.34
Red Urchin	0.87	0.97	0.94	0.70	0.8

Source: PacFin

TABLE 3.5.3-10. Producer Price Indices: Groundfish vs. Substitutes. (Page 1 of 1)

Year	Groundfish, fillets and steaks	Groundfish (cod, cusk, haddock, hake, perch, pollock, whiting)	Other frozen fish (salmon, flounder, halibut, etc.)	Meat products
1992	166.5	127.5	96.4	110.0
1993	161.3	122.9	94.2	113.6
1994	157.0	121.4	97.0	110.7
1995	164.8	126.1	95.3	109.3
1996	164.0	126.5	92.6	114.6
1997	177.8	131.2	96.6	116.1
1998	190.1	137.4	98.8	109.2
1999	216.7	153.0	99.3	108.9
2000	205.1	153.4	101.9	115.0
2001	190.5	145.5	94.9	120.3
2002p	192.0	143.5	87.8	115.5

Source: U.S. Department of Labor, Bureau of Labor Statistics website (http://146.142.4.24/cgi-bin/srgate)

3.5.4 Recreational Fisheries

Recreational fishing has been part of the culture and economy of West Coast fishing communities for more than 50 years. Along the northern coast, recreational fishing traditionally targeted salmon, but rockfish and lingcod often provided a bonus to anglers. Recreational fisheries have contributed substantially to fishing communities, bringing in dollars and also contributing to tourism in general.

The distribution of resident and non-resident ocean anglers among the West Coast states in 2000 is shown in Table 3.5.4-1. The table demonstrates the importance of recreational fishing, especially in Southern California. The estimated number of recreational marine anglers in Southern California was two and a half times the number in the next most numerous region, Washington state. While the bulk of recreational fishers in all areas were residents of those areas, a significant share were non-residents. Oregon had the greatest share of non-resident fishers at more than one-fifth of total ocean anglers.

Recreational fishing in the open ocean has generally been on an increasing trend since 1996 (Table 3.5.4-2); however, charter effort has decreased while private effort increased during that period. Part of this increase is likely the result of longer salmon seasons associated with increased abundance. Some effort shift from salmon to groundfish likely occurred prior to 1996 when salmon seasons were shortened. Groundfish are both targeted and caught incidentally when other species, such as salmon, are targeted. While the contribution of groundfish catches to the overall incentive to engage in a recreational fishing trip is uncertain, it seems likely that the possibility or frequency of groundfish catch on a trip adds to overall enjoyment and perceived value.

3.5.4.1 Recreational catch of overfished species

Estimated recreational catch of overfished groundfish species by vessels operating in ocean areas during 1998 through 2002 is shown in Table 3.5.4-3. The table splits out catch by sub region (Southern California, Northern California, Oregon, and Washington), and by type of vessel (charter and private, including rentals). These estimates were generated using RecFin data gathered from MRFSS and other port sampling procedures. Note that catch estimates for 2002 are preliminary.

There is no recreational fishery where darkblotched rockfish is either targeted or taken incidentally. Also, no significant amounts of POP are caught recreationally. There are, however, significant recreational catch of several other species. For example, canary rockfish are harvested primarily in Northern California and Oregon, with smaller amounts taken in Southern California and Washington. The bulk of canary rockfish were taken by charter vessels in all years shown except for 2002.

Lingcod is landed coast wide, but the majority of harvest occurs in Northern California and Oregon. Unlike canary rockfish, the bulk of lingcod were taken by private boats. Of the overfished species, lingcod were by far the most commonly caught species in the ocean recreational fisheries each year.

Other overfished groundfish species caught in the recreational fishery include bocaccio, cowcod, widow rockfish and yelloweye rockfish. Note that bocaccio is only considered overfished in Southern California. Cowcod are encountered almost exclusively in Southern California. Cowcod catch has diminished in recent years due to more restrictive management measures. Widow rockfish are caught primarily in Northern California, and occasionally in Oregon, but rarely in Southern California or Washington. Yelloweye rockfish are caught throughout Washington, Oregon, and Northern California, especially north of Cape Mendocino. Yelloweye rockfish are rarely caught in Southern California.

Table 3.5.4-4 shows estimated total mortality of overfished yelloweye and canary rockfish in the Oregon recreational fishery during 2002. Estimated discard mortality of yelloweye was equivalent to about 23% of the landed catch. Discard mortality of canary was estimated to be about 8% of the landed catch.

3.5.4.2 Recreational catch by region

Table 3.5.4-5 shows ocean recreational catch of major species and species groups by region and mode (private and charter) on the West Coast in 2002. The table shows almost one half of the total recreational groundfish harvest occurred in Northern California. Nearshore rockfish species accounted for one half of this. More than two thirds of shelf rockfish species caught were in Southern California. California claimed more than two thirds of the recreational groundfish harvested, and almost three quarters of the total recreational harvest. Half of the total salmon recreational harvest was landed in Washington. This comprised more than 80% of Washington's total recreational harvest. While Northern California's salmon catch was nearly as great as Washington's, it comprised less than half of the region's total recreational harvest.

Table 3.5.4-6 shows estimated catch of selected groundfish species by month in the Oregon recreational ocean fishery from 2000 to 2002, and the average annual catch over that period. The table shows the marked seasonality of recreational fishing off the Oregon coast, with most catch occurring during the late spring and summer months.

3.5.4.3 Seasonality and participation in recreational fishing

Fishing effort is related to weather, with relatively more effort occurring in the milder months of summer, and relatively less in winter (Table 3.5.4-7). As might be expected, this effect is more pronounced in higher latitudes, although the reasons include opportunity as well as climate. Salmon seasons are longer in California than in Oregon, which in turn are longer than in Washington. Until recently, groundfish seasons were also more restrictive in Washington, with the lingcod season being closed from November through March.

3.5.4.4 Recreational charter industry

The distribution of West Coast charter vessels engaged in ocean fishing in 2001 is shown in Table 3.5.4-8. More than half of the charter vessels operated from California ports, again demonstrating the importance of recreational fishing industry in that state.

3.5.4.5 Recreational fishing experience markets

Just as West Coast commercial groundfish is only one segment of a broader food market, the groundfish recreational fishery represents only one segment of a broader recreational market. Other types of marine recreational angler trips, freshwater angling, and other recreational activities are, to varying degrees, potential substitutes ocean groundfish fishing.

Demand for recreational trips and estimates of the economic impacts resulting from recreational fishing are related to numbers of anglers. Unfortunately, reliable data are not available on the number of West Coast anglers targeting specific species.

However, data are available on the total number of saltwater anglers, and it is evident the presence of opportunities to catch species other than directly targeted ones increases the propensity of anglers to fish and the value of the overall recreational fishing experience. In the U.S., over 9 million anglers took part in 76 million marine recreational fishing trips in 2000. The Pacific coast accounted for about 22% of these participants and 12% of trips. Seventy percent of West Coast trips were made off California, 19% off Washington, and 11% from Oregon.

Table 3.5.4-1 shows that although California's marine recreational fishery dominates the other West Coast states both in terms of numbers of anglers and trips, Oregon attracts the largest share of non-resident anglers, probably chiefly due to the access it affords to the seasonal salmon fisheries at the mouth of the Columbia River.

Table 3.5.4-2 shows that while only a relatively minor share of total West Coast recreational effort, in three of the four regions, groundfish catch, either targeted or incidental, accompanied a significant share of both charter and private recreational trips. This effect was greatest in Oregon where groundfish catch was consistently associated with over half the recreational trips each year. Only in Southern California did groundfish appear to be a relatively minor part of regional marine recreational effort.

3.5.4.6 Safety on private recreational and charter vessels

For a general discussion of safety issues see Section 3.5.2.6.

The rate of recreational boating fatalities has been decreasing during the past ten years. Nevertheless, 519 recreational boaters drowned in the United States in 2000, and the Coast Guard estimates that half would have survived had they been wearing life jackets. The Coast Guard also reports that nearly one-third of these fatalities involved alcohol. Because of its long coastline, large population, warmer weather, and popular recreational fisheries, California had a higher number of recreational vessel accidents in 2000 than Oregon or Washington. That year, boaters off California experienced 900 accidents and 49 fatalities. Of the accidents, 338 were caused by collisions with other vessels. Off Oregon, the statistics were 97 accidents and 14 fatalities, and in Washington, 131 accidents and 22 fatalities (FVCTF 2001).

Recreational and charter vessels face some of the same safety risks as commercial vessels. However, recreational vessels do not face the same risks associated with the use of heavy equipment, and they tend to operate in better weather and stay closer to shore. At the same time, the operators of private recreational boats have widely varying levels of ability and are often less familiar with currents, tides, hidden obstacles, and other safety risks than professional charter captains or commercial captains. Operating close to shore creates a new set of safety risks associated with groundings and obstacles.

Fewer safety regulations pertain to small recreational boats than to commercial or charter vessels. Some states apply additional regulations to recreational boats operating within the three-mile limit. Regulations for charter vessels tend to be more stringent than for either recreational or commercial vessels; generally, the more passengers a vessel can carry and the farther it goes out to sea, the more stringent the regulations become. Unlike the other vessel categories, charter operators must be tested and licensed.

TABLE 3.5.4-1. Number of marine anglers in West Coast states, 2000. (Page 1 of 1)

State	Number of Marine Anglers (Thousands) Total	Resident	Non-Resident	Percent Non-Resident
Washington	497	450	47	9%
Oregon	365	285	80	22%
N. California	439	388	51	12%
S. California	1,266	1,097	169	13%

Note: Estimates are not additive across states, since a participant may have fished in more than one state.
Source: Marine Angler Expenditures in the Pacific Coast Region, 2000 NMFS-F/SPO-49, Table 2, p.7.

TABLE 3.5.4-2. Trends in effort for recreational ocean fisheries in thousands of angler trips. (Page 1 of 1)

	Charter							Private						
Area	1996	1997	1998	1999	2000	2001	2002	1996	1997	1998	1999	2000	2001	2002
Total Angler Trips														
Washington	51	50	44	49	49	59	201	52	55	37	52	52	88	407
Oregon	54	65	57	60	87	70	62	57	87	213	173	330	140	130
Northern CA	90	139	158	162	206	221	142	253	312	528	549	523	901	556
Southern CA	982	812	674	609	876	577	438	1,099	1,073	1,167	879	1,314	1,757	1,494
Total	1,177	1,066	933	880	1,218	927	843	1,461	1,527	1,945	1,653	2,219	2,886	2,587
Trips with Groundfish Target and Incidental														
Washington	24	19	23	21	25	12	9	24	21	54	25	30	10	10
Oregon	43	47	47	44	69	47	46	33	57	119	88	153	22	36
Northern CA	63	159	58	95	101	141	53	110	113	160	188	120	164	253
Southern CA	59	23	33	45	57	204	189	35	11	15	30	28	252	391
Total	189	248	161	205	252	404	297	202	202	348	331	331	448	690

Note: 2001 and 2002 estimates not directly comparable to previous years due to differences in estimation methodology.

TABLE 3.5.4-3. Estimated recreational catch of selected overfished groundfish species in ocean waters by subregion for charter and private boats (mt). (Page 1 of 1)

		S. California			N. California			Oregon			Washington			Coast Wide		
Year	**Species**	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**	**Charter**	**Private**	**Total**
1998	Bocaccio	12.9	15.3	28.2	20.0	2.7	22.7	0.2	0.1	0.3	0.1	0.1	0.2	33.2	18.1	51.4
	Canary Rockfish	1.1	0.3	1.5	12.7	11.4	24.1	25.3	17.9	43.3	9.6	1.5	11.1	48.7	31.2	80.0
	Cowcod	0.7	2.1	2.8	-	-	-	-	-	-	-	-	-	0.7	2.1	2.8
	Widow Rockfish	0.3	0.0	0.3	32.4	3.2	35.5	15.3	0.7	16.0	-	-	-	47.9	3.9	51.8
	Yelloweye Rockfish	-	-	-	3.2	2.3	5.5	8.3	10.5	18.8	9.9	4.5	14.4	21.4	17.3	38.7
	Lingcod	7.2	9.6	16.9	32.6	165.1	197.7	17.7	51.3	69.0	20.0	7.0	27.0	77.5	233.0	310.6
1999	Bocaccio	38.7	27.9	66.6	45.8	6.4	52.2	0.2	0.2	0.4	0.2	0.2	0.4	84.9	34.7	119.6
	Canary Rockfish	1.7	0.1	1.8	47.2	15.1	62.3	15.3	13.4	28.7	4.2	0.7	4.9	68.3	29.4	97.7
	Cowcod	2.2	1.5	3.8	1.8	-	1.8	-	-	-	-	-	-	4.0	1.5	5.6
	Widow Rockfish	0.1	-	0.1	27.6	2.6	30.3	0.9	1.1	2.0	-	-	-	28.7	3.7	32.4
	Yelloweye Rockfish	1.6	-	1.6	7.3	3.7	11.0	8.9	8.4	17.3	8.0	10.4	18.5	25.8	22.5	48.4
	Lingcod	19.6	10.6	30.2	93.2	195.3	288.6	30.5	49.5	80.0	21.6	12.4	34.0	164.9	267.8	432.7
2000	Bocaccio	32.1	11.1	43.2	53.6	5.3	58.9	0.7	-	0.7	0.3	0.1	0.3	86.7	16.5	103.2
	Canary Rockfish	0.4	-	0.4	62.1	14.2	76.3	10.3	4.2	14.5	1.8	0.9	2.8	74.7	19.3	94.0
	Cowcod	0.5	3.7	4.2	-	1.7	1.7	-	-	-	-	-	-	0.5	5.4	5.9
	Widow Rockfish	0.1	-	0.1	11.5	0.2	11.6	3.0	-	3.0	-	-	-	14.5	0.2	14.7
	Yelloweye Rockfish	-	-	-	3.8	3.7	7.5	9.0	0.5	9.5	4.4	6.3	10.7	17.2	10.5	27.7
	Lingcod	3.1	2.0	5.1	56.0	107.1	163.1	22.6	27.4	50.0	17.8	10.4	28.2	99.5	146.9	246.4
2001	Bocaccio	25.9	28.4	54.3	45.9	3.0	48.8	0.5	0.2	0.7	0.7	0.2	0.9	73.0	31.8	104.8
	Canary Rockfish	-	-	-	20.5	11.8	32.3	6.1	4.7	10.9	1.2	1.2	2.4	27.9	17.7	45.6
	Cowcod	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pacific Ocean Perch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Widow Rockfish	-	0.3	0.3	9.1	0.1	9.2	4.1	-	4.1	-	-	-	13.2	0.4	13.6
	Yelloweye Rockfish	-	-	-	3.0	1.7	4.6	4.5	0.2	4.7	6.3	8.3	14.7	13.8	10.2	24.0
	Lingcod	3.1	19.2	22.3	39.7	76.6	116.3	28.6	31.4	60.0	17.5	14.7	32.2	88.9	141.9	230.8
2002 a/	Bocaccio	53.4	20.0	73.3	7.7	0.5	8.2	0.4	0.4	0.8	-	-	-	61.5	20.9	82.3
	Canary Rockfish	0.0	0.2	0.2	2.5	3.2	5.7	3.8	4.6	8.4	0.1	3.5	3.6	6.4	11.5	17.9
	Cowcod	-	0.5	0.5	0.1	-	0.1	-	-	-	-	-	-	0.1	0.5	0.6
	Pacific Ocean Perch	0.0	-	0.0	0.2	0.2	0.4	-	-	-	-	-	-	0.2	0.2	0.4
	Widow Rockfish	0.7	-	0.7	0.9	0.0	0.9	1.0	-	1.0	-	-	-	2.5	0.0	2.6
	Yelloweye Rockfish	0.6	-	0.6	0.4	1.1	1.5	0.7	2.4	3.1	-	-	-	1.7	3.5	5.2
	Lingcod	28.7	35.0	63.7	187.6	216.7	404.3	10.7	64.3	75.0	4.0	23.0	27.1	231.0	339.1	570.1

a/ Preliminary estimate. Source: RecFIN (MRFSS and Oregon Recreational Ocean Boat Survey)

TABLE 3.5.4-4. Estimated total mortality of selected species in Oregon recreational fishery in 2002. (Page 1 of 1)

	Yelloweye	Canary
Total landed weight (kg)	3,195	8,918
Estimated discard mortality due to non-retention (halibut fishery) (kg)	579	223
B1 discard mortality (kg)	144	479
Total impacts (kg)	3,918	9,620

Data source: Oregon Recreational Ocean Boat Survey (ORBS) and MRFSS for shore and estuary.
Total mortality estimates based on 2001 observer study for discard rate and 2003 study for avg size and includes impacts from halibut fishery.

TABLE 3.5.4-5. Estimated recreational fishery harvest by region for charter and private boats for 2002 (mt). (Page 1 of 1)

Area	Fishing Mode	Lingcod	Nearshore Rockfish	Shelf Rockfish	Other Nearshore Groundfish	Other Shelf Groundfish	Other Groundfish	Total Groundfish	Salmon	Halibut	Highly Migratory Species	Other	Total
Washington	Charter	36	139	3	1	0	1	180	648	21	41	1	891
	Private	46	42	3	7	5	1	103	965	27	3	0	1,097
	Total	81	181	5	8	5	2	283	1,613	48	44	2	1,988
Oregon	Charter	43	219	11	11	0	19	303	30	1	16	0	350
	Private	31	83	3	9	0	4	129	85	1	12	0	227
	Total	74	302	14	20	0	23	432	115	2	27	1	577
N. California	Charter	192	270	20	9	0	13	504	366	8	99	34	1,011
	Private	232	391	6	41	0	16	686	1,117	164	467	84	2,519
	Total	424	661	26	50	0	29	1,190	1,483	173	565	119	3,530
S. California	Charter	29	97	76	89	3	1	295	4	16	187	894	1,396
	Private	45	118	41	46	0	3	253	80	369	166	1,389	2,256
	Total	74	214	117	135	3	4	547	85	385	353	2,283	3,653
California	Charter	221	367	96	97	3	13	799	370	24	286	929	2,407
Total	Private	277	509	46	87	0	19	939	1,198	533	633	1,473	4,775
	Total	498	876	143	185	3	33	1,737	1,568	557	919	2,402	7,183
West Coast	Charter	300	725	109	110	4	34	1,282	1,049	46	342	930	3,649
Total	Private	353	633	52	103	5	24	1,170	2,247	561	647	1,474	6,099
	Total	653	1,358	162	212	9	58	2,452	3,296	607	990	2,404	9,748

Source: RecFIN data. Includes estimated catch from non-ocean areas.

TABLE 3.5.4-6. Estimated number of selected groundfish species landed in the Oregon ocean recreational fishery, 2000-2002. (Page 1 of 2)

Year	Month	Yelloweye	Canary	Lingcod	Widow	Minor Nearshore Rockfish: Black	Blue	Brown	China	Copper	Grass	Quillback	Cabezon	Kelp Greenling	Rock Greenling
2002	Jan	9	72	139	10	2,035	201		20	18		26	53	49	
	Feb	21	157	552	22	4,121	425		41	39		57	134	127	
	Mar	38	369	1,047	93	15,044	1,495	3	108	83		140	295	407	
	Apr	82	660	1,882	65	22,223	1,699	6	162	170		151	609	753	
	May	195	1,175	3,040	119	34,976	2,044	4	318	238		298	884	688	
	June	261	885	2,408	46	45,424	2,533	6	350	205	2	338	1,039	820	6
	July	180	1,154	2,552	241	44,728	2,622	5	366	549		485	1,126	919	6
	August	582	3,033	4,345	500	42,595	5,731		723	745	3	1,206	1,433	1,316	2
	September	161	958	1,653	84	22,193	3,066	2	356	329		414	682	841	2
	October	106	572	913	45	9,014	3,285		168	91	5	137	428	459	
	November	15	118	252	10	3,482	372		36	34		45	36	31	
	December	23	137	294	15	3,911	358		40	37		46	114	113	
	Total number	1,673	9,290	19,077	1,250	249,746	23,831	26	2,688	2,538	10	3,343	6,833	6,523	16
2001	Jan	13	86	124	14	1,737	733		17	13		16	27	34	
	Feb	51	438	561	34	5,418	2,441		64	29		121	121	142	
	Mar	62	742	1,166	81	17,046	5,588		122	90	2	172	312	228	
	Apr	68	454	979	11	24,461	3,844		161	102		120	460	276	
	May	518	1,464	3,083	42	37,865	4,255		329	282	5	371	807	827	3
	June	331	1,776	2,194	520	43,738	4,543	807	458	304	2	533	909	876	3
	July	415	2,059	2,190	697	48,376	5,934	71	543	271	11	602	925	1,013	
	August	624	2,358	3,045	1,702	68,332	16,255	4	674	263	3	758	1,223	1,501	5
	September	253	922	884	271	18,826	5,150		219	136	1	283	402	615	
	October	40	111	309	564	7,760	3,117		80	45		32	160	176	
	November	19	131	196	34	4,226	885	13	40	23		39	31	30	
	December	26	147	219	41	4,340	785	9	45	23		43	89	103	
	Total number	2,420	10,688	14,950	4,011	282,125	53,530	904	2,752	1,581	24	3,090	5,466	5,821	11

TABLE 3.5.4-6. Estimated number of selected groundfish species landed in the Oregon ocean recreational fishery, 2000-2002. (Page 2 of 2)

						Minor Nearshore Rockfish									
Year	Month	Yelloweye	Canary	Lingcod	Widow	Black	Blue	Brown	China	Copper	Grass	Quillback	Cabezon	Kelp Greenling	Rock Greenling
2000	Jan	22	153	130	18	1,910	1,006	61	21	21		21	74	111	
	Feb	141	522	533	36	4,461	2,298		106	91		91	182	223	
	Mar	91	671	554	151	12,761	5,363		70	78		116	228	346	
	Apr	286	998	1,158	260	26,715	5,810		255	169	2	100	499	546	1
	May	1,409	2,667	2,874	314	38,110	9,853		458	560		510	963	917	7
	June	574	2,872	2,788	609	49,476	8,985	4	749	544	4	705	1,456	1,780	36
	July	670	2,843	2,304	879	74,798	6,120		795	461		511	1,602	1,457	36
	August	1,168	6,844	2,676	1,450	76,045	14,842		1,064	788		1,093	1,597	1,904	57
	September	506	1,804	1,334	670	36,526	5,194		409	257	2	263	541	752	9
	October	54	513	431	68	12,632	2,825		145	46		84	178	246	7
	November	39	160	237	14	5,610	3,012		67	38		51	59	63	6
	December	60	320	333	35	4,992	2,168		61	50		40	135	156	6
	Total number	5,020	20,367	15,352	4,504	344,036	67,476	65	4,200	3,103	8	3,585	7,514	8,501	165
2000-02 avg.	Jan	15	104	131	14	1,894	647	20	19	17	0	21	51	65	0
	Feb	71	372	549	31	4,667	1,721	0	70	53	0	90	146	164	0
	Mar	64	594	922	108	14,950	4,149	1	100	84	1	143	278	327	0
	Apr	145	704	1,340	112	24,466	3,784	2	193	147	1	124	523	525	0
	May	707	1,769	2,999	158	36,984	5,384	1	368	360	2	393	885	811	3
	June	389	1,844	2,463	392	46,213	5,354	272	519	351	3	525	1,135	1,159	15
	July	422	2,019	2,349	606	55,967	4,892	25	568	427	4	533	1,218	1,130	14
	August	791	4,078	3,355	1,217	62,324	12,276	1	820	599	2	1,019	1,418	1,574	21
	September	307	1,228	1,290	342	25,848	4,470	1	328	241	1	320	542	736	4
	October	67	399	551	226	9,802	3,076	0	131	61	2	84	255	294	2
	November	24	136	228	19	4,439	1,423	4	48	32	0	45	42	41	2
	December	36	201	282	30	4,414	1,104	3	49	37	0	43	113	124	2
	Total number	3,038	13,448	16,460	3,255	291,969	48,279	332	3,213	2,407	14	3,339	6,604	6,948	64

Data source: Oregon Recreational Ocean Boat Survey (ORBS) and MRFSS for shore and estuary

TABLE 3.5.4-7. Estimated recreational groundfish effort by season and region for charter and private vessels in 2002 (1,000's angler trips). (Page 1 of 1)

Region	Mode	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	Total
Washington	Charter	0	0	8	1	0	0	9
	Private	0	0	8	2	0	0	10
	Total	0	0	16	3	0	0	20
Oregon	Charter	1	5	14	19	6	1	46
	Private	0	3	13	14	5	1	36
	Total	2	8	27	33	11	2	82
OR/CA border to Cape Mendocino	Charter	0	0	1	2	0	0	3
	Private	0	0	12	16	2	0	29
	Total	0	0	13	17	2	0	32
Central California	Charter	0	0	8	26	15	1	50
	Private	38	10	42	63	60	10	224
	Total	38	10	51	89	75	10	274
Southern California	Charter	10	46	42	31	52	9	189
	Private	78	56	71	53	73	59	391
	Total	88	102	112	84	125	68	579
California Total	Charter	10	46	51	58	67	10	242
	Private	117	66	125	132	134	69	643
	Total	126	112	176	190	202	79	885
Grand Total	Charter	11	50	74	78	73	11	297
	Private	117	69	145	149	139	70	690
	Total	128	120	219	227	212	80	986

Source: Washington and Oregon estimates from state port sampling programs. California estimates from RecFIN.

TABLE 3.5.4-8. Charter vessels engaged in saltwater fishing outside of Puget Sound in 2001 by port area. (Page 1 of 1)

State	Port Area	Charter Boats
Washington	Neah Bay	1
	La Push	0
	Westport	13
	Ilwaco	6
	Unknown	86
	TOTAL	106
Oregon	Astoria	22
	Tillamook	51
	Newport	45
	Coos Bay	13
	Brookings	15
	Unknown	86
	TOTAL	232
California	Crescent City	1
	Eureka	4
	Fort Bragg	14
	San Francisco	67
	Monterey	33
	Conception (Northern portion)	129
	San Diego	95
	Unknown	72
	TOTAL	415
GRAND TOTAL		753

3.5.5 Tribal Fisheries

3.5.5.1 Description of Tribal groundfish fisheries

In 1994 the U.S. government formally recognized the four Washington coastal tribes (Makah, Quileute, Hoh, and Quinault) have treaty rights to fish for groundfish; and concluded, in general terms, they may take half of the harvestable surplus of groundfish available in the tribes' usual and accustomed (U&A) fishing areas (described at 60 CFR 660.324). West Coast treaty tribes have formal allocations for sablefish, black rockfish, and Pacific whiting. Members of the four coastal treaty tribes participate in commercial, ceremonial, and subsistence fisheries for groundfish off the Washington coast. Participants in the tribal commercial fisheries use similar gear to non-tribal fishers. Groundfish caught in the tribal commercial fishery pass through the same markets as non-tribal commercial groundfish catch.

There are several groundfish species taken in tribal fisheries for which the tribes have no formal allocations, and some species for which no specific allocation has been determined. Rather than try to reserve specific allocations of these species, the tribes annually recommend trip limits for these species to the Council, who try to accommodate these fisheries. Tribal trip limits for groundfish species without tribal allocations are usually intended to constrain direct catch and incidental retention of overfished species in the tribal groundfish fisheries.

Twelve western Washington tribes possess and exercise treaty fishing rights to halibut, including the four tribes that possess treaty fishing rights to groundfish. Tribal halibut allocations are divided into a tribal commercial component and the year-round ceremonial and subsistence component.

The bulk of tribal groundfish landings occur during the March-April halibut and sablefish fisheries. Most continental shelf species taken in the tribal groundfish fisheries are taken during the halibut fisheries, and most slope species are similarly taken during the tribal sablefish fisheries. Approximately one-third of the tribal sablefish allocation is taken during an open competition fishery, in which vessels from the sablefish tribes all have access to this portion of the overall tribal sablefish allocation. The open competition portion of the allocation tends to be taken during the same period as the major tribal commercial halibut fisheries in March and April. The remaining two-thirds of the tribal sablefish allocation is split between the tribes according to a mutually agreed-upon allocation scheme. Specific sablefish allocations are managed by the individual sablefish tribes, beginning in March and lasting into the autumn, depending on vessel participation management measures used. Participants in the halibut and sablefish fisheries tend to use hook-and-line gear, as required by the International Pacific Halibut Commission. By agreement the tribes also use snap gear for equity reasons in the fully competitive halibut and sablefish fisheries (i.e. someone participating in a fully competitive sablefish fishery who landed no halibut would not have to meet any IPHC requirements, but would still have to use snap line gear by tribal regulation).

In 2002, tribal sablefish longline fisheries were allocated 10% of the total catch OY (436.7 mt) and then were discounted 3% of that allocation for discard mortality, for a landed catch allocation of 424 mt. For the commercial harvest of black rockfish off Washington State, the treaty tribes have a harvest guideline of: 20,000 lb (9,072 kg) north of Cape Alava (48°09'30" N latitude) and 10,000 lb (4,536 kg) between Destruction Island (47°40'00" N latitude) and Leadbetter Point (46°38'10" N latitude).

In addition to these hook-and-line fisheries, the Makah tribe annually harvests a whiting allocation using mid-water trawl gear. Since 1996, a portion of the U.S. whiting OY has been allocated to the Pacific Coast treaty tribes. The tribal allocation is subtracted from the whiting OY before allocation to the nontribal sectors. Since 1999, the tribal allocation has been based on a sliding scale related to the U.S. whiting OY. To date, only the Makah tribe has fished on the tribal whiting allocation. Makah vessels fit with mid-water trawl gear have also been targeting widow rockfish and yellowtail rockfish in recent years.

In 1999 and 2000, 32,500 mt of whiting was set aside for treaty Indian tribes on the coast of Washington state, resulting in a commercial OY of 199,500 mt for 2000. In 2001 and 2002, the landed catch OY declined to 190,400 mt and 129,600 mt, respectively, and the tribal allocations for those years were also reduced to 27,500 mt and 22,680 mt, respectively.

Table 3.5.5-1 shows recorded landings of groundfish species by treaty tribes from 1995 to 2002. Since 1996, Pacific whiting have comprised the vast bulk of tribal landings, even though in 2000 and 2001 whiting landings were relatively low due to reduced coastwide allocations. As shown in Table 3.5.5-2, in terms of exvessel revenue, sablefish landings provided well over half of total tribal groundfish revenue each year except 1998, 1999 and 2002.

3.5.5.2 Bycatch in the Tribal groundfish fisheries

Tribal directed groundfish fisheries are subject to full retention. For some rockfish species, where the tribes do not have formal allocations, trip limits proposed by the tribes are adopted by the Council to accommodate incidental catch in directed fisheries for Pacific halibut, sablefish, and yellowtail rockfish. These trip limits are intended to constrain direct catches while allowing for small incidental catches. Trip limits of 300 lbs. each exist for combined longspine and shortspine thornyheads, canary rockfish, minor shelf rockfish, and minor slope rockfish. Yelloweye rockfish are subject to a 100 lbs./trip limit. For all other species, limited entry trip limits apply. Rockfish trip limits do not apply during fully competitive fisheries for Pacific halibut nor in the tribal Pacific whiting fishery (where all rockfish are retained and forfeited to the tribe for charitable contribution). Groundfish bycatch in the Pacific whiting fishery is estimated by NMFS observers. Trip limit overages in all other fisheries are forfeited to the tribes. In 2002, the midwater yellowtail fishery accounted for all of the rockfish trip limit overages (443 lbs. of canary rockfish, 713 lbs. of darkblotched rockfish, and 212 lbs. of widow rockfish).

Estimated groundfish bycatch in Makah trawl and troll fisheries in recent years is depicted in Table 3.5.5-3. Among the overfished species, the table shows some bycatch of widow rockfish and canary rockfish in midwater and bottom trawl, and lingcod bycatch in bottom trawl and salmon troll fisheries. Estimated bycatch in tribal longline fisheries in recent years is shown in Table 3.5.5-4. The table shows some bycatch of lingcod, canary rockfish and yelloweye rockfish in tribal halibut fisheries.

3.5.5.3 Discard and retention in Tribal sablefish fisheries

The tribal sablefish allocation is 10% of the OY for the area north of Point Conception. This amount is reduced by about 3% to account for discard mortality. The tribal sablefish fishery is primarily a longline fishery. The discard mortality is calculated as the difference in market size category ratios in competitive compared to noncompetitive tribal longline fisheries. A small portion of the tribal sablefish allocation is also taken in the Makah bottom trawl fishery as an allowance to prevent discarding in the directed flatfish and Pacific cod fisheries. That portion of the tribal sablefish fishery that is taken by bottom trawl, estimated to be 48,000 lbs (dressed weight) in 2003, is subject to full retention (Table 3.5.5-5). At the end of the season most trawl vessels make one to two directed sablefish tows to take the remainder of their allowance. All overages are forfeited to the tribe. In 2002 these forfeitures accounted for 1,634 lbs in four landings (one per vessel). The lack of discard in the tribal trawl fishery does not significantly affect the overall rate of 3% applied to tribal sablefish fisheries.

TABLE 3.5.5-1. Historical West Coast groundfish catch in ocean areas by Tribal fleet: 1995 through 2002. (round weight-pounds) (Page 1 of 1)

Species	1995	1996	1997	1998	1999	2000	2001	2002
Arrowtooth Flounder	240	3		255	13,195	331	961	7,137
Dover Sole	1,764	2,441	1,268	4,509	11,594	2,030	4,619	35,417
English Sole		4	118	1,847	593	996	7,103	88,684
Petrale Sole		5	12	3,249	545	80	1,954	45,479
Rex Sole					26	151	1,358	6,632
Rock Sole				2,396	16		22	5,833
Unsp. Flatfish				38	775		437	8,406
Unspecified Sanddab							1,599	19,655
Sand Sole		12	40				269	2,748
Starry Flounder		22	54				3	301
Butter Sole								605
Flatfish Total	**2,004**	**2,487**	**1,492**	**12,294**	**26,744**	**3,588**	**18,325**	**220,897**
Bocaccio				2	38	145	449	
Nom. Canary Rockfish	59	171	26	609	1,033	539	4,064	13,285
Canary Rockfish				277	252	330	1,380	
Darkblotched Rockfish					36	76	226	3,074
Greenstriped Rockfish				1	51	16		
Pacific Ocean Perch					110	20	16	529
Redbanded Rockfish				1	128	492		
Redstripe Rockfish				1	63	131	1,510	
Rougheye Rockfish				1	80	76	1,529	
Rosethorn Rockfish								
Sharpchin Rockfish				1	9	10	85	
Silvergrey Rockfish					36	4	12	
Unsp. Pop Group		3			104			
Unsp. Rockfish	114,684	79,545	65,121	65,245	59,875	45,953		
Widow Rockfish				54	411	2,010	16,265	
Nom. Widow Rockfish					53	3	51	75,899
Yelloweye Rockfish					68	3	2	
Nom. Yellowtail Rockfish	519	1,297	2,471	10,448	28,671	9,585	7,598	1,037,741
Yellowtail Rockfish				3,263	6,498	68,463	210,006	
Unsp. Shelf Rockfish						3,099	20,503	19
Unsp. Near-shore						10	58	116
Unsp. Slope Rockfish						19,891	54,920	4,121
Blackgill Rockfish							19	
Shortraker Rockfish							289	
Rockfish Total	**115,262**	**81,016**	**67,618**	**79,903**	**97,516**	**150,856**	**318,982**	**1,140,036**
Spiny Dogfish		5,521			881	6,251		2,607
Lingcod	2,873	2,732	1,648	5,247	7,051	6,817	9,429	24,854
Pacific Cod	2,814	1,540	2,166	4,873	2,677	4,573	8,712	128,530
Sablefish	1,696,098	1,881,702	1,775,108	980,719	1,566,260	1,555,808	1,451,522	959,982
Unspecified Skate	2,517	1,689	1,017	2,031	2,169	1,920	1,407	18,635
Nominal Shortspine Thornyhead	15,697	16,010	16,892	7,606	13,251	8,987	10,945	10,173
Shortspine Thornyhead				471	240		27	
Nominal Longspine Thornyhead	1,305	538	139	28				
Other Groundfish Total	**1,721,304**	**1,909,732**	**1,796,970**	**1,000,975**	**1,592,529**	**1,584,356**	**1,482,042**	**1,145,107**
Pacific Whiting		**33,039,648**	**54,713,657**	**53,984,582**	**56,768,061**	**13,781,257**	**13,404,001**	**45,867,384**
All Groundfish Species	**1,838,570**	**35,032,883**	**56,579,737**	**55,077,754**	**58,484,850**	**15,520,057**	**15,223,350**	**47,901,855**

TABLE 3.5.5-2. Historical West Coast groundfish catch in ocean areas by tribal fleet: 1995 through 2002 (exvessel revenue $). (Page 1 of 1)

Species	1995	1996	1997	1998	1999	2000	2001	2002
Arrowtooth Flounder	24	1		26	1,319	33	111	715
Dover Sole	570	768	393	1,478	3,817	663	1,498	11,335
English Sole		1	106	613	220	309	2,726	29,289
Petrale Sole		8	8	3,249	545	84	1,692	46,509
Rex Sole					8	51	471	2,316
Rock Sole				791	5		7	2,033
Unsp. Flatfish				13	271		145	2,773
Unspecified Sanddab							372	5,110
Sand Sole		9	30				204	2,084
Starry Flounder		7	16				1	98
Butter Sole								206
Flatfish Total	**594**	**794**	**553**	**6,170**	**6,185**	**1,140**	**7,227**	**102,468**
Bocaccio				1	13	64	207	0
Nom. Canary Rockfish	20	60	12	230	372	196	1,901	5,886
Canary Rockfish				97	89	145	655	0
Darkblotched Rockfish				0	12	33	104	1,139
Greenstriped Rockfish				0	18	7	0	
Pacific Ocean Perch				0	38	9	7	237
Redbanded Rockfish				0	44	216	0	
Redstripe Rockfish				0	22	58	689	
Rougheye Rockfish				0	27	33	705	
Rosethorn Rockfish				0	0		0	
Sharpchin Rockfish				0	3	4	39	
Silvergrey Rockfish				0	12	2	5	
Unsp. Pop Group		1			36			
Unsp. Rockfish	48,130	32,345	26,723	26,575	25,334	20,737		
Widow Rockfish				19	143	883	7,801	0
Nom. Widow Rockfish					19	1	16	36,431
Yelloweye Rockfish					24	2	0	2,327
Nom. Yellowtail Rockfish	189	438	864	3,542	10,256	3,429	3,379	489,530
Yellowtail Rockfish				1,142	2,275	30,124	99,901	
Unsp. Shelf Rockfish						1,758	13,068	8
Unsp. Near-shore						4	25	14,434
Unsp. Slope Rockfish						8,238	22,558	7
Blackgill Rockfish							9	
Shortraker Rockfish							134	
Rockfish Total	**61,977**	**48,699**	**42,552**	**39,366**	**49,703**	**73,143**	**159,637**	**549,999**
Spiny Dogfish		544			177	830		405
Lingcod	1,404	1,255	731	3,007	4,169	4,065	6,075	18,176
Pacific Cod	1,086	587	818	1,924	1,096	1,987	3,792	63,961
Sablefish	3,046,910	3,003,716	3,162,376	1,280,233	2,045,434	2,544,542	2,411,517	1,512,595
Unspecified Skate	588	120	68	136	145	129	143	2,563
Nominal Shortspine Thornyhead	12,581	15,340	14,828	7,310	10,751	7,199	8,414	8,232
Shortspine Thornyhead				425	215		20	
Nominal Longspine Thornyhead	1,057	515	125	25				
Other Groundfish Total	**3,049,988**	**3,006,222**	**3,163,993**	**1,285,300**	**2,051,021**	**2,551,553**	**2,421,527**	**1,605,932**
Pacific Whiting		**1,651,982**	**2,735,683**	**2,699,229**	**2,838,403**	**551,250**	**536,160**	**2,065,122**
All Groundfish Species	**3,112,559**	**4,707,697**	**5,942,781**	**4,030,065**	**4,945,312**	**3,177,086**	**3,124,551**	**4,323,521**

TABLE 3.5.5-3. Bycatch of groundfish species (pounds) in Makah trawl and troll fisheries in 2000, 2001 and 2002. (Page 1 of 1)

	2000	2001	2002
Gear/Species	Pounds	Pounds	Pounds
MIDWATER TRAWL			
black	0	0	0
lingcod	0	6	215
canary	306	1,366	3,594
yelloweye	0	0	53
widow	2,036	11,549	27,639
yellowtail	67,872	190,494	586,438
POP	0	0	0
darkblotched	0	102	3,611
SST [a/]	0	0	0
BOTTOM TRAWL [b/]			
black	0	53	0
lingcod	7	508	9,003
canary	24	0	1,068
yelloweye	0	0	0
widow	0	0	0
yellowtail	563	505	5,909
POP	0	0	0
darkblotched	0	0	0
SST [a/]	0	0	283
TROLL			
black	0	0	0
lingcod	1,958	773	2,006
canary	381	607	1,189
yelloweye	988	43	83
widow	0	32	0
yellowtail	8,948	7,060	7,071
POP	0	0	0
darkblotched	0	0	0
SST [a/]	0	0	0
TOTAL			
black	0	53	0
lingcod	1,965	1,287	11,224
canary	711	1,973	5,851
yelloweye	988	43	136
widow	2,036	11,581	27,639
yellowtail	77,383	198,059	599,418
POP	0	0	0
darkblotched	0	102	3,611
SST [a/]	0	0	283

a/ Shortspine thornyhead
b/ No data available for bycatch by target species in bottom trawl. Primary target species are Pacific cod and flatfish.

TABLE 3.5.5-4. Bycatch of groundfish species in tribal longline fisheries in 2000, 2001 and 2002. (Page 1 of 1)

2000				2001				2002			
Target Species	Pounds	Bycatch Species	Pounds	Target Species	Pounds	Bycatch Species	Pounds	Target Species	Pounds	Bycatch Species	Pounds
						Quinault [a]					
Halibut	85,252	[b]		Halibut	85,644	rock	49	Halibut	104,191	canary	4
Sablefish	309,762	[b]		Sablefish	288,511	rougheye	7,964			yelloweye	10
						blackgill	2,444			yellowtail	4
						shortraker	3,710			shelf	19
						SST [c]	542	Sablefish	114,269	slope	4,121
										SST [c]	570
						Quileute					
Halibut	42,666	black	30	Halibut	45,034	black	0	Halibut	67,290	black	0
		lingcod	144			lingcod	1,599			lingcod	1,074
		canary	74			canary	25			canary	117
		yelloweye	2,365			yelloweye	4,224			yelloweye	3,287
		yellowtail	63			yellowtail	19			yellowtail	74
		widow	0			widow	0			widow	0
		POP	0			POP	0			POP	0
		darkblotched	0			darkblotched	0			darkblotched	0
		SST [c]	0			SST [c]	0			SST [c]	0
Sablefish	164,016	black	0	Sablefish	143,591	black	0	Sablefish	92,438	black	0
		lingcod	0			lingcod	0			lingcod	0
		canary	0			canary	0			canary	0
		yelloweye	0			yelloweye	0			yelloweye	0
		yellowtail	0			yellowtail	0			yellowtail	0
		widow	0			widow	0			widow	0
		POP	0			POP	0			POP	0
		darkblotched	0			darkblotched	0			darkblotched	0
		SST [c]	624			SST [c]	482			SST [c]	91
						Makah					
Halibut	151,268	black	0	Halibut	270,365	black	0	Halibut	294,618	black	0
		lingcod	2,289			lingcod	4,092			lingcod	10,793
		canary	19,547			canary	2,330			canary	597
		yelloweye	523			yelloweye	2,075			yelloweye	1,819
		yellowtail	0			yellowtail	382			yellowtail	235
		widow	3			widow	19			widow	0
		POP	0			POP	0			POP	0
		darkblotched	0			darkblotched	0			darkblotched	0
		SST [c]	0			SST [c]	0			SST [c]	0
Sablefish	490,229	black	0	Sablefish	464,723	black	0	Sablefish	227,740	black	0
		lingcod	0			lingcod	0			lingcod	0
		canary	0			canary	0			canary	0
		yelloweye	0			yelloweye	0			yelloweye	0
		yellowtail	0			yellowtail	0			yellowtail	0
		widow	0			widow	0			widow	0
		POP	0			POP	0			POP	0
		darkblotched	0			darkblotched	0			darkblotched	0
		SST [c]	7,662			SST [c]	10,081			SST [c]	9,229

a/ No black rockfish, lingcod, Pacific ocean perch, widow, or darkblotched caught for these fisheries/years for Quinault.
b/ Data unavailable.
c/ Shortspine thornyhead

TABLE 3.5.5-5. 2003 tribal sablefish allocations and discard estimates. (Page 1 of 1)

2003 Tribal OY = 650 mt				
dressed lb	895,619	**Trawl**	48,000	trawl landed dressed lbs.
Total lb	1,432,990		76,800	trawl landed round lbs.
			16,896	remaining trawl allowances + overage [a/]
			93,696	total trawl lbs.
1,432,990 - 93,696 =		**Longline**	1,339,294	total longline lbs. (total OY - trawl)
			40,179	longline discard mortality lbs. (3% of total longline)
			1,299,115	longline landed lbs.
1,299,115 + 76,800 =		**Total**	1,375,915	total landed lbs. (trawl + longline)
			96.02%	landed / total OY

a/ Sablefish taken in the tribal bottom trawl fishery are subject to full retention. All overages are forfeited to the tribe.

3.5.6 Communities

Fishing communities, as defined in the Magnuson-Stevens Act, include not only the people who actually catch the fish, but also those who share a common dependency on directly related fisheries-dependent services and industries. In commercial fishing this may include boatyards, fish handlers, processors, and ice suppliers. Similarly, entities that depend on recreational fishing may include tackle shops, small marinas, lodging facilities catering to out-of-town anglers, and tourism bureaus advertising charter fishing opportunities. People employed in fishery management and enforcement make up another component of fishing communities.

Fishing communities on the West Coast depend on commercial and/or recreational fisheries for many species. Participants in these fisheries employ a variety of fishing gears and combinations of gears. Naturally, community patterns of fishery participation vary coastwide and seasonally, based on species availability, the regulatory environment, and oceanographic and weather conditions. Communities are characterized by the mix of fishery operations, fishing areas, habitat types, seasonal patterns, and target species. While each community is unique, there are many similarities. For example, all face danger, safety issues, dwindling resources, and a multitude of state and federal regulations.

Individuals make up unique communities with differing cultural heritages and economic characteristics. Examples include a Vietnamese fishing community of San Francisco Bay and an Italian fishing community of Southern California. Native American communities with an interest in the groundfish fisheries are also considered. In most areas, fishers with a variety of ethnic backgrounds come together to form the fishing communities within local areas, drawn together by their common interests in economic and physical survival in an uncertain and changing ocean and regulatory environment.

Preceding sections of this document have provided numbers of commercial vessels, fish buyers, and charter vessels for various geographic regions. To the extent allowed by constraints on confidentiality (commercial) and data validity (recreational), information is also provided on the value of product landed and amount of recreational effort.

Supplemental county level economic and demographic information has been compiled for a general baseline description of West Coast fishing communities (PFMC 1999). This information may be accessed on the Council website (http://www.pcouncil.org/communities/comdoc.html).

3.5.6.1 Geographic Distribution of Commercial Fishing Fleet and Revenue

A list of Pacific Fisheries Information Network (PacFIN) ports comprising each port area group used in this section is shown in Figure 3.5.6-a and Table 3.5.6-1. For this discussion, there are 17 port groups arrayed north to south. Port groups were identified by several criteria, (1) avoid most disclosure issues regarding confidential information, (2) include the whole counties surrounding the ports, and (3) allow breaks along state lines to allow aggregation and display of information at the state level. The port area groups in each state are: Washington--Puget Sound, North Washington Coast, South and Central Washington Coast; Oregon--Astoria-Tillamook, Newport, Coos Bay, Brookings; California--Crescent City, Eureka, Fort Bragg, Bodega Bay, San Francisco, Monterey, Morro Bay, Santa Barbara, Los Angeles, San Diego.

Table 3.5.6-2 shows the number of vessels operating in different fisheries from each PacFIN port and port area during November 2000 through October 2001. The table shows major concentrations of the coastwide total 244 limited entry trawl vessels operating from Oregon and Northern California ports. The largest groundfish limited entry trawl fleets are shown in Astoria, Charleston, Newport, Crescent City, Fort Bragg, Westport, and Fields Landing. These are primarily engaged in the shelf and slope fisheries, but a majority are also engaged nearshore. There were also 28 vessels operating only in the at-sea whiting fishery. The 178 vessels in the limited entry fixed gear fleet are concentrated in the northern ports of Bellingham, Port

Angeles, Newport, Port Orford, Westport, Astoria, and Moss Landing. This group is dominated by the sablefish fleet operating primarily on the shelf and slope. Open access vessels deriving at least 5% of revenue from groundfish comprise the largest groundfish category of vessels in the table. These 771 vessels are distributed throughout the coast. In the North, these vessels are more engaged in shelf and slope fisheries. The southern fleet is more engaged nearshore. The second most numerous groundfish category is composed of the open access vessels deriving less than 5% of revenue from groundfish. Major concentrations of these 517 vessels operate from Newport, Charleston, Santa Barbara, and Garibaldi. The southern fleet is more active nearshore. Altogether there were 1,710 vessels recorded as landing significant quantities of groundfish of the total 4,589 vessels operating in all fisheries coastwide. Table 3.5.6-3 shows the geographic distribution of these vessels by length category.

Figure 3.5.6-2 shows the relative magnitude and geographical distribution of landings of groundfish species among West Coast port areas in 2001. The figure illustrates the areas with the highest volume of groundfish landings (diameter of the pie chart) are Newport, Astoria-Tillamook, and South and Central Washington Coast. These landings are predominantly made by limited entry trawl vessels. Figure 3.5.6-3 shows the corresponding distribution of exvessel revenue resulting from the landings in Figure 3.5.6-2. The figure shows the areas with the highest value of groundfish landings (diameter of the pie chart) are Astoria-Tillamook, Newport, and Coos Bay on the Oregon coast. These are also the areas most invested in the groundfish trawl fishery (size of shaded pie slice). The difference between the distribution of landings volume in Figure 3.5.6-2 and value in Figure 3.5.6-3 is due to the predominance of low-value whiting landings in Oregon and the presence of high-value, nontrawl sablefish landings along the entire coast. Groundfish and limited entry trawl, in particular, become relatively less important in terms of volume and value moving north or south from the Oregon and Washington coastal ports. In the Northern and Central California ports, limited entry trawl also dominates groundfish landings and value, although the magnitude is significantly less than in Oregon. Moving south from San Francisco, both the total value and the share of groundfish landed by the limited entry trawl fleet diminish. Along the northern coast, Brookings and North Washington Coast are somewhat unique in having nearly half of groundfish exvessel revenue landed by nontrawl sectors.

3.5.6.2 Geographic Distribution of Groundfish Buyers

Table 3.5.6-4 shows the number of buyers in West Coast ports purchasing groundfish and nongroundfish species from different categories of fisheries. The table shows that of the 1,283 total active buyers on the West Coast, 451 purchased groundfish from harvesters during the base period. Groundfish buyers are distributed all along the West Coast, but more heavily in some of the larger ports toward the south. The port area group with the greatest number of groundfish buyers was San Francisco with 69, led by the Port of San Francisco and Princeton with 31 and 29 buyers, respectively. Table 3.5.6-5 shows the distribution of buyers among ports broken down by the total value of exvessel purchases.

3.5.6.3 Geographic Distribution of Personal Income Impacts

Tables 3.5.6-6, 3.5.6-7, 3.5.6-8, and 3.5.6-9 display, for 1999 and 2001, estimated income impacts attributable to commercial harvesting and shoreside processing of Council-managed species in major port areas along the West Coast. These are total income impacts (direct, indirect, and induced effects), composed of the wages and salaries paid to primary producers, processors, and suppliers, and the additional income generated when those wages and salaries are spent in the local economy.

Income impact estimates were generated using the Fisheries Economic Assessment Model (FEAM) (Jensen 1996). FEAM uses historical landings data, information on industry cost and margin structure (vessels and processors), and income coefficients generated by IMPLAN (MIG 2000) to estimate "regionalized" local income impacts, after deducting for leakage in the form of payments to non-residents and to non-local suppliers, wholesalers and manufacturers. Three different components are included in the estimate of income impacts (1) direct income ! income paid directly to business owners and employees of fish harvesting and fish processing firms, (2) indirect income ! income paid to business owners and employees of firms supplying the fish harvesting and processing firms (e.g., engine repair and bait businesses), and (3) induced income ! income that is generated for owners and employees of other firms when recipients of direct and indirect income spend their money in the community (e.g., grocery stores and theaters). These effects should be thought of as those "associated with" the fishery rather than "generated by" the fishery, because in the absence of the fishing opportunity some of the income would still be generated in the community or elsewhere in the economy. For example, tourists visiting the coast for primary reasons other than fishing might spend their time and money on other activities, fishers not traveling to the coast for groundfish might spend their time and money on some alternative activity in another community, and the crew on vessels would seek an alternative source of income either within the community or elsewhere. Note that these measures estimate the income received by participants in the local economy, not gross sales or "turnover." Also note that these estimates assume changes in capital stock resulting from investment decisions are annualized, so the impact of purchasing or replacing capital assets (vessels, gear, buildings, plant, etc.) are amortized as a series of annual payments rather than treated as a lump sum purchase in any given year.

Tables 3.5.6-6 and 3.5.6-8 show the income in thousands of current U.S. dollars generated in 2001 and 1999, respectively, from harvesting and shoreside processing activities. Tables 3.5.6-7 and 3.5.6-9 display these dollar impacts as the percentage of each port area's income that is derived from each species group. From Table 3.5.6-6, the total income derived from commercial harvesting and shoreside processing of Council-managed species in 2001 was $579 million. California ports claimed $329 million, or 57% of this total. Oregon's share was $125 million (22%) and Washington's $82 million (14%). The West Coast at-sea whiting fishery was responsible for an additional $43 million (7%), much of which probably accrued to the Northern Oregon ports. From Table 3.5.6-7, in 1999 California's share of a total $686 million (not adjusted for inflation) was $417 million (61%), Oregon's share was $132 million (19%), and Washington's share was $80 million (12%). The remaining $57 million (8%) was attributable to the at-sea sector. West Coast commercial fishery-generated income declined 15% between 1999 and 2001, not adjusted for inflation. The change in groundfish-generated income over the same period was more severe: a decline of 21%.

Tables 3.5.6-7 shows that of the coastwide total $579 million income attributable to commercial harvesting and shoreside processing of Council-managed species groups in 2001, about 26% was due to groundfish-related activity. However, the distribution of groundfish-related activity was very uneven, with Oregon being most heavily dependent (43% of fishery-related income), Washington next (29% of fishery-related income), and California least dependent on groundfish relative to fishery-related income at 10%. Table 3.5.6-9 shows that compared with 2001, in 1999 groundfish were slightly more important coastwide, generating 28% of fishery-related income. Groundfish harvest in 1999 was also more important in Oregon and Washington than in California, accounting for 52% and 33% of total fishery-generated income in Oregon and Washington, respectively.

3.5.6.4 Dependence on and Engagement in Fishing and Fishing-related Activities

Table 3.5.6-10 displays estimated income and employment resulting from all commercial fishing activities for each port area group from November 2000 through October 2001. Indices are calculated as the percentage of total area personal income or total employment that is generated by commercial fishing and processing activities via local economic linkages. Note that income and employment rankings for all commercial fishery activity are broadly consistent, but show slight discrepancies due to differing shares of wage and non-wage income in each area's total personal income. Also displayed in the table are estimated income and employment derived from the groundfish fishery, split between limited entry trawl and other groundfish gear.

By examining the rankings in the first block of the table we get an idea of how engaged each port area is in commercial fishing relative to other opportunities in the regional economy. Both the income and employment measures indicate the area most heavily invested in commercial fishing relative to its economy is the south Washington coast. Next most engaged are Newport and Astoria-Tillamook in Oregon, and Crescent City, California. Brookings and Central Washington coast alternate for 5th and 6th place depending on whether the income or employment measure is used. By this measure the least engaged port areas are the large, relatively urbanized centers of Puget Sound, San Diego, San Francisco, and Los Angeles. While these areas certainly include local pockets that are heavily engaged in fishing activities, the size and diversity of the surrounding economies tends to mask the significance of locally important factors.

The second block on the first page of the table shows how much of the total fishery-related income and employment in each region is generated by groundfish activity. This measure shows Puget Sound, North Washington Coast, Astoria-Tillamook, and Eureka all dependent on groundfish for at least 50% of fishery-related income and employment. All but four of the port groups generate at least 14% of fishery-related income from groundfish.

The second page of the table splits the groundfish totals into limited entry trawl and other gear components. From this information we see that of the regions highly involved in groundfish, Astoria-Tillamook, Puget Sound, Newport, and Eureka-derive more than 40% of groundfish income from the limited entry trawl fishery. Only the North Washington coast derives more than one-third of groundfish income from nontrawl sources.

Table 3.5.6-11 shows estimated personal income generated in 2001 by the West Coast ocean recreational fishery. These estimates were also generated using the Fisheries Economic Assessment Model. The ocean recreational fishery accounted for $254 million in personal income and almost 10,000 jobs in 2001. Of this, groundfish trips accounted for $71 million and 2,800 jobs, respectively or about 28% of the total. The proportion of income associated with groundfish trips ranged from 17% in Washington to 45% in Oregon. The ratio of charter angler trips to private vessel participation was much greater in Northern and Southern California than in Washington and Oregon, probably reflecting differences in species opportunities, season length and weather along the coast.

3.5.6.5 Demographics, Ethnic, and Social Characteristics

Table 3.5.6-12 displays the most recent (2001) information on the components of total personal income in counties along the West Coast, Puget Sound, and Lower Columbia River. The counties are ranked on the basis of several different average or per capita income measures. In terms of total per capita personal income, the urban Northern California counties are on top, with Marin county ranked number one, followed by two other Bay Area counties: San Mateo and San Francisco. Figure 3.5.6-4 illustrates the distribution of per capita income among regional counties. San Mateo and San Francisco also rank first and second in terms of average annual wage, a measure of the strength of these economies as centers of high wage employment, with King county Washington at number three. Marin, San Mateo, and San Francisco counties are ranked first, second, and third in terms of per capita non-labor income (dividends, interest and rent). The status of Marin county as a top bedroom community for San Francisco-bound commuters is betrayed by its ranking as number one in terms of residence adjustment, a net measure of income brought home by resident commuters minus the income carried out by non-residents. The number two and three spots in this category are held by Contra Costa, California and Columbia County, Oregon, respectively. The four poorest counties in the region, measured by per capita income, are Del Norte County in California, and Klickitat, Pacific and Grays Harbor counties in Washington.

Transfer payments include welfare and Social Security benefits received from federal, state, and local governments. As such it can be both a measure of how dependent an area is on public assistance or an indicator of how attractive an area is as a retirement destination. By this measure, Pacific County, Washington is number one, followed by Curry County, Oregon and Clallam County in Washington. Looking at dividends, interest and rent (a measure of wealth) expands this picture. By this measure, Curry and

Clallam counties rank relatively high (7th and 11th respectively), but Pacific County is well down the list at 33rd, indicating that Pacific is probably the poorer of the three counties.

Table 3.5.6-13 and Figures 3.5.6-5 and 3.5.6-6 display some additional socioeconomic information about the coastal counties. The variables shown in the table represent the latest available county-level data. A pattern discernible in Figure 3.5.6-5 shows clusters of counties with relatively high unemployment rates arrayed along the lower Washington coast, Columbia River, and southern Oregon coast. Monterey and Del Norte were the only counties in California with unemployment rates among the highest ten. Three of the four counties with highest unemployment rates in 2002 were located in southwestern Washington.

Figure 3.5.6-5 also displays the national average unemployment rate and the state averages for the three coastal states. Unemployment rates for all three states were significantly above the national average in 2002. In Washington, 11 of the 15 counties displayed had higher unemployment rates than the state average. In Oregon, 7 of 11 counties displayed had higher than state-average unemployment. In California, 7 of 19 counties displayed had unemployment rates higher than the state average.

Looking at poverty rates tells another story. Four of the six counties with the highest poverty rate in 1999 were located in California and two are in Washington. Washington had three counties among the poorest ten. Figure 3.5.6-6 shows a band of counties with high poverty rates along the West Coast. Note also, the national and state average poverty rates shown in the figure. California's state average of 14.2% was considerably higher than the 12.4% national rate. Both Washington's and Oregon's poverty rates were lower than the national average.

Median income is a measure of relative household affluence and also an indicator of income distribution. It represents the income level of the household at the exact middle of the county income distribution. Although harder to measure, median income is a better gauge of income distribution than per capita income, because the median is not skewed by the presence of very high income individuals. Also, since it is a household measure, median income incorporates additional information about the size and structure of resident households. In 1999, Del Norte County in Northern California had the lowest median income. Of the next four lowest median income counties, two are located along the Oregon coast (Curry and Coos), one is in California (Humboldt) and another is in Washington (Pacific). The discrepancy between median and per capita income rankings may be due to different average household size, age composition, or the presence or absence of relatively high income persons. The two statistics are also measured for different years (1999 for median household income versus 2001 for personal income), use different survey methodology, and include different items counted as "income."

Table 3.5.6-13 includes information on the race of county households as reported by the 2000 Census. Counties with highest concentrations of minority populations are generally in California. Oregon counties are the least racially diverse of the group. Eight of 11 Oregon counties were at least 90% white. Only Hood River County on the Columbia River has a minority population above 10% (Hispanic or Latino). Three Oregon counties have among the 10 most concentrated Native American populations in the region (Wasco, Lincoln, and Coos). Only urban Multnomah County has an African American population concentration in the top 10.

In Washington, only five of the fifteen counties were more than 90% white. Four Washington counties had Native American populations in the top ten, two had African American populations in the top ten, and one had an Asian population in the top ten.

California counties were the most racially diverse. None of the 19 California counties was more than 85% white. California counties had six of the top ten regional concentrations of African Americans, three of the top ten Native American, nine of the top ten Asian and nine of the top ten proportions of Hispanic or Latino households.

The highest proportion of African American households are found in the California counties of Solano, Alameda, and Los Angeles; and in Pierce County, Washington. Native Americans are most represented in Del Norte, Humboldt and Mendocino counties in Northern California, and Clallam and Grays Harbor in Washington. The highest concentrations of Asian households were reported in Bay Area counties of San Francisco, Alameda, San Mateo and Solano; and Orange and Los Angeles counties in Southern California. All of the five counties reporting at least 30% of households as Hispanic or Latino were in California, led by Monterey (46.8%) and Los Angeles (44.6%), and including Santa Barbara, Ventura, and Orange.

3.5.6.6 Social Structure: Networks, Values, Identity

The fishing community on the West Coast is composed of many separate communities based on fishery, gear type, targeted species, geography and, to some degree, cultural background and ethnicity. For example, the Port of Astoria has Finnish roots that are celebrated in community festivals, and Native American communities have ties to the fishery that date back thousands of years.

Commercial fishing enterprises in Washington, Oregon, and California are socially and culturally diverse. However, most tend to be family-run businesses. While most fishers are male, women are often involved in the shoreside aspects of the fishing business and provide an important support and communications network for the fishing community. Few fishing families own multiple boats, and few boats are owned by large corporations. In many communities, families can trace several generations of involvement in the fishing industry.

Recreational fishing is also an important part of many communities' identities. The recreational fishing industry includes charter boats, guides, marinas; and gear, bait, and other suppliers. Many of these businesses are also family-owned and operated. In addition to their direct impact on the local community, the recreational fishing industry supports a broad-based community of thousands of individual boat owners and shore fishers participating in ocean and inland recreational fisheries.

The commercial fishing industry generally places a high value on independence. Fishing necessarily occurs at sea, and frequently attracts people who enjoy solitude and self-direction. This sense of independence and self-reliance contrasts sharply with the increasingly stringent controls being placed on the industry.

Fishing is also known for its high level of danger; it is consistently rated among the most dangerous professions in the United States. Despite this danger, there are few safety nets for people in the industry. Crew members are not technically "employees" and are not eligible for unemployment insurance, workers' compensation, and other benefits normally associated with workers in other demanding and dangerous occupations. Vagaries of weather, market conditions and regulations demand high levels of flexibility. Many crew members are itinerant, moving from port to port and job to job (Gilden 1999).

The challenges of pursuing and maintaining fishing-based livelihoods have caused fishers to form organizations to represent common interests. Examples include the Coos Bay Trawlers Association, the Newport Fishermen's Wives Association, the Pacific City Dorymen's Association, the Fishermen's Marketing Association, the Pacific Marine Conservation Council, the West Coast Fishermen's Alliance, the Western Fishboat Owner's Association and the Women's Coalition for Pacific Fisheries (Gilden 1999). These organizations help the multiple facets of the fishing community represent their interests to policy makers and the general public.

3.5.6.7 Impact on the Built Environment in Fishing Communities

While few coastal communities depend exclusively on fishing; harvesting, processing and related support industries (fuel, docks, ice, gear repair, etc.) are part of a complex web of interaction with other economic activities such as sport fishing, whale watching, tourism and other recreational activities. Commercial and recreational fishers coexist, and both contribute financially to the businesses and infrastructure that serve and support them. Communities such as Newport, Oregon celebrate their fishing industry, having turned the port waterfront into a major tourist attraction. This is also true for many other historic ports in Washington, Oregon, and California. Maintenance of port facilities for the fishing fleet provides access for other user groups, such as recreational fishers and boaters, and draws tourists who are attracted to the sights and smells of a working fishing port.

The presence of a viable commercial fleet helps provide the funding and incentive to dredge harbor entrances and to maintain jetties and port facilities. These in turn assist the recreational industry and private users to operate safely and efficiently from coastal ports. Seafood processors and shoreside support businesses pay property taxes and license fees to the port cities and surrounding jurisdictions, thereby contributing to the maintenance of the local infrastructure for all area residents.

The following are examples of fishery-related effects on port infrastructure. In ports such as Brookings and Garibaldi in Oregon, reduction in fishing fleets has coincided with the silting of harbor entrances due to reduced dredging. This has restricted access for larger vessels, including trawlers, and made it more difficult for a fleet to become established in the future (Gilden 1999). In another example, the Port of Astoria recently added a new breakwater to provide additional moorage for larger vessels involved in the new sardine fishery (Oregon Coastal Zone Management Association 2002).

TABLE 3.5.6-1. Location and composition of port groups. (Page 1 of 2)

State	Port Group Area	County	PCID	Name
Washington	Puget Sound	Whatcom	BLN	Blaine
		Whatcom	BLL	Bellingham Bay
		San Juan	FRI	Friday Harbor
		Skagit	ANA	Anacortes
		Skagit	LAC	La Conner
		Snohomish	ONP	Other North Puget Sound Ports
		Snohomish	EVR	Everett
		King	SEA	Seattle
		Pierce	TAC	Tacoma
		Thurston	OLY	Olympia
		Mason	SHL	Shelton
		Unknown	OSP	Other South Puget Sound Ports
	North Washington Coast	Jefferson	TNS	Port Townsend
		Clallam	SEQ	Sequim
		Clallam	PAG	Port Angeles
		Clallam	NEA	Neah Bay
		Clallam	LAP	La Push
	South & Central WA Coast	Grays Harbor	CPL	Copalis Beach
		Grays Harbor	GRH	Grays Harbor
		Grays Harbor	WPT	Westport
		Pacific	WLB	Willapa Bay
		Pacific	LWC	Ilwaco/chinook
		Klickitat	OCR	Other Columbia River Ports
	Unidentified WA	Pacific	OWC	Other Washington Coastal Ports
		Unknown	OWA	Unknown WA Ports
Oregon	Astoria	Multnomah	CRV	Psuedo Port Code for Columbia R.
		Clatsop	AST	Astoria
		Clatsop	GSS	Gearhart - Seaside
		Clatsop	CNB	Cannon Beach
		Unknown	WAL	Landed in WA; Transp. to OR
	Tillamook	Tillamook	NHL	Nehalem Bay
		Tillamook	TLL	Tillamook / Garibaldi
		Tillamook	NTR	Netarts Bay
		Tillamook	PCC	Pacific City
	Newport	Lincoln	SRV	Salmon River
		Lincoln	SLZ	Siletz Bay
		Lincoln	DPO	Depoe Bay
		Lincoln	NEW	Newport
		Lincoln	WLD	Waldport
		Lincoln	YAC	Yachats
	Coos Bay	Lane	FLR	Florence
		Douglas	WIN	Winchester Bay
		Coos	COS	Coos Bay
		Coos	BDN	Bandon
	Brookings	Curry	ORF	Port Orford
		Curry	GLD	Gold Beach
		Curry	BRK	Brookings

TABLE 3.5.6-1. Location and composition of port groups. (Page 2 of 2)

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
	Santa Barbara	Santa Barbara	SB	Santa Barbara
		Santa Barbara	SBA	Santa Barbara Area
		Ventura	HNM	Port Hueneme
		Ventura	OXN	Oxnard
		Ventura	VEN	Ventura
		Ventura	OBV	Other S.B. and Ven. Co. Ports
	Los Angeles	Los Angeles	TRM	Terminal Island
		Los Angeles	SPA	San Pedro Area
		Los Angeles	SP	San Pedro
		Los Angeles	WLM	Willmington
		Los Angeles	LGB	Longbeach
		Orange	NWB	Newport Beach
		Orange	DNA	Dana Point
		Orange	OLA	Other LA and Orange Co. Ports
	San Diego	San Diego	SD	San Diego
		San Diego	OCN	Oceanside
		San Diego	SDA	San Diego Area
		San Diego	OSD	Other S.D. Co. Ports
	Unidentified CA	Unknown	OCA	Unknown CA Ports

TABLE 3.5.6-2. Number of vessels by vessel primary port and species group in 2001.[a/] (Page 1 of 5)

	Vessels with Limited Entry Trawl Permits						Vessels with Fixed Gear Limited Entry Permits (No Trawl Permit)					Open Access Vessels with More than 5% Revenue from Groundfish					Open Access Vessels with Less than 5% Revenue from Groundfish						Vessels Participating in Other Fisheries							
	Whiting	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Total Groundfish	Halibut (Pac & CA)	Shrimp/Prawns	Crabs	Salmon	HMS	CPS	Other	Total
Blaine	2	4	4	4	4	4	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	5	-	-	11	-	-	-	117	119
Bellingham	1	5	5	5	5	5	19	2	14	17	19	-	-	1	-	1	-	-	-	-	-	25	13	-	14	-	5	2	203	210
Point Roberts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	6	6
Friday Harbor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3
Anacortes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	74	74
LaConner	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1	-	1	1	1	2	2	-	3	-	-	-	25	25
Everett	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	51	51
Seattle	-	-	-	-	-	-	2	-	-	2	2	-	-	-	-	-	-	-	1	-	1	3	3	-	12	1	7	1	75	93
Tacoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	2	-	26	27
Shelton	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4
Centralia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	14
Puget Sound Total	**3**	**9**	**9**	**9**	**9**	**9**	**21**	**2**	**14**	**19**	**21**	**1**	**0**	**1**	**0**	**2**	**3**	**1**	**3**	**2**	**4**	**36**	**19**	**1**	**42**	**3**	**14**	**3**	**598**	**626**
Port Townsend	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	23	23
Quilcene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2
Sequim	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	10
Port Angeles	-	3	3	3	3	3	14	1	13	14	15	12	6	17	8	20	-	-	4	1	4	42	19	-	1	11	2	-	25	58
Neah Bay	-	3	3	3	3	3	-	-	-	-	-	-	-	2	-	2	-	-	-	-	-	5	2	-	-	-	-	-	3	5
La Push	-	-	-	-	-	-	2	1	2	2	2	3	1	2	2	3	-	-	-	-	-	5	1	-	6	-	2	-	4	10
North WA Coast Total	**0**	**6**	**6**	**6**	**6**	**6**	**16**	**2**	**15**	**16**	**17**	**15**	**7**	**21**	**10**	**25**	**0**	**0**	**4**	**1**	**4**	**52**	**22**	**0**	**7**	**11**	**5**	**0**	**67**	**108**
Copalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	10
Aberdeen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	2
Westport (WA)	5	11	5	12	11	12	11	-	9	11	11	6	-	4	4	6	7	1	21	3	22	51	16	13	100	40	58	9	44	178
Central WA Coast Total	**5**	**11**	**5**	**12**	**11**	**12**	**11**	**0**	**9**	**11**	**11**	**6**	**0**	**4**	**4**	**6**	**7**	**1**	**21**	**3**	**22**	**51**	**16**	**13**	**101**	**41**	**58**	**9**	**54**	**190**

TABLE 3.5.6-2. Number of vessels by vessel primary port and species group in 2001.[a/] (Page 2 of 5)

	Vessels with Limited Entry Trawl Permits						Vessels with Fixed Gear Limited Entry Permits (No Trawl Permit)					Open Access Vessels with More than 5% Revenue from Groundfish					Open Access Vessels with Less than 5% Revenue from Groundfish						Vessels Participating in Other Fisheries							
	Whiting	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Total Groundfish	Halibut (Pac & CA)	Shrimp/Prawns	Crabs	Salmon	HMS	CPS	Other	Total
Tokeland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	4	2	4	4	-	4	20	-	2	-	35	57
Ilwaco	1	4	2	4	4	4	3	3	4	3	4	5	-	2	2	5	15	2	22	8	29	42	25	7	51	35	96	7	61	163
Pacific County	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	46	47
Columbia River	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	173	173
South WA Coast Total	**1**	**4**	**2**	**4**	**4**	**4**	**3**	**3**	**4**	**3**	**4**	**5**	**0**	**2**	**2**	**5**	**18**	**2**	**26**	**10**	**33**	**46**	**25**	**11**	**72**	**36**	**98**	**8**	**315**	**440**
Astoria	4	31	18	31	30	31	11	-	9	7	11	11	3	9	7	12	17	4	16	9	19	73	21	23	66	27	68	19	43	164
Gearhart-Seaside	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	2
Cannon Beach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	2
Nehalem Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	2
Garibaldi (Tillamook)	-	3	3	3	3	3	-	-	-	-	-	-	7	5	-	7	2	12	21	2	27	37	18	-	18	47	26	1	14	71
Pacific City	-	-	-	-	-	-	-	-	-	-	-	-	17	13	-	17	-	-	-	-	-	17	-	-	2	8	5	-	2	21
Astoria-Tillamook Total	**4**	**34**	**21**	**34**	**33**	**34**	**11**	**0**	**9**	**7**	**11**	**11**	**27**	**27**	**7**	**36**	**19**	**16**	**37**	**11**	**46**	**127**	**39**	**23**	**88**	**86**	**99**	**20**	**59**	**262**
Depoe Bay	-	-	-	-	-	-	-	-	-	-	-	-	3	3	-	3	1	1	1	1	2	5	2	-	5	4	3	-	8	12
Newport	15	26	12	25	25	26	13	3	11	10	14	7	5	8	2	9	24	10	87	24	90	139	94	21	89	157	157	13	50	267
Waldport	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	6
Newport Total	**15**	**26**	**12**	**25**	**25**	**26**	**13**	**3**	**11**	**10**	**14**	**7**	**8**	**11**	**2**	**12**	**25**	**11**	**88**	**25**	**92**	**144**	**96**	**21**	**100**	**161**	**160**	**13**	**58**	**285**
Florence	-	-	-	-	-	-	3	-	1	1	3	-	1	1	1	1	1	1	8	-	8	12	7	-	10	27	15	1	3	30
Winchester	-	-	-	-	-	-	3	-	3	-	3	1	-	-	-	1	-	3	9	-	10	14	6	1	12	25	14	-	4	35
Charleston (Coos Bay)	4	26	17	29	27	29	8	-	7	3	9	12	15	16	7	21	5	14	30	3	34	93	18	25	59	84	77	3	47	146
Bandon	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	2	-	1	2	-	2	4	-	-	2	4	2	-	-	8
Coos Bay Total	**4**	**26**	**17**	**29**	**27**	**29**	**14**	**0**	**11**	**4**	**15**	**13**	**18**	**18**	**8**	**25**	**6**	**19**	**49**	**3**	**54**	**123**	**31**	**26**	**83**	**140**	**108**	**4**	**54**	**219**
Port Orford	-	-	-	-	-	-	11	14	14	14	14	8	35	36	33	37	-	7	5	2	7	58	12	-	30	27	11	-	53	67
Gold Beach	-	-	-	-	-	-	-	-	-	-	-	-	20	19	17	20	-	2	2	2	2	22	-	-	1	3	1	-	23	23
Brookings	-	4	3	4	4	4	3	1	2	1	3	1	25	25	9	28	1	9	9	-	12	47	3	3	33	28	20	-	34	71
Brookings Total	**0**	**4**	**3**	**4**	**4**	**4**	**14**	**15**	**16**	**15**	**17**	**9**	**80**	**80**	**59**	**85**	**1**	**18**	**16**	**4**	**21**	**127**	**15**	**3**	**64**	**58**	**32**	**0**	**110**	**161**
Crescent	**2**	**20**	**14**	**20**	**20**	**20**	**8**	**4**	**5**	**2**	**9**	**7**	**35**	**35**	**7**	**37**	**4**	**8**	**15**	**3**	**19**	**85**	**11**	**21**	**118**	**31**	**45**	**4**	**44**	**141**

TABLE 3.5.6-2. Number of vessels by vessel primary port and species group in 2001.[a/] (Page 3 of 5)

	Vessels with Limited Entry Trawl Permits						Vessels with Fixed Gear Limited Entry Permits (No Trawl Permit)					Open Access Vessels with More than 5% Revenue from Groundfish					Open Access Vessels with Less than 5% Revenue from Groundfish						Vessels Participating in Other Fisheries							
City	Whiting	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Total Groundfish	Halibut (Pac & CA)	Shrimp/Prawns	Crabs	Salmon	HMS	CPS	Other	Total
Orick	-	-	-	-	-	-	-	-	-	-	-	1	8	8	1	8	-	-	1	-	1	9	1	-	4	7	2	-	-	12
Trinidad	-	-	-	-	-	-	-	-	-	-	-	-	5	6	-	6	-	1	1	-	1	7	-	-	23	2	1	-	3	27
Eureka Area	1	16	15	16	16	16	4	2	4	4	4	13	13	12	8	17	2	1	1	-	2	39	7	5	51	33	17	1	36	78
Fields Landing	3	10	7	10	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	2	1	7	2	-	1	8	14
Eureka Total	**4**	**26**	**22**	**26**	**26**	**26**	**4**	**2**	**4**	**4**	**4**	**14**	**26**	**26**	**9**	**31**	**2**	**2**	**3**	**0**	**4**	**65**	**10**	**6**	**85**	**44**	**20**	**2**	**47**	**131**
Fort Bragg	-	12	5	12	12	12	3	1	3	3	4	27	36	34	6	57	4	5	3	1	8	81	3	3	26	49	19	1	56	130
Albion	-	-	-	-	-	-	-	-	-	-	-	2	6	5	-	7	-	1	1	-	2	9	-	-	2	2	1	-	12	17
Point Arena	-	-	-	-	-	-	-	-	-	-	-	-	4	3	1	4	-	3	2	1	4	8	-	-	5	3	1	-	11	19
Fort Bragg Total	**0**	**12**	**5**	**12**	**12**	**12**	**3**	**1**	**3**	**3**	**4**	**29**	**46**	**42**	**7**	**68**	**4**	**9**	**6**	**2**	**14**	**98**	**3**	**3**	**33**	**54**	**21**	**1**	**79**	**166**
Bodega Bay	-	-	-	-	-	-	2	2	2	1	2	1	21	23	7	26	1	1	11	1	11	39	14	-	44	125	28	1	24	171
Cloverdale	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2	-	3	3	4	-	6	4	1	-	17	24
Yountville	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1	1	-	-	-	1	2	1	-	10	2	-	-	9	15
Tomales Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	1
Point Reyes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	6	8	1	-	-	10
Sausilito	-	-	-	-	-	-	-	-	-	-	-	1	-	1	1	1	-	4	5	-	5	6	7	-	4	21	6	1	39	53
Bodega Bay Total	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**2**	**1**	**2**	**2**	**22**	**25**	**8**	**28**	**2**	**8**	**18**	**1**	**20**	**50**	**33**	**-**	**70**	**161**	**36**	**2**	**89**	**274**
Oakland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Alameda	-	-	-	-	-	-	-	-	-	-	-	-	2	1	1	2	-	-	-	-	-	2	-	-	-	1	-	-	2	3
Berkeley	-	-	-	-	-	-	-	-	-	-	-	1	8	9	3	10	-	-	-	-	-	10	5	-	-	4	2	-	8	15
Richmond	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	-	-	1	-	1	3	3	1	-	5	-	-	1	10
San Francisco	-	6	6	6	6	6	6	6	8	7	9	9	22	21	12	27	1	5	7	1	9	51	33	3	29	59	17	2	86	155
Princeton	1	6	8	8	7	8	3	2	2	3	3	8	39	36	8	44	1	6	6	3	11	66	34	2	56	74	30	10	43	135
San Francisco Total	**1**	**12**	**14**	**14**	**13**	**14**	**9**	**8**	**10**	**10**	**12**	**18**	**71**	**68**	**25**	**85**	**2**	**11**	**14**	**4**	**21**	**132**	**75**	**6**	**85**	**143**	**49**	**12**	**141**	**319**
Gilroy	-	-	-	-	-	-	-	-	-	-	-	-	10	8	2	10	-	-	-	-	-	10	-	-	1	-	1	-	8	10
Santa Cruz	-	2	2	2	2	2	-	-	-	-	-	9	11	11	10	18	1	5	4	1	6	26	18	-	7	31	19	3	19	46
Moss Landing	-	8	6	8	8	8	11	2	6	11	11	19	24	23	13	38	1	2	2	1	6	63	27	2	6	71	42	7	38	132
Monterey	-	2	2	2	2	2	-	1	-	1	1	1	25	23	6	26	2	3	1	3	6	35	23	5	1	50	10	5	42	81

TABLE 3.5.6-2. Number of vessels by vessel primary port and species group in 2001.[a/] (Page 4 of 5)

	Vessels with Limited Entry Trawl Permits						Vessels with Fixed Gear Limited Entry Permits (No Trawl Permit)					Open Access Vessels with More than 5% Revenue from Groundfish					Open Access Vessels with Less than 5% Revenue from Groundfish						Vessels Participating in Other Fisheries							
	Whiting	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Total Groundfish	Halibut (Pac & CA)	Shrimp/Prawns	Crabs	Salmon	HMS	CPS	Other	Total
Monterey Total	**0**	**12**	**10**	**12**	**12**	**12**	**11**	**3**	**6**	**12**	**12**	**29**	**70**	**65**	**31**	**92**	**4**	**10**	**7**	**5**	**18**	**134**	**68**	**7**	**15**	**152**	**72**	**15**	**107**	**269**
San Simeon	-	-	-	-	-	-	-	-	-	-	-	-	6	6	-	6	-	-	-	-	-	6	-	-	-	-	-	-	3	6
Morro Bay	-	2	2	2	2	2	-	1	2	-	2	2	56	49	10	57	2	16	13	7	20	81	26	9	19	36	68	6	55	122
Avila	1	5	2	5	5	5	-	-	1	1	1	-	50	47	2	50	-	10	8	1	10	66	32	5	17	9	31	3	46	78
Morro Bay Total	**1**	**7**	**4**	**7**	**7**	**7**	**0**	**1**	**3**	**1**	**3**	**2**	**112**	**102**	**12**	**113**	**2**	**26**	**21**	**8**	**30**	**153**	**58**	**14**	**36**	**45**	**99**	**9**	**104**	**206**
Santa Barbara	-	-	-	-	-	-	-	-	-	-	-	-	31	16	11	31	-	25	13	10	29	60	32	15	46	4	20	10	111	136
Santa Cruz Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	1
Ventura	-	-	-	-	-	-	1	-	1	1	1	2	9	8	9	12	1	9	8	7	10	23	15	8	17	1	16	8	29	43
Oxnard	-	-	-	-	-	-	6	4	6	6	6	2	14	8	9	14	-	14	5	10	17	37	13	8	19	-	14	3	58	64
Port Hueneme	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	2	3	31	9	31
Santa Barbara Total	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**4**	**8**	**7**	**8**	**4**	**54**	**32**	**29**	**57**	**1**	**48**	**26**	**27**	**56**	**121**	**61**	**31**	**82**	**7**	**54**	**52**	**207**	**275**
Terminal Island	-	-	-	-	-	-	1	1	1	1	1	2	19	9	10	19	1	9	6	2	12	32	35	7	28	2	47	26	100	126
San Pedro	-	-	-	-	-	-	-	-	-	-	-	-	7	8	3	10	-	17	12	5	18	28	16	2	18	1	51	53	59	112
Willmington	-	-	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	1	1	-	1	-	1	1	1	2
Catalina Island	-	-	-	-	-	-	-	-	-	-	-	2	6	2	4	8	-	3	2	1	4	12	10	3	15	-	12	9	26	41
Long Beach	-	-	-	-	-	-	-	-	-	-	-	-	2	3	1	3	-	-	-	-	-	3	4	-	1	-	4	1	4	6
Newport Beach	-	-	-	-	-	-	4	2	3	4	5	1	1	2	2	2	1	1	-	-	2	9	3	3	8	-	4	5	11	18
Dana Point	-	-	-	-	-	-	-	1	-	-	1	-	1	1	-	1	-	2	-	-	2	4	-	3	26	-	4	-	18	33
Los Angeles Total	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**5**	**5**	**6**	**8**	**5**	**36**	**25**	**20**	**43**	**2**	**32**	**20**	**8**	**38**	**89**	**69**	**18**	**97**	**3**	**123**	**95**	**219**	**338**
North Shore	-	-	-	-	-	-	-	-	-	-	-	1	3	8	5	8	1	6	9	6	10	18	5	5	26	-	18	7	30	49
San Diego	-	-	-	-	-	-	-	1	1	-	1	1	7	6	5	10	1	5	4	1	7	18	6	2	30	-	37	11	41	65
Oceanside	-	-	-	-	-	-	5	1	2	5	5	-	1	3	2	3	-	4	2	2	4	12	2	3	9	-	15	2	14	26

TABLE 3.5.6-2. Number of vessels by vessel primary port and species group in 2001.[a/] (Page 5 of 5)

	Vessels with Limited Entry Trawl Permits						Vessels with Fixed Gear Limited Entry Permits (No Trawl Permit)					Open Access Vessels with More than 5% Revenue from Groundfish					Open Access Vessels with Less than 5% Revenue from Groundfish						Vessels Participating in Other Fisheries							
	Whiting	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Total Groundfish	Halibut (Pac & CA)	Shrimp/Prawns	Crabs	Salmon	HMS	CPS	Other	Total
San Diego Total	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**2**	**3**	**5**	**6**	**2**	**11**	**17**	**12**	**21**	**2**	**15**	**15**	**9**	**21**	**48**	**13**	**10**	**65**	**0**	**70**	**20**	**85**	**140**
Other California	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	8	10
At-Sea Only	**28**	**20**	**2**	**28**	**23**	**28**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**28**	**11**	**-**	**2**	**26**	**9**	**28**	**25**	**28**
Grand Total	**68**	**229**	**146**	**242**	**232**	**243**	**158**	**57**	**138**	**136**	**178**	**179**	**623**	**601**	**252**	**771**	**104**	**237**	**389**	**126**	**517**	**1709**	**675**	**214**	**1247**	**1202**	**1172**	**297**	**2470**	**4588**

NOTE: The Primary port is the port at which the vessel made more landings than any other port, as measured in terms of exvessel value. Vessels in the "at-sea only" row are those that made no shoreside landings. Vessels delivering at-sea that had some shoreside landings were assigned to a primary port based on their shoreside landings. Source: Derived from PacFIN monthly vessel summary files.

a/ Actual period is November 2000 through October 2001.

TABLE 3.5.6-3. Number of vessels by port by length class in 2001.[a/] (Page 1 of 2)

	Vessel Length Category							
	<40'	40'-50'	50'-60'	60'-70'	70'-150'	>150'	Unspecified	Total
Blaine	75	18	17	3	4	-	2	119
Bellingham	109	33	39	16	9	1	3	210
Point Roberts	6	-	-	-	-	-	-	6
Friday Harbor	3	-	-	-	-	-	-	3
Anacortes	70	1	2	-	-	-	1	74
LaConner	24	1	-	-	-	-	-	25
Everett	34	8	4	3	-	-	2	51
Seattle	48	19	15	5	6	-	-	93
Tacoma	17	4	4	1	-	-	-	26
Shelton	4	-	-	-	-	-	-	4
Centralia	13	1	-	-	-	-	-	14
Puget Sound Total	**403**	**85**	**81**	**28**	**19**	**1**	**8**	**625**
Port Townsend	18	1	2	1	1	-	-	23
Quilcene	2	-	-	-	-	-	-	2
Sequim	10	-	-	-	-	-	-	10
Port Angeles	36	17	4	-	1	-	-	58
Neah Bay	2	2	1	-	-	-	-	5
La Push	4	4	2	-	-	-	-	10
North WA Coast Total	**72**	**24**	**9**	**1**	**2**	**0**	**0**	**108**
Copalis	-	4	6	-	-	-	-	10
Aberdeen	2	-	-	-	-	-	-	2
Westport (WA)	56	53	41	16	12	-	-	178
Central WA Coast Total	**58**	**57**	**47**	**16**	**12**	**0**	**0**	**190**
Tokeland	50	2	2	1	2	-	-	57
Ilwaco	69	36	27	16	15	-	-	163
Pacific County	45	-	1	-	-	-	1	47
Columbia River	173	-	-	-	-	-	-	173
South WA Coast Total	**337**	**38**	**30**	**17**	**17**	**0**	**1**	**440**
Astoria	37	55	20	25	24	-	3	164
Gearhart-Seaside	2	-	-	-	-	-	-	2
Cannon Beach	2	-	-	-	-	-	-	2
Nehalem Bay	2	-	-	-	-	-	-	2
Garibaldi (Tillamook)	57	11	3	-	-	-	-	71
Pacific City	21	-	-	-	-	-	-	21
Astoria-Tillamook Total	**121**	**66**	**23**	**25**	**24**	**0**	**3**	**262**
Depoe Bay	9	3	-	-	-	-	-	12
Newport	103	89	36	20	19	-	-	267
Waldport	6	-	-	-	-	-	-	6
Newport Total	**118**	**92**	**36**	**20**	**19**	**0**	**0**	**285**
Florence	22	5	3	-	-	-	-	30
Winchester	28	1	4	1	1	-	-	35
Charleston (Coos Bay)	72	36	11	14	12	-	1	146
Bandon	7	-	1	-	-	-	-	8
Coos Bay Total								
Port Orford	67	-	-	-	-	-	-	67
Gold Beach	23	-	-	-	-	-	-	23
Brookings	56	10	3	1	1	-	-	71
Brookings Total								
Crescent City	**70**	**35**	**22**	**6**	**8**	**-**	**-**	**141**
Orick	12	-	-	-	-	-	-	12
Trinidad	26	-	-	-	-	-	1	27
Eureka Area	36	24	11	5	1	1	-	78
Fields Landing	4	1	2	1	6	-	-	14
Eureka Total	**78**	**25**	**13**	**6**	**7**	**1**	**1**	**131**

TABLE 3.5.6-3. Number of vessels by port by length class in 2001.[a/] (Page 2 of 2)

	Vessel Length Category							
	<40'	40'-50'	50'-60'	60'-70'	70'-150'	>150'	Unspecified	Total
Fort Bragg	95	18	9	5	2	-	1	130
Albion	17	-	-	-	-	-	-	17
Point Arena	19	-	-	-	-	-	-	19
Fort Bragg Total	**131**	**18**	**9**	**5**	**2**	**0**	**1**	**166**
Bodega Bay	138	24	6	2	1	-	-	171
Cloverdale	24	-	-	-	-	-	-	24
Yountville	14	-	-	-	-	-	1	15
Tomales Bay	1	-	-	-	-	-	-	1
Point Reyes	8	2	-	-	-	-	-	10
Sausilito	50	3	-	-	-	-	-	53
Bodega Bay Total	**235**	**29**	**6**	**2**	**1**	**-**	**1**	**274**
Oakland	1	-	-	-	-	-	-	1
Alameda	3	-	-	-	-	-	-	3
Berkeley	15	-	-	-	-	-	-	15
Richmond	9	-	-	-	1	-	-	10
San Francisco	120	23	5	4	3	-	-	155
Princeton	96	28	7	2	-	-	2	135
San Francisco Total	**479**	**80**	**18**	**8**	**5**	**0**	**3**	**593**
Gilroy	8	-	1	-	-	-	1	10
Santa Cruz	41	5	-	-	-	-	-	46
Moss Landing	90	20	16	4	2	-	-	132
Monterey	76	1	1	-	1	-	2	81
Monterey Total	**215**	**26**	**18**	**4**	**3**	**0**	**3**	**269**
San Simeon	6	-	-	-	-	-	-	6
Morro Bay	93	14	8	6	1	-	-	122
Avila	63	8	3	3	1	-	-	78
Morro Bay Total	**162**	**22**	**11**	**9**	**2**	**0**	**0**	**206**
Santa Barbara	118	14	1	1	1	-	1	136
Santa Cruz Island	1	-	-	-	-	-	-	1
Ventura	27	10	5	-	1	-	-	43
Oxnard	59	5	-	-	-	-	-	64
Port Hueneme	-	6	18	4	3	-	-	31
Santa Barbara Total	**205**	**35**	**24**	**5**	**5**	**0**	**1**	**275**
Terminal Island	70	19	2	1	34	-	-	126
San Pedro	64	11	14	9	14	-	-	112
Willmington	2	-	-	-	-	-	-	2
Catalina Island	40	-	-	1	-	-	-	41
Long Beach	5	1	-	-	-	-	-	6
Newport Beach	17	1	-	-	-	-	-	18
Dana Point	30	3	-	-	-	-	-	33
Los Angeles Total	**228**	**35**	**16**	**11**	**48**	**0**	**0**	**338**
North Shore	45	2	1	-	1	-	-	49
San Diego	41	16	4	1	3	-	-	65
Oceanside	21	3	-	-	2	-	-	26
San Diego Total	**107**	**21**	**5**	**1**	**6**	**0**	**0**	**140**
Other California	9	1	-	-	-	-	-	10
At-Sea Only	**-**	**-**	**-**	**-**	**15**	**-**	**6**	**21**
Grand Totals	**3,068**	**712**	**384**	**178**	**208**	**2**	**28**	**4,580**

NOTE: Does not include at-sea deliveries by catcher-processor. Include deliveries to motherships. Vessels delivering to motherships with other deliveries to shorebased processors were assigned to a port based on their shore based landings. Source: Derived from PacFIN monthly vessel summary files.

a/ Actual period is November 2000 through October 2001.

TABLE 3.5.6-4. Number of processors/buyers by primary port in 2001. [a/] (Page 1 of 4)

	Processors/Buyers Buying from Vessels with Limited Entry Trawl Permits						Processors/Buyers Buying from Vessels with Fixed Gear Limited Entry Permits (No Trawl Permit)					Processors/Buyers Buying from Open Access Vessels with More than 5% Revenue from Groundfish					Processors/Buyers Buying from Open Access Vessels with Less than 5% Revenue from Groundfish						Processors/Buyers Buying from Vessels Participating in Other Fisheries							
	Whiting	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Total Groundfish	Halibut (Pac & CA)	Shrimp/Prawns	Crabs	Salmon	HMS	CPS	Other	Total
Blaine	1	1	1	2	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-	1	5	5
Bellingham	1	1	1	3	1	3	2	1	2	2	2	-	-	-	-	-	1	-	1	1	1	4	2	-	9	-	1	1	40	40
Point Roberts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	8	8
Friday Harbor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	8
Anacortes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	14	14
LaConner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	14	14
Everett	-	-	-	-	-	-	1	-	1	1	1	-	-	-	-	-	-	-	-	-	-	1	1	-	1	1	-	-	11	11
Seattle	-	-	-	-	-	-	1	-	-	1	1	-	-	1	-	1	-	-	1	-	1	2	2	-	7	2	9	-	32	39
Tacoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	25	26
Olympia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	9	10
Shelton	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	12	12
Centralia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	8	9
Puget Sound Total	**2**	**2**	**2**	**5**	**2**	**5**	**4**	**1**	**3**	**4**	**4**	**0**	**0**	**1**	**0**	**1**	**1**	**0**	**2**	**1**	**2**	**9**	**5**	**0**	**23**	**8**	**11**	**3**	**186**	**196**
Port Townsend	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	13	13
Quilcene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	15
Sequim	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	5	5
Port Angeles	-	1	-	2	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	1	5	2	-	28	29
Neah Bay	-	7	6	7	7	7	1	-	-	1	1	1	-	1	-	2	-	-	-	-	-	7	4	-	-	3	-	-	7	8
La Push	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	1	1	1	1	2	-	1	1	2	-	3	4
Quillayute	-	1	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1	2	1	-	2	4
North Washington Coast Total	**0**	**10**	**7**	**11**	**10**	**12**	**2**	**1**	**1**	**2**	**2**	**2**	**1**	**2**	**1**	**3**	**0**	**0**	**1**	**1**	**1**	**12**	**7**	**0**	**5**	**11**	**6**	**0**	**73**	**78**
Copalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	1	2
Aberdeen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	1	3	1	-	2	5
Westport (WA)	1	2	1	2	2	2	4	-	2	3	4	2	-	2	1	3	1	-	5	1	5	6	5	1	16	10	10	3	10	22
Central WA Coast Total	**1**	**2**	**1**	**2**	**2**	**2**	**4**	**0**	**2**	**3**	**4**	**2**	**0**	**2**	**1**	**3**	**1**	**0**	**5**	**1**	**5**	**6**	**6**	**1**	**18**	**13**	**11**	**3**	**13**	**29**

TABLE 3.5.6-4. Number of processors/buyers by primary port in 2001. [a/] (Page 2 of 4)

	Processors/Buyers Buying from Vessels with Limited Entry Trawl Permits						Processors/Buyers Buying from Vessels with Fixed Gear Limited Entry Permits (No Trawl Permit)					Processors/Buyers Buying from Open Access Vessels with More than 5% Revenue from Groundfish					Processors/Buyers Buying from Open Access Vessels with Less than 5% Revenue from Groundfish						Processors/Buyers Buying from Vessels Participating in Other Fisheries							
	Whiting	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Total Groundfish	Halibut (Pac & CA)	Shrimp/Prawns	Crabs	Salmon	HMS	CPS	Other	Total
Tokeland	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	2	-	3	3	3	3	1	2	10	-	1	-	14	17
Ilwaco	1	2	2	2	2	2	1	1	1	1	2	1	-	1	1	1	2	1	4	2	4	5	8	2	7	5	9	2	16	19
Pacific County	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	1	21	22
Columbia River	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	2	-	1	1	1	1	2	1	-	-	2	1	-	23	23
South WA Coast Total	**1**	**2**	**2**	**2**	**2**	**2**	**1**	**1**	**1**	**1**	**2**	**1**	**2**	**4**	**1**	**4**	**4**	**2**	**8**	**6**	**8**	**10**	**10**	**4**	**19**	**8**	**11**	**3**	**74**	**81**
Astoria	2	4	3	5	5	5	6	2	3	4	6	2	5	5	3	5	4	2	5	4	6	8	8	4	9	9	6	7	8	19
Gearhart-Seaside	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	2	-	-	-	2
Cannon Beach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Nehalem Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1
Garibaldi (Tillamook)	-	1	2	1	1	2	2	1	2	-	2	-	3	4	-	4	1	4	6	-	6	9	10	1	9	10	5	-	10	25
Netarts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	2	-	-	-	-	2
Pacific City	-	-	-	-	-	-	-	-	-	-	-	-	3	3	-	3	-	-	-	-	-	3	1	-	3	3	3	-	1	5
Astoria-Tillamook Total	**2**	**5**	**5**	**6**	**6**	**7**	**8**	**3**	**5**	**4**	**8**	**2**	**11**	**12**	**3**	**12**	**5**	**6**	**11**	**4**	**12**	**20**	**19**	**5**	**24**	**25**	**14**	**7**	**20**	**55**
Siletz Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	1	-	-	-	-	1
Depoe Bay	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	2	1	1	1	-	2	2	2	-	3	2	1	-	2	3
Newport	4	7	5	7	7	9	6	6	8	4	11	4	6	11	2	12	5	5	15	3	16	24	25	3	25	44	33	4	9	63
Waldport	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1	-	-	-	-	-	1	-	-	6	1	1	-	1	6
Newport Total	**4**	**7**	**5**	**7**	**7**	**9**	**6**	**6**	**8**	**4**	**11**	**4**	**9**	**14**	**2**	**15**	**6**	**6**	**16**	**3**	**18**	**27**	**27**	**3**	**35**	**47**	**35**	**4**	**12**	**73**
Florence	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	4	4	2	-	7	10	7	-	-	15
Winchester	-	-	-	-	-	-	-	-	2	-	2	-	-	-	-	-	-	2	2	-	2	3	4	-	6	5	12	1	3	16
Charleston (Coos Bay)	1	2	3	4	4	5	3	-	2	1	4	2	2	4	1	4	2	5	7	2	7	9	6	2	7	17	25	1	7	33
Bandon	-	-	-	1	-	1	-	-	-	-	-	-	2	2	1	2	-	1	1	1	1	2	1	-	3	7	5	-	1	10
Coos Bay Total	**1**	**2**	**3**	**5**	**4**	**6**	**3**	**0**	**4**	**1**	**6**	**2**	**4**	**6**	**2**	**6**	**2**	**8**	**14**	**3**	**14**	**18**	**13**	**2**	**23**	**39**	**49**	**2**	**11**	**74**
Port Orford	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	1	-	-	1
Gold Beach	-	-	1	1	-	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	-	1	1	1	-	1	1
Brookings	1	4	2	3	4	4	2	2	3	1	4	1	8	7	5	8	1	3	3	1	3	10	1	3	8	9	12	1	7	16
Brookings Total	**1**	**4**	**3**	**4**	**4**	**5**	**3**	**3**	**4**	**2**	**5**	**2**	**9**	**8**	**6**	**9**	**1**	**4**	**4**	**2**	**4**	**11**	**3**	**3**	**10**	**10**	**14**	**1**	**8**	**18**

TABLE 3.5.6-4. Number of processors/buyers by primary port in 2001. [a/] (Page 3 of 4)

	Processors/Buyers Buying from Vessels with Limited Entry Trawl Permits						Processors/Buyers Buying from Vessels with Fixed Gear Limited Entry Permits (No Trawl Permit)					Processors/Buyers Buying from Open Access Vessels with More than 5% Revenue from Groundfish					Processors/Buyers Buying from Open Access Vessels with Less than 5% Revenue from Groundfish						Processors/Buyers Buying from Vessels Participating in Other Fisheries							
	Whiting	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Total Groundfish	Halibut (Pac & CA)	Shrimp/Prawns	Crabs	Salmon	HMS	CPS	Other	Total
Crescent City	**2**	**4**	**3**	**5**	**4**	**5**	**4**	**6**	**8**	**4**	**8**	**4**	**13**	**14**	**7**	**15**	**3**	**3**	**7**	**3**	**7**	**17**	**3**	**7**	**20**	**7**	**13**	**5**	**11**	**31**
Orick	-	-	-	-	-	-	-	-	-	-	-	-	4	4	1	4	-	-	-	-	-	4	1	-	1	3	1	-	-	4
Trinidad	-	-	-	1	-	1	-	-	-	-	-	-	4	4	-	4	-	-	-	-	-	4	-	1	5	1	2	-	1	7
Eureka Area	-	1	-	2	2	2	2	4	4	2	4	3	4	4	3	4	1	2	1	-	2	5	-	2	10	7	6	-	6	21
Eureka Total	**0**	**1**	**0**	**3**	**2**	**3**	**2**	**4**	**4**	**2**	**4**	**3**	**12**	**12**	**4**	**12**	**1**	**2**	**1**	**0**	**2**	**13**	**1**	**3**	**16**	**11**	**9**	**0**	**7**	**32**
Fort Bragg	-	-	1	-	1	2	1	1	1	1	1	1	9	9	3	10	-	3	2	1	3	11	-	-	5	7	12	-	7	22
Albion	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	1
Point Arena	-	-	-	-	-	-	-	-	1	-	1	1	1	-	-	1	-	1	3	1	3	3	-	1	2	6	2	-	1	6
Elk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	1	1
Fort Bragg Total	**0**	**0**	**1**	**0**	**1**	**2**	**1**	**1**	**3**	**1**	**3**	**2**	**10**	**9**	**3**	**11**	**0**	**4**	**5**	**2**	**6**	**15**	**0**	**1**	**8**	**13**	**14**	**0**	**9**	**30**
Bodega Bay	-	2	2	2	2	2	1	1	4	3	4	1	10	13	6	14	-	3	6	2	6	18	5	2	10	24	10	1	10	44
Cloverdale	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	2	2	-	3	3	3	-	4	4	2	-	4	8
Yountville	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1	2	1	1	-	3	4	1	-	6	2	-	1	11	13
Tomales Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		1	-	-	1	-	-	-	1
Point Reyes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	1	-	-	-	1
Sausilito	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2	2	2	-	2	6	3	-	5	9
Bodega Bay Total	**-**	**2**	**2**	**2**	**2**	**2**	**1**	**2**	**4**	**3**	**5**	**1**	**11**	**14**	**6**	**15**	**2**	**6**	**11**	**2**	**14**	**27**	**13**	**2**	**23**	**38**	**15**	**2**	**30**	**76**
Alameda	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	1	-	-	1	2	-	-	1	3
Berkeley	-	-	-	-	-	-	-	-	-	-	-	-	3	3	1	4	-	-	-	1	1	5	2	-	1	3	1	-	1	6
Richmond	-	-	-	-	-	-	1	1	1	1	1	1	1	2	2	3	-	1	1	1	1	3	2	1	1	5	1	1	2	8
San Francisco	-	3	4	5	5	6	2	11	12	4	13	5	20	19	12	24	-	6	5	1	8	31	14	6	11	13	6	2	34	48
Princeton	1	5	6	5	5	6	1	5	5	2	7	4	20	19	5	23	1	5	3	1	6	29	13	2	30	30	19	6	18	59
San Francisco Total	**1**	**8**	**10**	**10**	**10**	**12**	**4**	**17**	**18**	**7**	**21**	**10**	**45**	**43**	**20**	**55**	**1**	**12**	**9**	**4**	**16**	**69**	**31**	**9**	**44**	**53**	**27**	**9**	**56**	**124**
Gilroy	-	-	-	-	-	-	-	-	-	-	-	-	3	3	-	3	-	-	-	-	-	3	-	-	-	-	-	-	2	3
Santa Cruz	-	4	5	5	4	5	1	1	1	2	2	4	12	9	6	12	1	5	4	-	6	14	12	-	9	14	12	4	9	24
Moss Landing	1	2	1	2	2	2	4	4	4	6	8	3	8	6	6	9	2	2	3	3	7	14	11	4	6	20	15	2	7	30
Monterey	1	1	2	2	1	2	-	1	-	1	1	1	7	7	3	7	3	3	3	2	7	10	4	4	3	5	4	3	8	13
Monterey Total	**2**	**7**	**8**	**9**	**7**	**9**	**5**	**6**	**5**	**9**	**11**	**8**	**30**	**25**	**15**	**31**	**6**	**10**	**10**	**5**	**20**	**41**	**27**	**8**	**18**	**39**	**31**	**9**	**26**	**70**

TABLE 3.5.6-4. Number of processors/buyers by primary port in 2001. [a/] (Page 4 of 4)

	Processors/Buyers Buying from Vessels with Limited Entry Trawl Permits						Processors/Buyers Buying from Vessels with Fixed Gear Limited Entry Permits (No Trawl Permit)					Processors/Buyers Buying from Open Access Vessels with More than 5% Revenue from Groundfish					Processors/Buyers Buying from Open Access Vessels with Less than 5% Revenue from Groundfish						Processors/Buyers Buying from Vessels Participating in Other Fisheries							
	Whiting	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Sablefish	Nearshore spp	Shelf spp	Slope spp	Total	Total Groundfish	Halibut (Pac & CA)	Shrimp/Prawns	Crabs	Salmon	HMS	CPS	Other	Total
San Simeon	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	2	-	-	-	-	-	2	-	-	-	1	-	1	2	2
Morro Bay	-	3	1	4	4	4	2	1	1	2	2	2	7	4	4	8	1	5	6	3	7	11	7	3	6	8	17	3	8	21
Avila	-	1	2	1	-	2	-	1	2	-	2	-	7	7	1	7	-	3	2	-	4	9	4	1	3	2	6	1	7	12
Morro Bay Total	**0**	**4**	**3**	**5**	**4**	**6**	**2**	**2**	**3**	**2**	**4**	**2**	**16**	**13**	**5**	**17**	**1**	**8**	**8**	**3**	**11**	**22**	**11**	**4**	**9**	**11**	**23**	**5**	**17**	**35**
Santa Barbara	-	1	1	2	1	2	-	-	-	-	-	-	4	4	2	4	1	9	7	5	13	17	13	14	20	3	7	8	25	37
Ventura	-	1	1	1	1	1	4	2	3	4	4	2	11	9	9	12	1	12	9	10	14	17	13	11	21	-	12	7	18	27
Oxnard	-	-	-	-	-	-	7	6	6	7	11	2	10	7	6	11	-	8	7	7	11	16	10	7	16	-	11	3	16	27
Port Hueneme	1	1	1	1	1	1	1	-	1	1	1	1	2	2	1	2	-	2	1	1	2	2	3	2	2	2	3	8	3	8
Santa Barbara Total	**1**	**3**	**3**	**4**	**3**	**4**	**12**	**8**	**10**	**12**	**16**	**5**	**27**	**22**	**18**	**29**	**2**	**31**	**24**	**23**	**40**	**52**	**39**	**34**	**59**	**5**	**33**	**26**	**62**	**99**
Terminal Island	-	-	-	-	-	-	-	-	-	-	-	2	9	3	4	9	2	3	4	2	4	10	6	3	9	-	7	10	23	31
San Pedro	-	-	-	-	-	-	2	3	2	2	4	1	5	4	3	6	-	9	7	3	10	14	9	-	12	2	21	10	26	34
Willmington	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1
Catalina Island	-	-	-	-	-	-	2	2	2	2	3	1	5	3	3	7	-	5	1	-	5	10	5	4	10	-	7	4	14	17
Long Beach	-	-	-	-	-	-	-	-	-	-	-	-	2	1	1	2	1	1	-	1	1	2	2	1	3	-	-	2	4	4
Newport Beach	-	-	-	-	-	-	2	2	2	2	2	1	1	1	1	1	1	4	1	-	5	5	4	5	10	-	4	3	7	12
Dana Point	-	-	-	-	-	-	1	-	-	1	1	1	3	3	2	3	-	1	-	-	1	3	1	2	10	-	4	1	6	13
Los Angeles Total	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**7**	**6**	**7**	**10**	**6**	**25**	**15**	**14**	**28**	**4**	**23**	**13**	**6**	**26**	**44**	**27**	**15**	**55**	**2**	**43**	**30**	**81**	**112**
North Shore	-	-	-	-	-	-	-	-	-	-	-	1	4	7	5	8	2	6	8	5	9	11	6	4	12	2	8	5	10	16
San Diego	-	-	-	-	-	-	-	2	1	-	2	-	6	5	3	7	1	4	4	2	5	10	2	1	18	-	12	6	15	23
Oceanside	-	-	-	-	-	-	-	1	-	-	1	-	3	2	2	4	-	4	1	2	4	5	2	1	5	1	3	2	4	8
San Diego Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**0**	**3**	**1**	**13**	**14**	**10**	**19**	**3**	**14**	**13**	**9**	**18**	**26**	**10**	**6**	**35**	**3**	**23**	**13**	**29**	**47**
Other California	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	7	10
At-Sea Only	**12**	**11**	**1**	**12**	**12**	**12**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**12**	**8**	**-**	**1**	**11**	**6**	**12**	**13**	**13**
Grand	**30**	**74**	**59**	**92**	**82**	**103**	**69**	**71**	**90**	**68**	**127**	**57**	**238**	**230**	**118**	**285**	**43**	**139**	**162**	**78**	**224**	**451**	**260**	**107**	**448**	**354**	**388**	**134**	**745**	**1,283**

Source: Derived from PacFIN monthly vessel summary files.

a/ Actual period is November 2000 through October 2001.

TABLE 3.5.6-5. Number of buyers/processors by purchase value of raw product (exvessel value) in 2001.[a/] (Page 1 of 1)

	Level of Purchases in Exvessel Value						
	<$5,000	$5,000-$20,000	$20,000-$100,000	$100,000-$300,000	$300,000-$1,000,000	>$1,000,000	Total
Puget Sound	51	40	52	18	19	16	196
North Washington Coast	35	14	15	6	4	4	78
Central WA Coast	9	6	6	1	2	5	29
South WA Coast	31	25	15	4	3	3	81
Astoria - Tillamook	25	8	10	1	7	4	55
Newport	34	17	14	1	3	4	73
Coos Bay	36	26	5	5	*	*	74
Brookings	4	3	6	1	*	*	18
Crescent City	11	11	1	1	3	4	31
Eureka	17	9	3	3	0	0	32
Fort Bragg	16	6	4	*	*	*	30
Bodega Bay - San Francisco	104	39	28	13	13	3	200
Monterey	40	12	8	6	2	2	70
Morro Bay	16	9	4	2	2	2	35
Santa Barbara	32	19	21	15	8	4	99
Los Angeles	37	17	23	16	10	10	113
San Diego	13	10	11	9	*	*	47
At-Sea Only	*	-	-	*	*	*	13
Total	492	254	223	100	76	60	1,283

NOTE: "*" = Values omitted to preserve confidentiality.

a/ Actual period is November 2000 through October 2001.

TABLE 3.5.6-6. Local income impacts associated with commercial fishery landings by major port group for 2001 ($1,000). (Page 1 of 2)

	WASHINGTON						OREGON				
Species Group	Puget Sound	North WA Coast	Central WA Coast	South WA Coast	Unsp. Wa	WA TOTAL	Astoria-Tillamook	Newport	Coos Bay	Brookings	OR TOTAL
Whiting	0		6,567	724		7,291	7,923	12,557	1,248		21,728
Sablefish	2,582	3,658	1,112	216	1,174	8,741	4,300	3,695	3,187	1,233	12,414
Shortspine Thornyhead	84	31	35	6	0	156	302	233	245	105	885
Longspine Thornyhead	23	0	24	3	0	51	763	448	680	276	2,166
Slope Rockfish	94	46	31	9	8	188	368	95	75	25	563
Dover Sole	631	119	241	86	0	1,077	2,790	854	1,646	435	5,724
Rex Sole	19	13	7	6		44	190	65	209	41	505
Petrale Sole	914	104	123	33		1,174	1,065	859	841	86	2,851
Arrowtooth Flounder	1,239	57	83	17		1,396	642	161	108	3	914
Other Slope Groundfish						0	9	13	56	13	91
Widow Rockfish	264	63	97	102		526	922	592	248	268	2,030
Chilipepper Rockfish						0	186		1	0	187
Yellowtail Rockfish	602	506	179	84		1,371	1,217	405	55	63	1,740
Shelf Rockfish	101	52	9	3	5	170	70	54	43	79	245
English Sole, Flathead Sole	145	68	21	11		245	242	106	229	36	613
Sanddabs	1	2	1	0		4	47	7	90	4	149
Other Shelf Groundfish	1,128	202	17	4	0	1,352	132	54	42	111	338
Nearshore Rockfish	0	1	0	0	0	1	61	16	18	589	684
Other Flatfish	28	9	0	1		38	90	7	52	5	154
Other Groundfish						0	47	1	21	280	349
Groundfish Total	7,854	4,930	8,547	1,305	1,187	23,824	21,365	20,219	9,093	3,653	54,330
Pink Shrimp Trawl			2,500	1,377		3,877	7,024	4,126	5,219	554	16,924
Spot Prawn Trawl						0					0
Spot Prawn Pot						0					0
Ridgeback Prawn Trawl						0					0
Pacific Halibut	104	974	25	72	276	1,452	181	450	119	27	778
CA Halibut (except Gillnet)						0			0		0
Salmon	156	1,380	420	94	38	2,089	770	4,310	2,251	460	7,790
Sea Cucumber						0	0		0		0
CA Sheephead						0					0
Gillnet Complex						0					0
Squid	0		0	0		0	0	0	0		0
Other CPS	0		59	0		59	0	0	0		0
HMS	1,277	54	3,857	10,026	4	15,217	3,475	7,089	3,505	241	14,310
Dungeness Crab	3,984	735	18,877	9,202	1,632	34,430	13,839	7,865	4,947	2,338	28,989
Other Crustaceans	236	2	785	58		1,081	62	100	133	67	361
Other Species			18	124		142	129	639	68	484	1,320
Total	13,611	8,075	35,089	22,258	3,137	82,170	46,845	44,798	25,335	7,824	124,802

TABLE 3.5.6-6. Local income impacts associated with commercial fishery landings by major port group for 2001 ($1,000). (Page 2 of 2)

Species Group	CALIFORNIA												
	Crescent City	Eureka	Fort Bragg	Bodega Bay - SF	Monterey	Morro Bay	Santa Barbara	Los Angeles	San Diego	Unsp. CA	CA TOTAL	At Sea Sector	W - O - C TOTAL
Whiting	1,225	181		0	0	0	a/	0			1,407	43,405	73,830
Sablefish	1,294	1,835	2,125	929	1,443	138	143	396	360	0	8,664	59	29,879
Shortspine Thornyhead	163	283	238	114	296	85	155	181	179	0	1,695	0	2,736
Longspine Thornyhead	616	671	574	99	474	109	340	121	31	0	3,034	0	5,251
Slope Rockfish	22	31	204	148	116	76	65	62	5	1	730	17	1,498
Dover Sole	610	1,279	1,223	444	756	225	a/	1			4,539	2	11,342
Rex Sole	126	169	118	40	35	27	a/	0			516	23	1,088
Petrale Sole	159	866	123	725	237	271	a/	1	0		2,408		6,433
Arrowtooth Flounder	6	4	0				a/				11	2	2,322
Other Slope Groundfish	13	54	34	4	112	2		0			219		310
Widow Rockfish	118	303	48	88	9	5	0	4	0		575	77	3,208
Chilipepper Rockfish	3	5	179	359	138	9	0	3	1		697	1	885
Yellowtail Rockfish	40	32	0	8	1	0					81	232	3,424
Shelf Rockfish	61	68	40	155	89	95	56	37	9	0	609	27	1,052
English Sole, Flathead Sole	147	272	75	214	83	55	a/	0			853	0	1,710
Sanddabs	73	186	2	1,370	85	6	a/	83	0		1,810		1,963
Other Shelf Groundfish	83	44	37	87	28	53	47	49	44		473	0	2,164
Nearshore Rockfish	570	272	138	317	404	658	284	74	49	1	2,767	0	3,452
Other Flatfish	104	66	0	248	31	12	22	25	0		509		701
Other Groundfish	65	24	143	48	157	395	164	21	18		1,035		1,385
Groundfish Total	5,499	6,645	5,303	5,396	4,495	2,222	1,313	1,059	697	3	32,633	43,846	154,632
Pink Shrimp Trawl	1,395	1,054				217	4				2,669		23,470
Spot Prawn Trawl	0	19	125	895	149	1,107	699	29			3,024		3,024
Spot Prawn Pot		0	47	3	663	72	1,098	1,098	775		3,756		3,756
Ridgeback Prawn Trawl						1	1,166	199			1,366		1,366
Pacific Halibut	0		3			0					3	0	2,232
CA Halibut (except Gillnet)	5	27	0	1,649	213	261	850	299	14	1	3,317		3,317
Salmon	64	344	1,432	6,804	1,526	133	9	3		3	10,318	0	20,197
Sea Cucumber				2		4	1,256	517	4	4	1,786		1,786
CA Sheephead	0			0	1	5	285	164	167		621		621
Gillnet Complex					15	85	1,177	981	338		2,595		2,595
Squid	0	0		12	8,660	85	43,350	51,801	18		103,927	0	103,927
Other CPS	0	0	0	18	15,208	0	6,884	43,361	8	0	65,479	0	65,538
HMS	874	1,719	269	1,237	2,727	4,422	797	23,189	4,913		40,148	0	69,675
Dungeness Crab	4,287	2,335	1,178	8,008	125	58		0			15,991	0	79,409
Other Crustaceans	636	38	2	1,841	22	340	5,728	3,714	4,031	393	16,745		18,187
Other Species	14	10	5,567	733	0	15	6,547	9,697	1,776	10	24,370		25,831
Total	12,774	12,191	13,925	26,599	33,804	9,024	71,164	136,110	12,741	413	328,746	43,846	579,563

a/ Values omitted to preserve confidentiality. Totals include the value.

TABLE 3.5.6-7. Local income impacts associated with commercial fishery landings by major port group for 2001 (% of Total). (Page 1 of 2)

	WASHINGTON						OREGON				
Species Group	Puget Sound	North WA Coast	Central WA Coast	South WA Coast	Unsp. Wa	WA TOTAL	Astoria-Tillamook	Newport	Coos Bay	Brookings	OR TOTAL
Whiting	0.0		18.7	3.3		8.9	16.9	28.0	4.9		17.4
Sablefish	19.0	45.3	3.2	1.0	37.4	10.6	9.2	8.2	12.6	15.8	9.9
Shortspine Thornyhead	0.6	0.4	0.1	0.0	0.0	0.2	0.6	0.5	1.0	1.3	0.7
Longspine Thornyhead	0.2	0.0	0.1	0.0	0.0	0.1	1.6	1.0	2.7	3.5	1.7
Slope Rockfish	0.7	0.6	0.1	0.0	0.3	0.2	0.8	0.2	0.3	0.3	0.5
Dover Sole	4.6	1.5	0.7	0.4	0.0	1.3	6.0	1.9	6.5	5.6	4.6
Rex Sole	0.1	0.2	0.0	0.0		0.1	0.4	0.1	0.8	0.5	0.4
Petrale Sole	6.7	1.3	0.4	0.1		1.4	2.3	1.9	3.3	1.1	2.3
Arrowtooth Flounder	9.1	0.7	0.2	0.1		1.7	1.4	0.4	0.4	0.0	0.7
Other Slope Groundfish						0.0	0.0	0.0	0.2	0.2	0.1
Widow Rockfish	1.9	0.8	0.3	0.5		0.6	2.0	1.3	1.0	3.4	1.6
Chilipepper Rockfish						0.0	0.4		0.0	0.0	0.1
Yellowtail Rockfish	4.4	6.3	0.5	0.4		1.7	2.6	0.9	0.2	0.8	1.4
Shelf Rockfish	0.7	0.7	0.0	0.0	0.2	0.2	0.2	0.1	0.2	1.0	0.2
English Sole, Flathead Sole	1.1	0.8	0.1	0.0		0.3	0.5	0.2	0.9	0.5	0.5
Sanddabs	0.0	0.0	0.0	0.0		0.0	0.1	0.0	0.4	0.1	0.1
Other Shelf Groundfish	8.3	2.5	0.0	0.0	0.0	1.6	0.3	0.1	0.2	1.4	0.3
Nearshore Rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	7.5	0.5
Other Flatfish	0.2	0.1	0.0	0.0		0.0	0.2	0.0	0.2	0.1	0.1
Other Groundfish						0.0	0.1	0.0	0.1	3.6	0.3
Groundfish Total	57.7	61.1	24.4	5.9	37.8	29.0	45.6	45.1	35.9	46.7	43.5
Pink Shrimp Trawl			7.1	6.2		4.7	15.0	9.2	20.6	7.1	13.6
Spot Prawn Trawl						0.0					0.0
Spot Prawn Pot						0.0					0.0
Ridgeback Prawn Trawl						0.0					0.0
Pacific Halibut	0.8	12.1	0.1	0.3	8.8	1.8	0.4	1.0	0.5	0.3	0.6
CA Halibut (except Gillnet)						0.0			0.0		0.0
Salmon	1.1	17.1	1.2	0.4	1.2	2.5	1.6	9.6	8.9	5.9	6.2
Sea Cucumber						0.0	0.0		0.0		0.0
CA Sheephead						0.0					0.0
Gillnet Complex						0.0					0.0
Squid	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Other CPS	0.0		0.2	0.0		0.1	0.0	0.0	0.0		0.0
HMS	9.4	0.7	11.0	45.0	0.1	18.5	7.4	15.8	13.8	3.1	11.5
Dungeness Crab	29.3	9.1	53.8	41.3	52.0	41.9	29.5	17.6	19.5	29.9	23.2
Other Crustaceans	1.7	0.0	2.2	0.3		1.3	0.1	0.2	0.5	0.9	0.3
Other Species			0.1	0.6		0.2	0.3	1.4	0.3	6.2	1.1
Total	100	100	100	100	100	100	100	100	100	100	100

TABLE 3.5.6-7. Local income impacts associated with commercial fishery landings by major port group for 2001 (% of Total). (Page 2 of 2)

	CALIFORNIA												
Species Group	Crescent City	Eureka	Fort Bragg	Bodega Bay - SF	Monterey	Morro Bay	Santa Barbara	Los Angeles	San Diego	Unsp. CA	CA TOTAL	At Sea Sector	W - O - C TOTAL
Whiting	9.6	1.5		0.0	0.0	0.0	a/	0.0			0.4	99.0	12.7
Sablefish	10.1	15.1	15.3	3.5	4.3	1.5	0.2	0.3	2.8	0.0	2.6	0.1	5.2
Shortspine Thornyhead	1.3	2.3	1.7	0.4	0.9	0.9	0.2	0.1	1.4	0.0	0.5	0.0	0.5
Longspine Thornyhead	4.8	5.5	4.1	0.4	1.4	1.2	0.5	0.1	0.2	0.0	0.9	0.0	0.9
Slope Rockfish	0.2	0.3	1.5	0.6	0.3	0.8	0.1	0.0	0.0	0.3	0.2	0.0	0.3
Dover Sole	4.8	10.5	8.8	1.7	2.2	2.5	a/	0.0			1.4	0.0	2.0
Rex Sole	1.0	1.4	0.8	0.1	0.1	0.3	a/	0.0			0.2	0.1	0.2
Petrale Sole	1.2	7.1	0.9	2.7	0.7	3.0	a/	0.0	0.0		0.7		1.1
Arrowtooth Flounder	0.1	0.0	0.0				a/				0.0	0.0	0.4
Other Slope Groundfish	0.1	0.4	0.2	0.0	0.3	0.0		0.0			0.1		0.1
Widow Rockfish	0.9	2.5	0.3	0.3	0.0	0.1	0.0	0.0	0.0		0.2	0.2	0.6
Chilipepper Rockfish	0.0	0.0	1.3	1.3	0.4	0.1	0.0	0.0	0.0		0.2	0.0	0.2
Yellowtail Rockfish	0.3	0.3	0.0	0.0	0.0	0.0					0.0	0.5	0.6
Shelf Rockfish	0.5	0.6	0.3	0.6	0.3	1.0	0.1	0.0	0.1	0.0	0.2	0.1	0.2
English Sole, Flathead Sole	1.2	2.2	0.5	0.8	0.2	0.6	a/	0.0			0.3	0.0	0.3
Sanddabs	0.6	1.5	0.0	5.2	0.3	0.1	a/	0.1	0.0		0.6		0.3
Other Shelf Groundfish	0.7	0.4	0.3	0.3	0.1	0.6	0.1	0.0	0.3		0.1	0.0	0.4
Nearshore Rockfish	4.5	2.2	1.0	1.2	1.2	7.3	0.4	0.1	0.4	0.4	0.8	0.0	0.6
Other Flatfish	0.8	0.5	0.0	0.9	0.1	0.1	0.0	0.0	0.0		0.2		0.1
Other Groundfish	0.5	0.2	1.0	0.2	0.5	4.4	0.2	0.0	0.1		0.3		0.2
Groundfish Total	43.1	54.5	38.1	20.3	13.3	24.6	1.8	0.8	5.5	0.7	9.9	100	26.7
Pink Shrimp Trawl	10.9	8.6				2.4	0.0				0.8		4.0
Spot Prawn Trawl	0.0	0.2	0.9	3.4	0.4	12.3	1.0	0.0			0.9		0.5
Spot Prawn Pot		0.0	0.3	0.0	2.0	0.8	1.5	0.8	6.1		1.1		0.6
Ridgeback Prawn Trawl						0.0	1.6	0.1			0.4		0.2
Pacific Halibut	0.0		0.0			0.0					0.0	0.0	0.4
CA Halibut (except Gillnet)	0.0	0.2	0.0	6.2	0.6	2.9	1.2	0.2	0.1	0.2	1.0		0.6
Salmon	0.5	2.8	10.3	25.6	4.5	1.5	0.0	0.0		0.6	3.1	0.0	3.5
Sea Cucumber				0.0		0.0	1.8	0.4	0.0	1.0	0.5		0.3
CA Sheephead	0.0			0.0	0.0	0.1	0.4	0.1	1.3		0.2		0.1
Gillnet Complex					0.0	0.9	1.7	0.7	2.6		0.8		0.4
Squid	0.0	0.0		0.0	25.6	0.9	60.9	38.1	0.1		31.6	0.0	17.9
Other CPS	0.0	0.0	0.0	0.1	45.0	0.0	9.7	31.9	0.1	0.0	19.9	0.0	11.3
HMS	6.8	14.1	1.9	4.7	8.1	49.0	1.1	17.0	38.6		12.2	0.0	12.0
Dungeness Crab	33.6	19.2	8.5	30.1	0.4	0.6		0.0			4.9	0.0	13.7
Other Crustaceans	5.0	0.3	0.0	6.9	0.1	3.8	8.0	2.7	31.6	95.0	5.1		3.1
Other Species	0.1	0.1	40.0	2.8	0.0	0.2	9.2	7.1	13.9	2.5	7.4		4.5
Total	100	100	100	100	100	100	100	100	100	100	100	100	100

a/ Values omitted to preserve confidentiality. Totals include the value.

TABLE 3.5.6-8. Local income impacts associated with commercial fishery landings by major port group for 1999 ($1,000). (Page 1 of 2)

	WASHINGTON						OREGON				
Species Group	Puget Sound	North WA Coast	Central WA Coast	South WA Coast	Unsp. Wa	WA TOTAL	Astoria-Tillamook	Newport	Coos Bay	Brookings	OR TOTAL
Whiting	3	2	3,000	938	0	3,943	16,326	12,740	1,205	0	30,271
Sablefish	2,385	3,542	1,278	124	1,001	8,330	4,159	3,875	3,362	1,434	12,830
Shortspine Thornyhead	107	53	64	15	3	243	402	298	349	136	1,186
Longspine Thornyhead	29	0	56	8	0	93	770	348	875	245	2,238
Slope Rockfish	1,507	258	339	38	9	2,152	743	332	302	78	1,455
Dover Sole	843	183	337	170	0	1,532	2,769	978	2,109	550	6,406
Rex Sole	9	4	12	10	0	35	128	51	194	29	402
Petrale Sole	480	234	143	62	0	920	688	382	848	128	2,045
Arrowtooth Flounder	3,126	232	223	114	0	3,695	1,553	150	179	11	1,892
Other Slope Groundfish	0	0	0	0	0	0	10	10	68	17	105
Widow Rockfish	875	94	240	85	0	1,294	1,514	1,889	669	282	4,354
Chilipepper Rockfish	2	0	0	0	0	2	0	0	3	0	3
Yellowtail Rockfish	1,393	237	232	143	0	2,004	1,732	426	305	123	2,587
Shelf Rockfish	998	101	68	37	0	1,204	384	432	347	377	1,540
English Sole, Flathead Sole	126	126	26	18	0	296	181	67	209	31	487
Sanddabs	0	0	0	0	0	0	14	7	294	5	319
Other Shelf Groundfish	766	375	52	12	0	1,205	290	101	95	146	632
Nearshore Rockfish	0	0	0	0	0	0	79	2	2	393	476
Other Flatfish	11	10	1	1	0	23	129	33	82	0	245
Other Groundfish	0	0	0	0	0	0	2	10	0	116	128
Groundfish Total	12,660	5,451	6,071	1,777	1,013	26,972	31,875	22,129	11,496	4,102	69,602
Pink Shrimp Trawl	6	13	1,697	437	0	2,153	5,479	5,054	5,058	1,435	17,026
Spot Prawn Trawl	0	0	0	0	0	0	0	0	0	0	0
Spot Prawn Pot	0	0	0	0	0	0	0	0	0	0	0
Ridgeback Prawn Trawl	0	0	0	0	0	0	0	0	0	0	0
Pacific Halibut	0	635	29	59	168	891	193	212	86	61	552
CA Halibut (except Gillnet)	0	0	0	0	0	0	0	0	0	0	0
Salmon	2	1,198	207	14	12	1,433	141	619	1,171	301	2,232
Sea Cucumber	0	0	0	0	0	0	0	0	0	0	0
CA Sheephead	0	0	0	0	0	0	0	0	0	0	0
Gillnet Complex	0	0	0	19	0	19	0	0	0	0	0
Squid	0	0	0	0	0	0	0	0	0	0	0
Other CPS	0	0	65	9	0	74	0	0	0	0	0
HMS	412	69	1,528	5,278	10	7,297	3,169	3,265	777	36	7,247
Dungeness Crab	4,708	2,125	24,334	6,838	2,414	40,420	12,649	9,701	6,185	6,367	34,903
Other Crustaceans	0	0	401	36	142	579	47	82	15	19	163
Other Species	39	12	0	0	1	52	92	30	32	169	324
Total	17,827	9,504	34,332	14,467	3,761	79,890	53,645	41,093	24,820	12,491	132,048

TABLE 3.5.6-8. Local income impacts associated with commercial fishery landings by major port group for 1999 ($1,000). (continued) (Page 2 of 2)

Species Group	CALIFORNIA											At Sea Sector	W - O - C TOTAL
	Crescent City	Eureka	Fort Bragg	Bodega Bay - SF	Monterey	Morro Bay	Santa Barbara	Los Angeles	San Diego	Unsp. CA	CA TOTAL		
Whiting	724	73	0	0	0	0	0	0	0	0	798	56,956	91,968
Sablefish	1,289	2,478	1,834	1,233	1,513	320	82	577	183	0	9,509	2	30,670
Shortspine Thornyhead	260	519	334	205	754	230	47	695	69	0	3,112	0	4,540
Longspine Thornyhead	633	1,236	811	466	511	459	40	135	20	0	4,311	0	6,642
Slope Rockfish	60	147	107	120	136	75	66	9	3	0	722	4	4,333
Dover Sole	1,039	1,918	1,270	1,068	885	839	a/	0	0	0	7,020	0	14,958
Rex Sole	107	151	141	93	63	24	a/	0	0	0	579	0	1,016
Petrale Sole	335	746	260	539	267	74	a/	0	0	0	2,228	0	5,194
Arrowtooth Flounder	29	13	1	3	0	0	a/	0	0	0	45	0	5,633
Other Slope Groundfish	13	81	40	14	148	13	0	0	0	0	309	0	414
Widow Rockfish	179	165	199	400	76	53	1	0	1	0	1,074	63	6,785
Chilipepper Rockfish	11	54	553	754	244	54	10	6	8	0	1,693	0	1,698
Yellowtail Rockfish	53	32	7	90	8	1	3	0	0	0	195	673	5,459
Shelf Rockfish	139	167	111	355	151	144	192	110	51	0	1,420	7	4,171
English Sole, Flathead Sole	152	135	119	237	87	17	a/	0	0	0	747	0	1,530
Sanddabs	132	166	5	1,118	334	33	a/	51	3	0	1,845	0	2,165
Other Shelf Groundfish	108	81	105	131	105	74	86	75	86	0	851	0	2,689
Nearshore Rockfish	293	120	204	453	324	1,264	240	154	25	0	3,077	0	3,553
Other Flatfish	25	10	1	191	18	9	19	34	1	0	309	0	576
Other Groundfish	67	22	506	98	144	893	174	17	3	0	1,923	0	2,052
Groundfish Total	5,649	8,316	6,606	7,570	5,768	4,574	968	1,864	453	0	41,767	57,706	196,046
Pink Shrimp Trawl	2,664	979	327	72	1	395	10	0	0	0	4,448	0	23,627
Spot Prawn Trawl	0	0	75	962	400	1,552	1,714	219	0	0	4,922	0	4,922
Spot Prawn Pot	0	0	1	89	276	32	927	1,314	571	0	3,210	0	3,210
Ridgeback Prawn Trawl	0	0	0	2	2	5	4,289	10	0	0	4,307	0	4,307
Pacific Halibut	0	0	12	0	0	0	0	0	0	0	12	0	1,455
CA Halibut (except Gillnet)	21	4	0	2,695	269	319	687	598	22	0	4,616	0	4,616
Salmon	22	135	343	12,008	3,860	133	14	0	0	0	16,515	0	20,181
Sea Cucumber	0	0	0	12	0	0	971	313	59	0	1,355	0	1,355
CA Sheephead	0	0	0	0	1	46	167	201	134	0	549	0	549
Gillnet Complex	0	0	0	0	495	62	1,243	1,390	298	0	3,488	0	3,507
Squid	0	0	0	8	326	20	94,757	42,521	12	0	137,644	0	137,644
Other CPS	0	1	0	66	11,262	0	4,354	38,019	445	0	54,146	0	54,220
HMS	308	1,031	130	1,020	4,022	1,889	800	48,973	10,905	0	69,077	0	83,621
Dungeness Crab	12,731	9,908	2,206	4,986	124	7	0	0	0	0	29,962	0	105,285
Other Crustaceans	596	17	0	2,772	73	293	4,637	2,992	2,325	1	13,707	0	14,449
Other Species	19	31	3,739	839	0	14	15,579	6,014	1,218	0	27,453	0	27,829
Total	22,008	20,421	13,440	33,100	26,879	9,342	131,117	144,429	16,441	1	417,179	57,706	686,823

a/ Values omitted to preserve confidentiality. Totals include the value.

TABLE 3.5.6-9. Local income impacts associated with commercial fishery landings by major port group for 1999 (% of Total). (Page 1 of 2)

	WASHINGTON						OREGON				
Species Group	Puget Sound	North WA Coast	Central WA Coast	South WA Coast	Unsp. Wa	WA TOTAL	Astoria-Tillamook	Newport	Coos Bay	Brookings	OR TOTAL
Whiting	0.0	0.0	8.7	6.5	0.0	4.9	30.4	31.0	4.9	0.0	22.9
Sablefish	13.4	37.3	3.7	0.9	26.6	10.4	7.8	9.4	13.5	11.5	9.7
Shortspine Thornyhead	0.6	0.6	0.2	0.1	0.1	0.3	0.7	0.7	1.4	1.1	0.9
Longspine Thornyhead	0.2	0.0	0.2	0.1	0.0	0.1	1.4	0.8	3.5	2.0	1.7
Slope Rockfish	8.5	2.7	1.0	0.3	0.2	2.7	1.4	0.8	1.2	0.6	1.1
Dover Sole	4.7	1.9	1.0	1.2	0.0	1.9	5.2	2.4	8.5	4.4	4.9
Rex Sole	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.1	0.8	0.2	0.3
Petrale Sole	2.7	2.5	0.4	0.4	0.0	1.2	1.3	0.9	3.4	1.0	1.5
Arrowtooth Flounder	17.5	2.4	0.6	0.8	0.0	4.6	2.9	0.4	0.7	0.1	1.4
Other Slope Groundfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.1
Widow Rockfish	4.9	1.0	0.7	0.6	0.0	1.6	2.8	4.6	2.7	2.3	3.3
Chilipepper Rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellowtail Rockfish	7.8	2.5	0.7	1.0	0.0	2.5	3.2	1.0	1.2	1.0	2.0
Shelf Rockfish	5.6	1.1	0.2	0.3	0.0	1.5	0.7	1.1	1.4	3.0	1.2
English Sole, Flathead Sole	0.7	1.3	0.1	0.1	0.0	0.4	0.3	0.2	0.8	0.2	0.4
Sanddabs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.2
Other Shelf Groundfish	4.3	3.9	0.2	0.1	0.0	1.5	0.5	0.2	0.4	1.2	0.5
Nearshore Rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	3.1	0.4
Other Flatfish	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.3	0.0	0.2
Other Groundfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1
Groundfish Total	71.0	57.4	17.7	12.3	26.9	33.8	59.4	53.9	46.3	32.8	52.7
Pink Shrimp Trawl	0.0	0.1	4.9	3.0	0.0	2.7	10.2	12.3	20.4	11.5	12.9
Spot Prawn Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn Pot	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ridgeback Prawn Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific Halibut	0.0	6.7	0.1	0.4	4.5	1.1	0.4	0.5	0.3	0.5	0.4
CA Halibut (except Gillnet)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salmon	0.0	12.6	0.6	0.1	0.3	1.8	0.3	1.5	4.7	2.4	1.7
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CA Sheephead	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gillnet Complex	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Squid	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other CPS	0.0	0.0	0.2	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
HMS	2.3	0.7	4.5	36.5	0.3	9.1	5.9	7.9	3.1	0.3	5.5
Dungeness Crab	26.4	22.4	70.9	47.3	64.2	50.6	23.6	23.6	24.9	51.0	26.4
Other Crustaceans	0.0	0.0	1.2	0.3	3.8	0.7	0.1	0.2	0.1	0.2	0.1
Other Species	0.2	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.1	1.4	0.2
Total	100	100	100	100	100	100	100	100	100	100	100

TABLE 3.5.6-9. Local income impacts associated with commercial fishery landings by major port group for 1999 (% of Total). (Page 2 of 2)

	CALIFORNIA												
Species Group	Crescent City	Eureka	Fort Bragg	Bodega Bay - SF	Monterey	Morro Bay	Santa Barbara	Los Angeles	San Diego	Unsp. CA	CA TOTAL	At Sea Sector	W - O - C TOTAL
Whiting	3.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	98.7	13.4
Sablefish	5.9	12.1	13.6	3.7	5.6	3.4	0.1	0.4	1.1	0.0	2.3	0.0	4.5
Shortspine Thornyhead	1.2	2.5	2.5	0.6	2.8	2.5	0.0	0.5	0.4	0.0	0.7	0.0	0.7
Longspine Thornyhead	2.9	6.1	6.0	1.4	1.9	4.9	0.0	0.1	0.1	0.0	1.0	0.0	1.0
Slope Rockfish	0.3	0.7	0.8	0.4	0.5	0.8	0.0	0.0	0.0	0.0	0.2	0.0	0.6
Dover Sole	4.7	9.4	9.4	3.2	3.3	9.0	0.0	0.0	0.0	0.0	1.7	0.0	2.2
Rex Sole	0.5	0.7	1.0	0.3	0.2	0.3	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Petrale Sole	1.5	3.7	1.9	1.6	1.0	0.8	0.0	0.0	0.0	0.0	0.5	0.0	0.8
Arrowtooth Flounder	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Other Slope Groundfish	0.1	0.4	0.3	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Widow Rockfish	0.8	0.8	1.5	1.2	0.3	0.6	0.0	0.0	0.0	0.0	0.3	0.1	1.0
Chilipepper Rockfish	0.0	0.3	4.1	2.3	0.9	0.6	0.0	0.0	0.0	0.0	0.4	0.0	0.2
Yellowtail Rockfish	0.2	0.2	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.8
Shelf Rockfish	0.6	0.8	0.8	1.1	0.6	1.5	0.1	0.1	0.3	0.0	0.3	0.0	0.6
English Sole, Flathead Sole	0.7	0.7	0.9	0.7	0.3	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.2
Sanddabs	0.6	0.8	0.0	3.4	1.2	0.3	0.0	0.0	0.0	0.0	0.4	0.0	0.3
Other Shelf Groundfish	0.5	0.4	0.8	0.4	0.4	0.8	0.1	0.1	0.5	0.0	0.2	0.0	0.4
Nearshore Rockfish	1.3	0.6	1.5	1.4	1.2	13.5	0.2	0.1	0.2	0.0	0.7	0.0	0.5
Other Flatfish	0.1	0.0	0.0	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Other Groundfish	0.3	0.1	3.8	0.3	0.5	9.6	0.1	0.0	0.0	0.0	0.5	0.0	0.3
Groundfish Total	25.7	40.7	49.2	22.9	21.5	49.0	0.7	1.3	2.8	0.0	10.0	100.0	28.5
Pink Shrimp Trawl	12.1	4.8	2.4	0.2	0.0	4.2	0.0	0.0	0.0	0.0	1.1	0.0	3.4
Spot Prawn Trawl	0.0	0.0	0.6	2.9	1.5	16.6	1.3	0.2	0.0	0.0	1.2	0.0	0.7
Spot Prawn Pot	0.0	0.0	0.0	0.3	1.0	0.3	0.7	0.9	3.5	0.0	0.8	0.0	0.5
Ridgeback Prawn Trawl	0.0	0.0	0.0	0.0	0.0	0.1	3.3	0.0	0.0	0.0	1.0	0.0	0.6
Pacific Halibut	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
CA Halibut (except Gillnet)	0.1	0.0	0.0	8.1	1.0	3.4	0.5	0.4	0.1	0.0	1.1	0.0	0.7
Salmon	0.1	0.7	2.6	36.3	14.4	1.4	0.0	0.0	0.0	0.0	4.0	0.0	2.9
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.2	0.4	0.0	0.3	0.0	0.2
CA Sheephead	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.1	0.8	0.0	0.1	0.0	0.1
Gillnet Complex	0.0	0.0	0.0	0.0	1.8	0.7	0.9	1.0	1.8	0.0	0.8	0.0	0.5
Squid	0.0	0.0	0.0	0.0	1.2	0.2	72.3	29.4	0.1	0.0	33.0	0.0	20.0
Other CPS	0.0	0.0	0.0	0.2	41.9	0.0	3.3	26.3	2.7	0.0	13.0	0.0	7.9
HMS	1.4	5.0	1.0	3.1	15.0	20.2	0.6	33.9	66.3	0.0	16.6	0.0	12.2
Dungeness Crab	57.8	48.5	16.4	15.1	0.5	0.1	0.0	0.0	0.0	0.0	7.2	0.0	15.3
Other Crustaceans	2.7	0.1	0.0	8.4	0.3	3.1	3.5	2.1	14.1	100.0	3.3	0.0	2.1
Other Species	0.1	0.2	27.8	2.5	0.0	0.2	11.9	4.2	7.4	0.0	6.6	0.0	4.1
Total	100	100	100	100	100	100	100	100	100	100	100	100	100

a/ Values omitted to preserve confidentiality. Totals include the value.

TABLE 3.5.6-10. Income and employment from commercial fishing activities by port group in 2001.[a/] (Page 1 of 2)

	All Commercial Fishery						All Groundfish			
Port Group Area	Commercial Fishery-Related Income ($,000)	Fishery-Related Income as a share of Total Personal Income		Commercial Fishery-Related Employment	Fishery-Related Employment as a share of Total Employment		Income ($,000)	Employ.	Groundfish-Related Income as a share of Total Fishery Income	
		(Percent)	(Rank)		(Percent)	(Rank)			(Percent)	(Rank)
Puget Sound	14,344	0.01%	17	531	0.03%	16	8,694	322	60.61%	1
North WA Coast	8,262	0.36%	9	357	1.14%	8	4,865	210	58.89%	2
Central WA Coast	29,858	2.03%	5	1,091	4.26%	6	7,442	272	24.93%	10
South WA Coast	21,053	4.78%	1	957	14.24%	1	1,557	71	7.39%	14
Astoria - Tillamook	46,402	3.29%	4	1,959	7.72%	4	24,122	1,019	51.98%	3
Newport	45,709	4.27%	2	1,968	10.76%	2	22,122	952	48.40%	5
Coos Bay	23,476	0.20%	11	948	0.44%	11	9,266	374	39.47%	7
Brookings	8,792	1.77%	6	400	5.76%	5	3,754	171	42.70%	6
Crescent City	19,111	3.90%	3	773	9.43%	3	6,246	253	32.68%	9
Eureka	14,729	0.50%	8	591	1.11%	9	7,501	301	50.93%	4
Fort Bragg	15,740	0.73%	7	650	1.82%	7	6,183	255	39.28%	8
Bodega Bay - San Francisco	39,330	0.02%	15	1,205	0.04%	15	5,744	176	14.60%	13
Monterey	34,174	0.16%	12	1,146	0.39%	12	5,091	171	14.90%	12
Morro Bay	10,348	0.16%	13	374	0.36%	13	2,482	90	23.99%	11
Santa Barbara	98,377	0.26%	10	3,075	0.78%	10	1,396	44	1.42%	16
Los Angeles	149,075	0.04%	14	3,840	0.06%	14	1,148	30	0.77%	17
San Diego	13,431	0.01%	16	367	0.03%	17	625	17	4.65%	15
TOTAL	592,209	0.06%		20,230	0.15%		118,239	4,726	19.97%	

TABLE 3.5.6-10. Income and employment from commercial fishing activities by port group in 2001.[a/] (Page 2 of 2)

Port Group Area	Groundfish Limited Entry Trawl: Income ($,000)	Groundfish Limited Entry Trawl: Employ.	Limited Entry Groundfish Trawl-Related Income as a share of Fishery Income (Percent)	Limited Entry Groundfish Trawl-Related Income as a share of Fishery Income (Rank)	Other Groundfish Gear: Income ($,000)	Other Groundfish Gear: Employ.	Other Groundfish-Related Income as a share of Fishery Income (Percent)	Other Groundfish-Related Income as a share of Fishery Income (Rank)
Puget Sound	6,558	243	45.72%	2	2,136	79	14.89%	3
North WA Coast	1,318	57	15.96%	10	3,547	153	42.93%	1
Central WA Coast	6,558	240	21.96%	9	885	32	2.96%	14
South WA Coast	1,377	63	6.54%	14	180	8	0.85%	16
Astoria-Tillamook	22,338	943	48.14%	1	1,784	75	3.85%	13
Newport	19,991	861	43.74%	3	2,132	92	4.66%	10
Coos Bay	7,718	312	32.88%	5	1,548	63	6.59%	8
Brookings	1,985	90	22.58%	8	1,769	80	20.12%	2
Crescent City	5,019	203	26.26%	7	1,227	50	6.42%	9
Eureka	6,437	258	43.70%	4	1,064	43	7.23%	7
Fort Bragg	4,503	186	28.61%	6	1,680	69	10.68%	5
Bodega Bay - San Francisco	4,176	128	10.62%	11	1,569	48	3.99%	12
Monterey	2,579	86	7.55%	13	2,512	84	7.35%	6
Morro Bay	1,095	40	10.58%	12	1,388	50	13.41%	4
Santa Barbara	9	0	0.01%	16	1,387	43	1.41%	15
Los Angeles	1	0	0.00%	17	1,147	30	0.77%	17
San Diego	4	0	0.03%	15	621	17	4.62%	11
TOTAL	91,664	3,709	15.48%		26,575	1,017	4.49%	

Note: Includes total income and employment impacts: wages and salaries paid to primary producers, processors and suppliers, and the additional income and employment generated when wages and salaries are spent (PFMC FEAM 9/02).

a/ Actual period is November 2000 through October 2001.

TABLE 3.5.6-11. Effort, personal income and jobs related to the West Coast recreational ocean fisheries in 2001. (Page 1 of 1)

Area		Angler Trips (1,000s)			Coastal Community Income Impacts for the Recreational Fishery ($1,000s)			
		Charter	Private	Total	Charter	Private	Total	Total Jobs
Washington Coast	Total	59	88	147	$5,335	$3,285	$8,620	392
	Groundfish	12	10	23	$1,134	$385	$1,519	69
Oregon	Total	70	140	211	$6,382	$4,911	$11,293	514
	Groundfish	47	22	69	$4,227	$783	$5,011	228
North/Central California[a/]	Total	221	901	1,122	$27,294	$54,172	$81,466	3,363
	Groundfish	141	164	305	$17,414	$9,860	$27,274	1,126
Southern California[b/]	Total	577	1,757	2,334	$72,321	$81,023	$153,345	5,536
	Groundfish	204	252	456	$25,569	$11,621	$37,190	1,343
California Total	Total	798	2,658	3,456	$99,616	$135,195	$234,811	8,899
	Groundfish	345	416	761	$43,983	$21,481	$64,465	2,468
Grand Total	Total	927	2,886	3,813	$111,332	$143,392	$254,724	9,823
	Groundfish	404	449	853	$48,345	$22,649	$70,994	2,765

a/ Includes counties from Monterey north.
b/ Includes counties from San Luis Obispo south.

TABLE 3.5.6-12a. Coastal Counties Economic Profile: 2001. (Page 1 of 2)

State		County	Population	Personal Income ($,000)	Per Capita Personal Income ($)	Rank	Wages & Salaries ($,000)	Wage & Salary Employment	Average Annual Wage	Rank
Washington	1	Whatcom	170,673	4,192,379	$24,564	32	2,114,526	74,361	$28,436	26
	2	Skagit	105,236	2,901,787	$27,574	22	1,344,262	46,755	$28,751	24
	3	Snohomish	623,890	18,379,862	$29,460	17	8,474,469	232,347	$36,473	12
	4	King	1,753,901	80,617,305	$45,965	4	57,968,327	1,224,623	$47,336	3
	5	Pierce	718,918	19,123,592	$26,601	24	8,985,363	278,938	$32,213	20
	6	Thurston	212,831	6,015,831	$28,266	20	2,997,554	91,221	$32,860	19
	7	Clallam	65,304	1,671,533	$25,596	28	577,617	22,655	$25,496	34
	8	Jefferson	26,467	763,572	$28,850	18	218,382	9,134	$23,909	41
	9	Grays Harbor	68,233	1,521,515	$22,299	42	700,511	25,101	$27,908	28
	10	Pacific	20,766	447,144	$21,533	43	148,885	6,691	$22,252	45
	11	Wahkiakum	3,769	86,440	$22,934	38	22,741	903	$25,184	38
	12	Cowlitz	93,752	2,309,418	$24,633	31	1,279,646	40,655	$31,476	22
	13	Clark	359,337	10,335,767	$28,763	19	4,163,231	124,370	$33,475	17
	14	Skaminia	9,991	224,570	$22,477	41	50,724	2,036	$24,914	39
	15	Klickitat	19,301	412,819	$21,388	44	169,524	6,360	$26,655	31
Oregon	16	Clatsop	35,619	878,501	$24,664	30	415,343	16,462	$25,230	36
	17	Tillamook	24,477	571,762	$23,359	36	210,304	8,696	$24,184	40
	18	Lincoln	44,162	1,072,817	$24,293	34	424,292	17,844	$23,778	42
	19	Lane	324,300	8,419,843	$25,963	25	4,227,811	150,099	$28,167	27
	20	Douglas	100,309	2,311,002	$23,039	37	1,060,450	39,622	$26,764	30
	21	Coos	62,374	1,424,226	$22,834	39	569,451	22,366	$25,461	35
	22	Curry	21,071	519,836	$24,671	29	154,578	6,940	$22,273	44
	23	Columbia	44,267	1,147,914	$25,932	27	308,356	10,735	$28,724	25
	24	Multnomah	669,762	22,831,399	$34,089	11	17,622,969	472,626	$37,287	11
	25	Hood River	20,528	462,060	$22,509	40	248,852	10,494	$23,714	43
	26	Wasco	23,769	577,671	$24,304	33	265,875	9,683	$27,458	29
	27	Del Norte	27,367	483,737	$17,676	45	204,647	7,992	$25,606	33

TABLE 3.5.6-12a. Coastal Counties Economic Profile: 2001. (Page 2 of 2)

State		County	Population	Personal Income ($,000)	Per Capita Personal Income ($)	Rank	Wages & Salaries ($,000)	Wage & Salary Employment	Average Annual Wage	Rank
California										
	28	Humboldt	126,591	3,026,604	$23,909	35	1,361,763	53,072	$25,659	32
	29	Mendocino	86,800	2,252,193	$25,947	26	905,491	35,949	$25,188	37
	30	Sonoma	466,466	16,172,878	$34,671	10	7,499,243	209,407	$35,812	13
	31	Marin	248,837	15,697,430	$63,083	1	5,241,032	121,340	$43,193	6
	32	Napa	127,926	4,744,264	$37,086	7	2,320,881	67,268	$34,502	15
	33	Solano	405,565	10,881,241	$26,830	23	4,591,746	136,863	$33,550	16
	34	Contra Costa	978,729	41,098,522	$41,992	5	16,175,738	363,372	$44,516	5
	35	Alameda	1,475,331	56,974,006	$38,618	6	34,485,200	748,518	$46,071	4
	36	San Francisco	775,978	43,311,877	$55,816	3	38,416,304	630,154	$60,963	2
	37	San Mateo	708,710	41,038,760	$57,906	2	24,514,233	396,229	$61,869	1
	38	Santa Cruz	255,697	9,426,281	$36,865	8	3,833,732	111,000	$34,538	14
	39	Monterey	409,008	12,229,942	$29,901	16	5,824,801	182,700	$31,882	21
	40	San Luis Obispo	251,126	7,010,602	$27,917	21	3,046,755	105,685	$28,829	23
	41	Santa Barbara	401,339	13,540,609	$33,739	13	6,476,417	194,714	$33,261	18
	42	Ventura	770,285	24,828,184	$32,232	14	11,972,971	320,403	$37,368	10
	43	Los Angeles	9,677,220	296,232,770	$30,611	15	179,269,456	4,424,333	$40,519	7
	44	Orange	2,900,200	106,284,489	$36,647	9	60,852,829	1,526,308	$39,869	8
	45	San Diego	2,869,900	97,240,725	$33,883	12	53,507,978	1,420,849	$37,659	9
	TOTAL		28,586,082	991,695,679	$34,692		575,225,260	14,007,873	$41,064	

Source: U.S. Department of Commerce / Bureau of Economic Analysis / Regional Economic Information System (REIS)

TABLE 3.5.6-12b. Coastal Counties Economic Profile: 2001. (Page 1 of 2)

State		County	Dividends, Interest & Rent ($,000)	D.I.&.R. per capita	Rank	Transfer Payments ($,000)	Transfer Payments per capita	Rank	net Residence Adjustment ($,000)	Res. Adj. per capita	Rank
Washington	1	Whatcom	970,114	$5,684	30	679,149	$3,979	27	42,842	$251	26
	2	Skagit	695,957	$6,613	20	493,386	$4,688	18	53,395	$507	22
	3	Snohomish	2,829,326	$4,535	39	2,058,977	$3,300	41	3,958,718	$6,345	6
	4	King	14,961,952	$8,531	8	6,481,483	$3,695	31	-7,413,977	-$4,227	43
	5	Pierce	3,285,154	$4,570	38	2,860,860	$3,979	26	2,254,601	$3,136	11
	6	Thurston	1,110,777	$5,219	36	872,466	$4,099	25	514,280	$2,416	14
	7	Clallam	540,259	$8,273	11	386,682	$5,921	3	8,204	$126	33
	8	Jefferson	260,172	$9,830	5	149,161	$5,636	5	76,700	$2,898	12
	9	Grays Harbor	296,361	$4,343	42	383,310	$5,618	6	16,004	$235	27
	10	Pacific	116,668	$5,618	33	130,744	$6,296	1	14,706	$708	18
	11	Wahkiakum	23,808	$6,317	23	20,009	$5,309	11	14,438	$3,831	10
	12	Cowlitz	404,617	$4,316	43	479,724	$5,117	14	-39,028	-$416	39
	13	Clark	2,021,252	$5,625	32	1,328,400	$3,697	30	2,060,315	$5,734	8
	14	Skaminia	44,631	$4,467	40	36,471	$3,650	34	82,443	$8,252	4
	15	Klickitat	108,962	$5,645	31	102,486	$5,310	10	3,147	$163	31
Oregon	16	Clatsop	205,219	$5,762	27	158,028	$4,437	19	3,206	$90	34
	17	Tillamook	153,343	$6,265	24	128,198	$5,237	13	3,252	$133	32
	18	Lincoln	295,467	$6,691	19	246,222	$5,575	7	-2,714	-$61	35
	19	Lane	1,975,383	$6,091	25	1,428,727	$4,406	20	53,082	$164	30
	20	Douglas	522,790	$5,212	37	551,145	$5,494	8	-16,694	-$166	36
	21	Coos	354,778	$5,688	29	355,443	$5,699	4	17,938	$288	25
	22	Curry	180,741	$8,578	7	130,570	$6,197	2	10,012	$475	23
	23	Columbia	193,854	$4,379	41	181,823	$4,107	24	393,134	$8,881	3
	24	Multnomah	4,528,166	$6,761	18	2,851,081	$4,257	21	-5,298,341	-$7,911	44
	25	Hood River	118,773	$5,786	26	72,295	$3,522	37	-19,937	-$971	41
	26	Wasco	136,543	$5,745	28	116,760	$4,912	16	15,241	$641	20

TABLE 3.5.6-12b. Coastal Counties Economic Profile: 2001. (Page 2 of 2)

State		County	Dividends, Interest & Rent ($,000)	D.I.&R. per capita	Rank	Transfer Payments ($,000)	Transfer Payments per capita	Rank	net Residence Adjustment ($,000)	Res. Adj. per capita	Rank
California	27	Del Norte	90,459	$3,305	45	147,523	$5,391	9	-17,987	-$657	40
	28	Humboldt	672,509	$5,312	35	647,486	$5,115	15	-41,460	-$328	37
	29	Mendocino	587,738	$6,771	17	455,472	$5,247	12	15,980	$184	28
	30	Sonoma	3,900,414	$8,362	10	1,703,132	$3,651	33	1,327,120	$2,845	13
	31	Marin	4,531,883	$18,212	1	868,723	$3,491	38	3,311,965	$13,310	1
	32	Napa	1,152,754	$9,011	6	529,143	$4,136	23	218,052	$1,705	15
	33	Solano	1,611,915	$3,974	44	1,324,642	$3,266	42	2,552,806	$6,294	7
	34	Contra Costa	8,293,067	$8,473	9	3,610,056	$3,689	32	9,013,445	$9,209	2
	35	Alameda	9,457,498	$6,410	21	5,770,910	$3,912	28	1,726,178	$1,170	17
	36	San Francisco	9,065,200	$11,682	3	3,647,078	$4,700	17	-14,618,935	-$18,839	45
	37	San Mateo	9,428,151	$13,303	2	2,238,066	$3,158	44	952,615	$1,344	16
	38	Santa Cruz	1,992,530	$7,793	12	844,294	$3,302	40	1,805,743	$7,062	5
	39	Monterey	2,839,193	$6,942	15	1,366,320	$3,341	39	121,598	$297	24
	40	San Luis Obispo	1,940,351	$7,727	13	935,292	$3,724	29	151,125	$602	21
	41	Santa Barbara	4,206,721	$10,482	4	1,415,228	$3,526	36	-145,358	-$362	38
	42	Ventura	4,874,431	$6,328	22	2,469,328	$3,206	43	3,066,579	$3,981	9
	43	Los Angeles	53,683,113	$5,547	34	40,382,542	$4,173	22	-18,831,606	-$1,946	42
	44	Orange	20,321,546	$7,007	14	8,765,149	$3,022	45	2,000,111	$690	19
	45	San Diego	19,845,857	$6,915	16	10,441,722	$3,638	35	474,703	$165	29
	TOTAL		194,830,397	$6,816		110,245,706	$3,857		-10,112,359	-$354	

Source: U.S. Department of Commerce / Bureau of Economic Analysis / Regional Economic Information System (REIS)

TABLE 3.5.6-13. Coastal Counties Social Profile. (Page 1 of 2)

State		County	Unemploy-ment Rate (2002)	Rank	Poverty Rate (1999)	Rank	Median Income (1999)	Rank	Race of Census Households (2000 Census) White	Black or African American	American Indian and Alaska Native	Asian	Other	Hispanic or Latino (of any race)
Washington	1	Whatcom	6.3%	14	14.2%	34	$39,465	24	88.4%	0.7%	2.8%	2.8%	8.1%	5.2%
	2	Skagit	7.7%	29	11.1%	17	$41,044	21	86.5%	0.4%	1.9%	1.5%	11.2%	11.2%
	3	Snohomish	7.7%	28	6.9%	3	$51,645	7	85.6%	1.7%	1.4%	5.8%	11.3%	4.7%
	4	King	6.5%	16	8.4%	9	$52,893	5	75.7%	5.4%	0.9%	10.8%	17.9%	5.5%
	5	Pierce	7.5%	26	10.5%	15	$44,119	17	78.4%	7.0%	1.4%	5.1%	13.2%	5.5%
	6	Thurston	5.8%	12	8.8%	10	$45,980	15	85.7%	2.4%	1.5%	4.4%	10.5%	4.5%
	7	Clallam	7.5%	25	12.5%	24	$35,958	32	89.1%	0.8%	5.1%	1.1%	4.9%	3.4%
	8	Jefferson	6.6%	18	11.3%	18	$38,050	29	92.2%	0.4%	2.3%	1.2%	5.1%	2.1%
	9	Grays Harbor	9.5%	39	16.1%	41	$33,218	37	88.3%	0.3%	4.7%	1.2%	6.7%	4.8%
	10	Pacific	8.6%	34	14.4%	38	$30,362	43	90.5%	0.2%	2.4%	2.1%	6.8%	5.0%
	11	Wahkiakum	7.7%	30	8.1%	6	$38,095	28	93.5%	0.3%	1.6%	0.5%	4.7%	2.6%
	12	Cowlitz	10.8%	43	14.0%	33	$38,649	27	91.8%	0.5%	1.5%	1.3%	6.2%	4.6%
	13	Clark	9.1%	36	9.1%	12	$47,776	14	88.8%	1.7%	0.8%	3.2%	8.7%	4.7%
	14	Skaminia	11.3%	44	13.1%	28	$39,421	25	92.1%	0.3%	2.2%	0.5%	5.4%	4.0%
	15	Klickitat	14.3%	45	17.0%	42	$34,439	35	87.6%	0.3%	3.5%	0.7%	8.7%	7.8%
Oregon	16	Clatsop	6.5%	15	13.2%	30	$35,313	33	93.1%	0.5%	1.0%	1.2%	5.3%	4.5%
	17	Tillamook	6.0%	13	11.4%	20	$33,000	38	93.9%	0.2%	1.2%	0.6%	4.7%	5.1%
	18	Lincoln	7.7%	27	13.9%	32	$31,884	40	90.6%	0.3%	3.1%	0.9%	6.0%	4.8%
	19	Lane	6.8%	22	14.4%	37	$36,073	31	90.6%	0.8%	1.1%	2.0%	7.5%	4.6%
	20	Douglas	8.9%	35	13.1%	29	$32,903	39	93.9%	0.2%	1.5%	0.6%	4.4%	3.3%
	21	Coos	8.6%	33	15.0%	39	$30,824	41	92.0%	0.3%	2.4%	0.9%	5.3%	3.4%
	22	Curry	6.7%	19	12.2%	22	$29,699	44	92.9%	0.2%	2.1%	0.7%	4.8%	3.6%
	23	Columbia	10.4%	41	9.1%	11	$45,388	16	94.4%	0.2%	1.3%	0.6%	4.0%	2.5%
	24	Multnomah	8.5%	32	12.7%	25	$40,608	22	79.2%	5.7%	1.0%	5.7%	14.1%	7.5%
	25	Hood River	9.5%	38	14.2%	35	$37,110	30	78.9%	0.6%	1.1%	1.5%	19.4%	25.0%
	26	Wasco	9.8%	40	12.9%	27	$35,021	34	86.6%	0.3%	3.8%	0.8%	9.3%	9.3%

TABLE 3.5.6-13. Coastal Counties Social Profile. (Page 2 of 2)

									Race of Census Households (2000 Census)					
State		County	Unemploy-ment Rate (2002)	Rank	Poverty Rate (1999)	Rank	Median Income (1999)	Rank	White	Black or African American	American Indian and Alaska Native	Asian	Other	Hispanic or Latino (of any race)
California	27	Del Norte	9.2%	37	20.2%	45	$29,206	45	78.9%	4.3%	6.4%	2.3%	10.4%	13.9%
	28	Humboldt	6.5%	17	19.5%	44	$30,669	42	84.7%	0.9%	5.7%	1.7%	8.7%	6.5%
	29	Mendocino	7.2%	23	15.9%	40	$33,974	36	80.8%	0.6%	4.8%	1.2%	13.9%	16.5%
	30	Sonoma	4.5%	7	8.1%	5	$49,481	11	81.6%	1.4%	1.2%	3.1%	15.8%	17.3%
	31	Marin	4.0%	2	6.6%	2	$67,785	1	84.0%	2.9%	0.4%	4.5%	12.7%	11.1%
	32	Napa	4.3%	5	8.3%	8	$48,896	13	80.0%	1.3%	0.8%	3.0%	17.9%	23.7%
	33	Solano	5.5%	11	8.3%	7	$49,663	10	56.4%	14.9%	0.8%	12.7%	27.9%	17.6%
	34	Contra Costa	5.2%	9	7.6%	4	$60,368	3	65.5%	9.4%	0.6%	11.0%	24.5%	17.7%
	35	Alameda	6.8%	21	11.0%	16	$51,298	8	48.8%	14.9%	0.6%	20.4%	35.6%	19.0%
	36	San Francisco	7.3%	24	11.3%	19	$51,291	9	49.7%	7.8%	0.4%	30.8%	42.1%	14.1%
	37	San Mateo	5.0%	8	5.8%	1	$64,694	2	59.5%	3.5%	0.4%	20.0%	36.6%	21.9%
	38	Santa Cruz	8.0%	31	11.9%	21	$49,095	12	75.1%	1.0%	1.0%	3.4%	23.0%	26.8%
	39	Monterey	10.4%	42	13.5%	31	$43,263	19	55.9%	3.7%	1.0%	6.0%	39.3%	46.8%
	40	San Luis Obispo	3.4%	1	12.8%	26	$40,407	23	84.6%	2.0%	0.9%	2.7%	12.4%	16.3%
	41	Santa Barbara	4.2%	4	14.3%	36	$43,211	20	72.7%	2.3%	1.2%	4.1%	23.8%	34.2%
	42	Ventura	5.5%	10	9.2%	13	$53,676	4	69.9%	1.9%	0.9%	5.3%	27.2%	33.4%
	43	Los Angeles	6.8%	20	17.9%	43	$38,900	26	48.7%	9.8%	0.8%	11.9%	40.7%	44.6%
	44	Orange	4.1%	3	10.3%	14	$52,129	6	64.8%	1.7%	0.7%	13.6%	32.8%	30.8%
	45	San Diego	4.3%	6	12.4%	23	$44,009	18	66.5%	5.7%	0.9%	8.9%	26.9%	26.7%

Source: U.S. Department of Labor/Bureau of Labor Statistics; U.S. Department of Commerce / Bureau of the Census/1999 Current Population Survey; U.S. Department of Commerce/ Bureau of the Census/Census 2000 Redistricting Data.

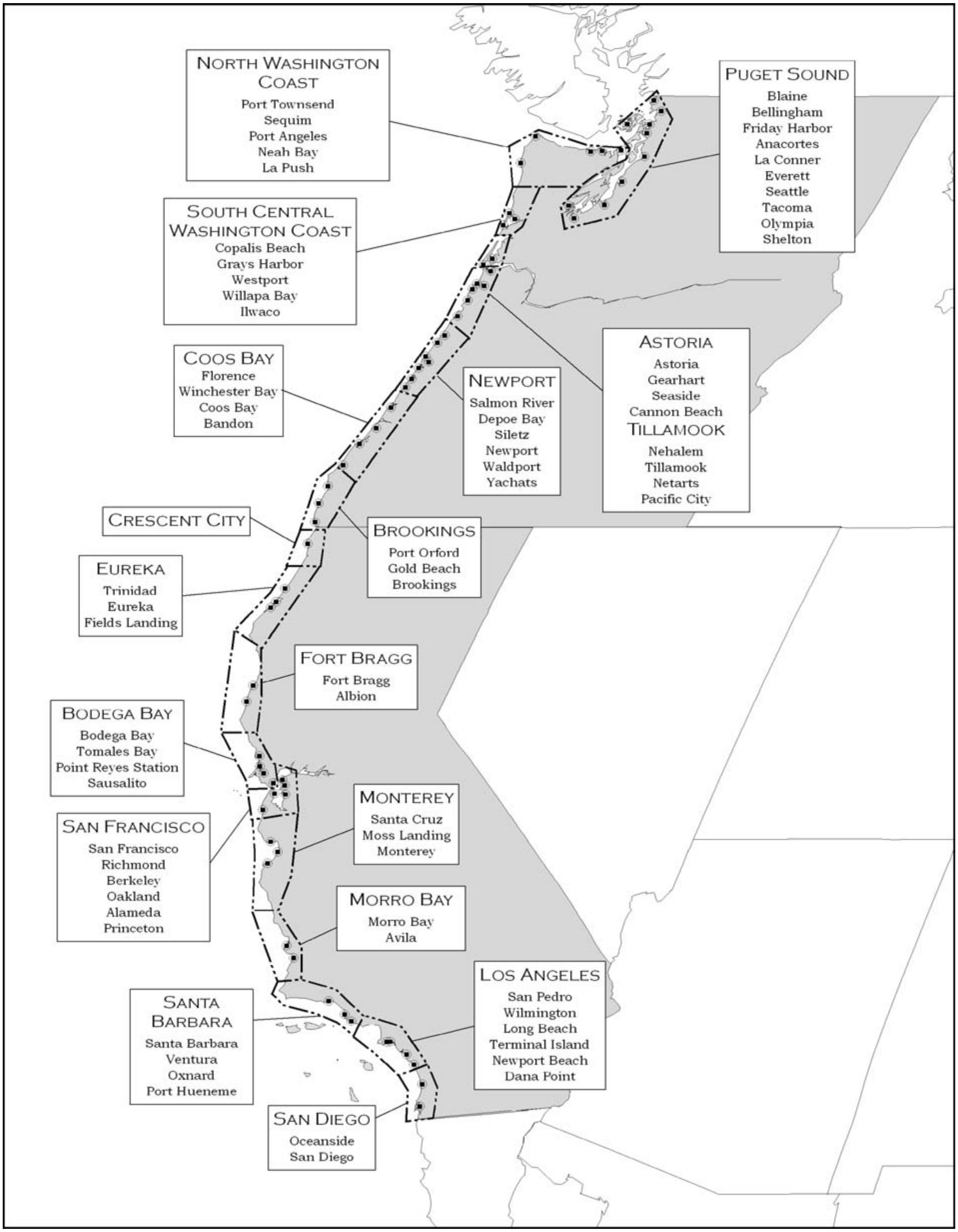

FIGURE 3.5.6-1 Ports and port groups used in socioeconomic sections.

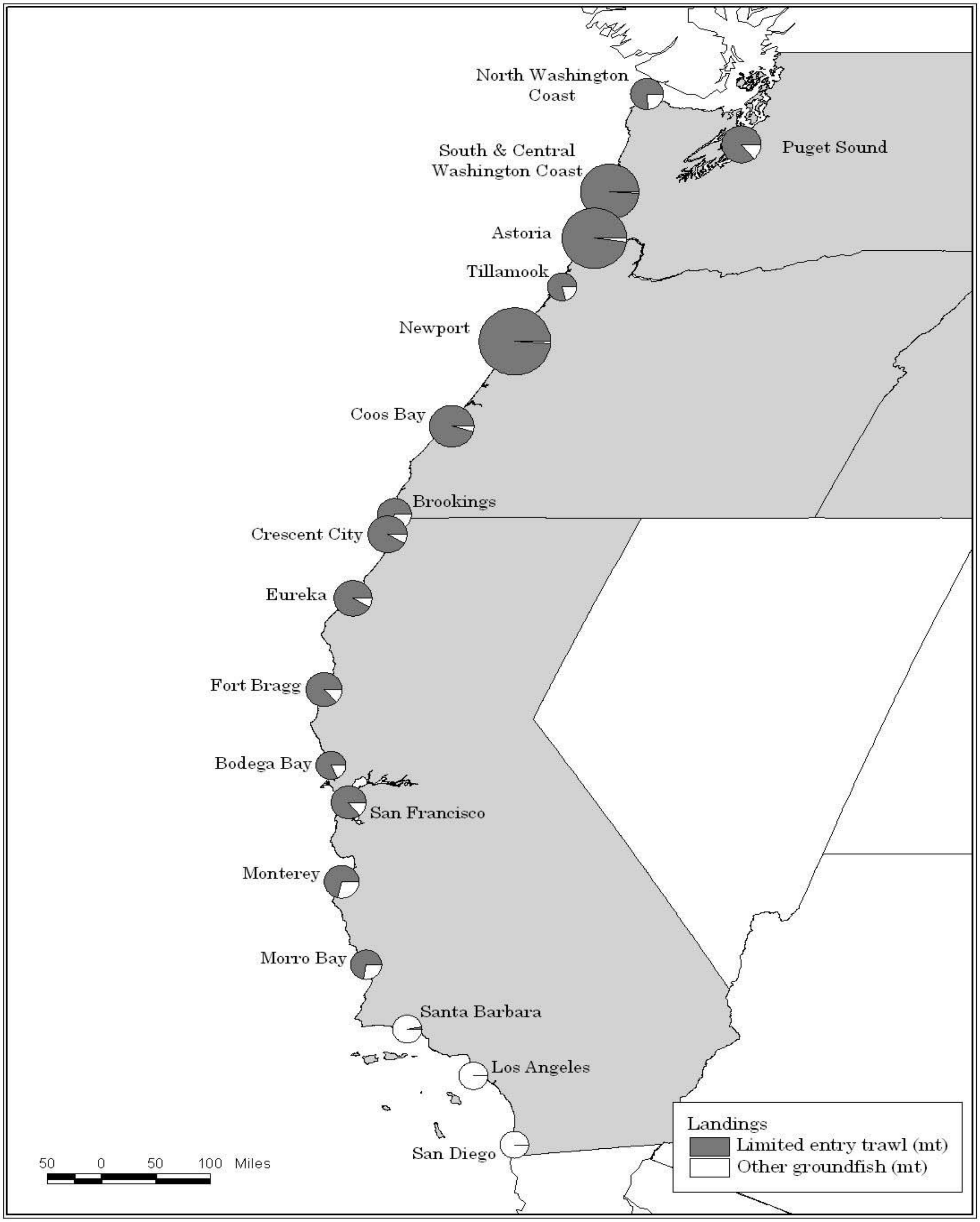

FIGURE 3.5.6-2. Distribution of groundfish landings in 2001 by round weight for port groups.

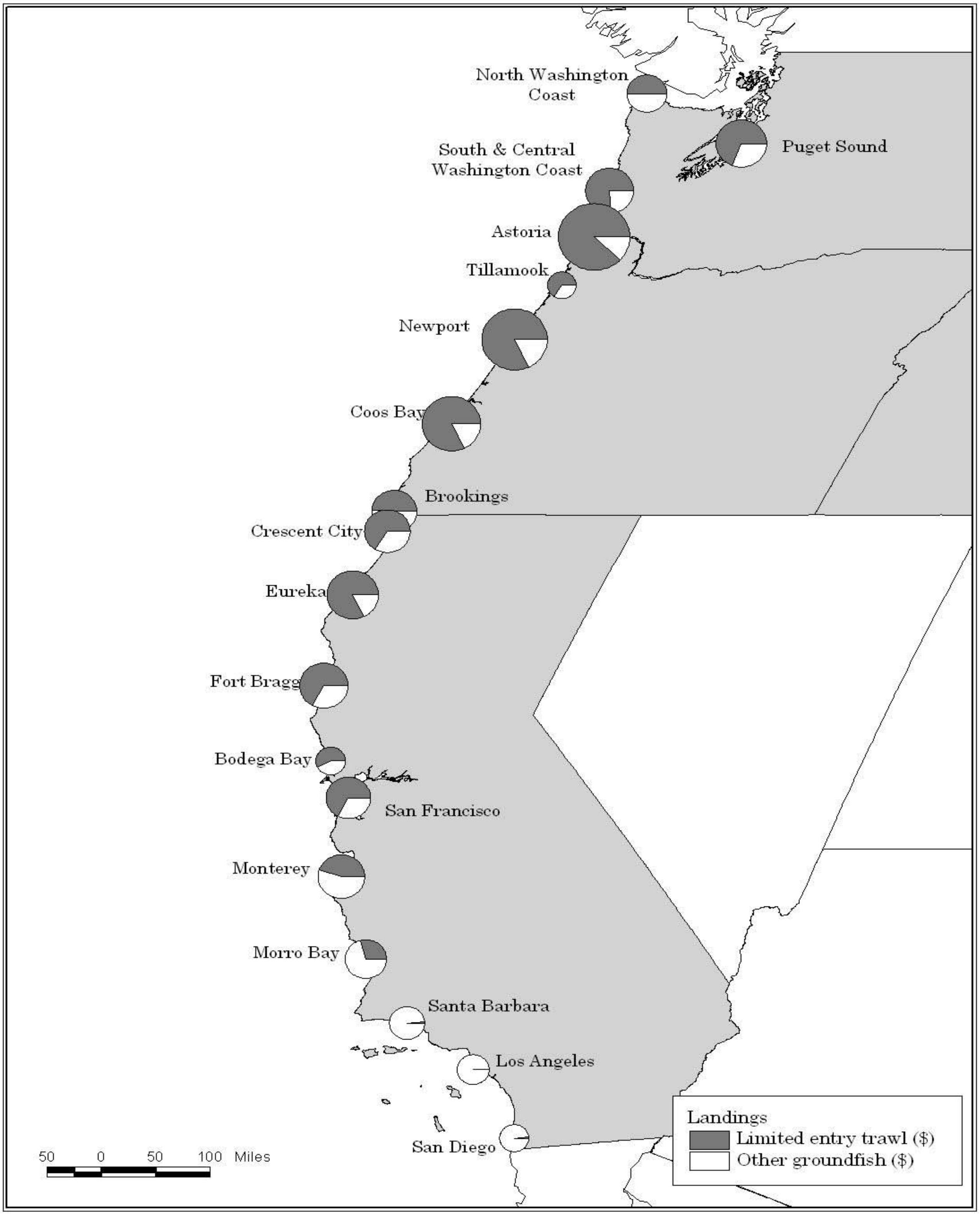

FIGURE 3.5.6-3. Distribution of groundfish landings in 2001 by exvessel value for port groups.

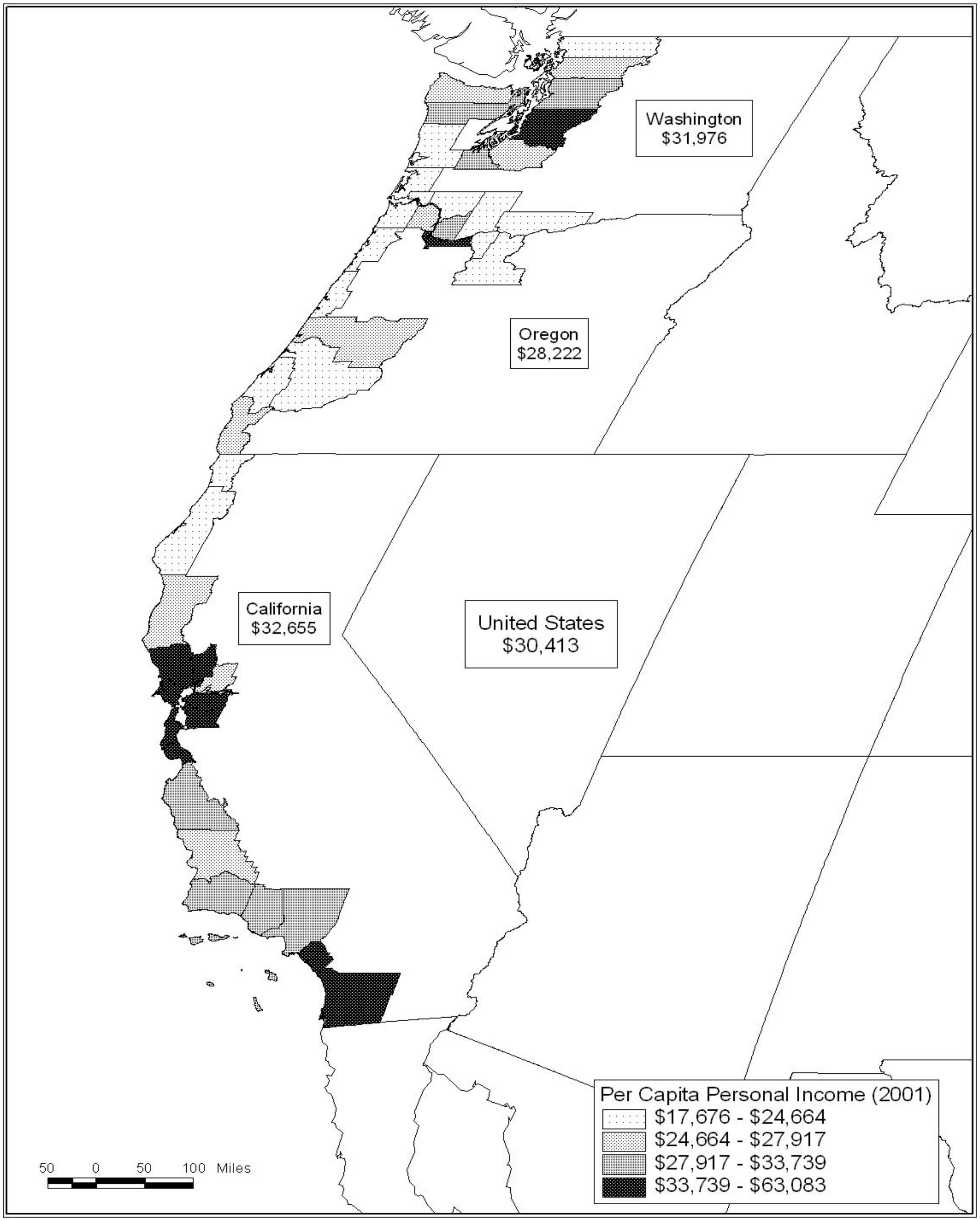

FIGURE 3.5.6-4. Per capita personal income in West Coast and selected regional counties, 2001.

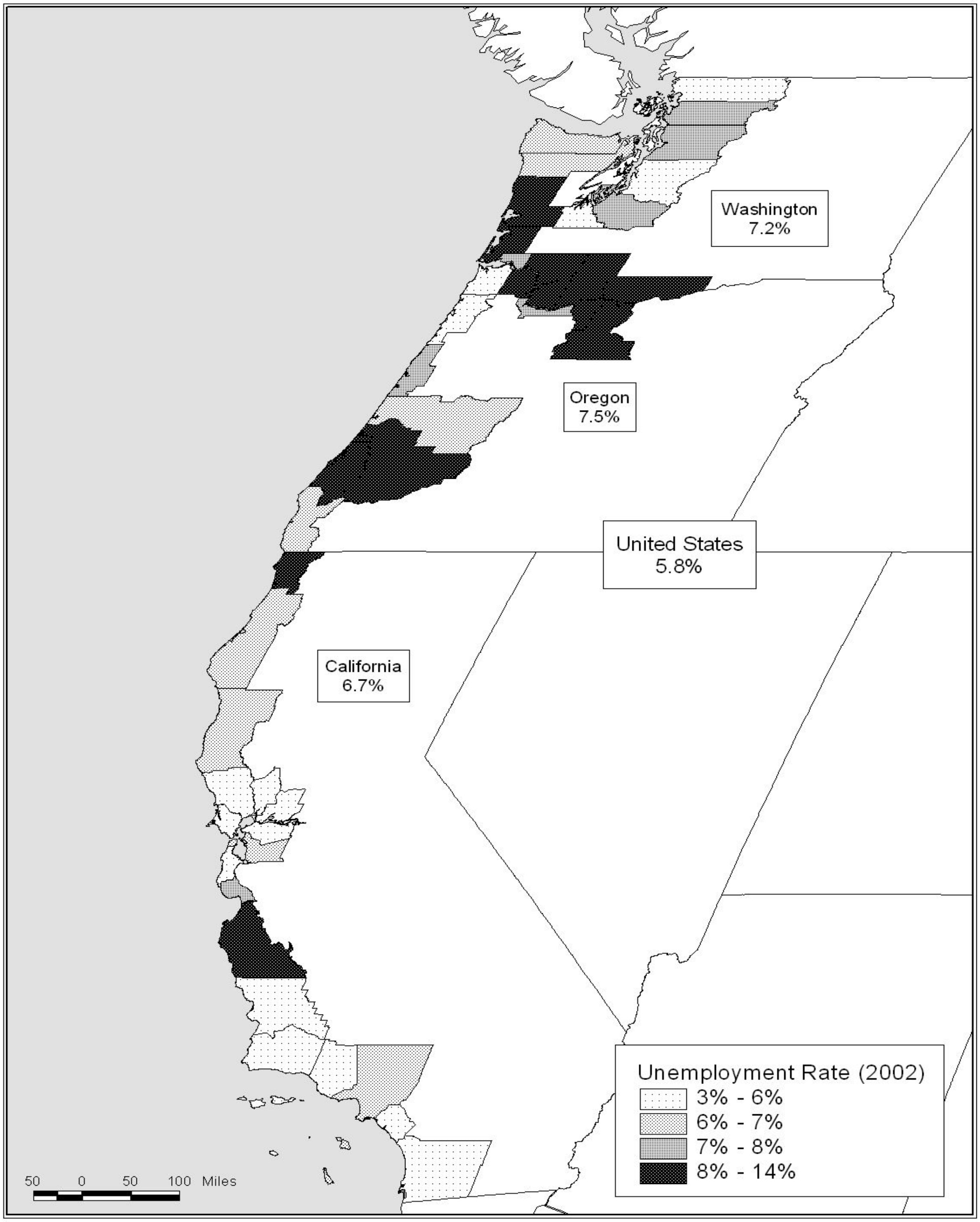

FIGURE 3.5.6-5. Unemployment rates in West Coast and selected regional counties, 2002.

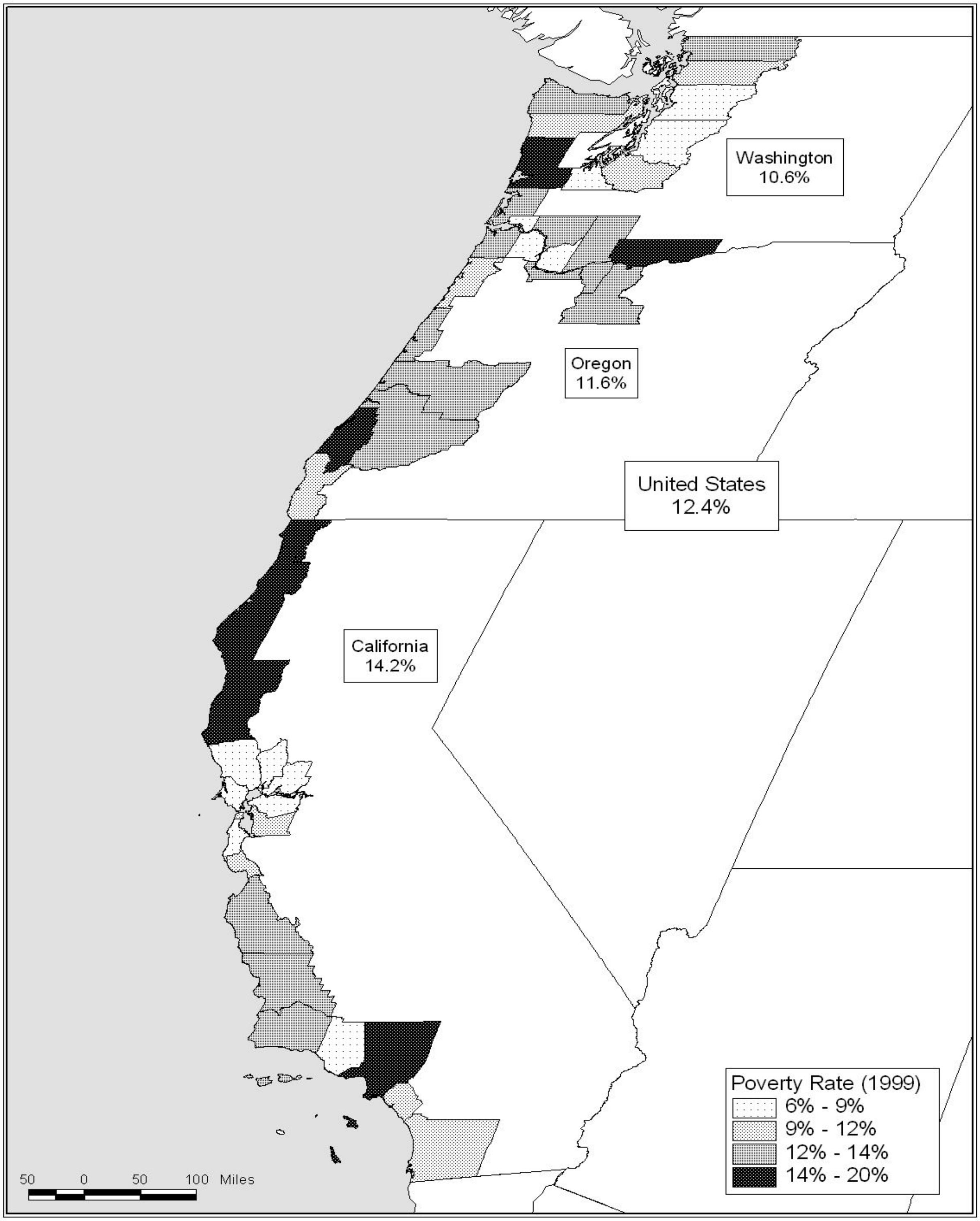

FIGURE 3.5.6-6. Poverty rates in West Coast and selected regional counties, 1999.

3.5.7 General Public

This section discusses nonmarket values that may be held by members of the general public (other than the recreational fishing experience). Offsite nonconsumptive uses of resources that are protected or preserved by management are public in nature in that no one is excluded from deriving the identified benefits. Total value placed on offsite nonconsumptive use of the stock or component of the ecosystem set aside will also depend on:

1. The size of the human population.
2. The level of income.
3. Education levels.
4. Environmental perceptions and preferences.

(After Spurgeon, 1992, as cited in Caribbean Fishery Management Council, 1998).

The above relationships imply that as human populations and the welfare of those populations increase, and as the fish stocks and their ecosystems remaining in good condition decreases, the nonconsumptive values associated with maintaining ocean resources are likely to increase. Also implied is that once the basic integrity of ecosystem processes and marine fisheries components are preserved, the likely additional benefit from incremental increases will decrease.

Value may also be placed on biological diversity. The value of biological diversity may be part of the value placed on a site by nonconsumptive users (onsite or offsite). Three levels of biological diversity have been identified, (1) genetic diversity within a species, (2) species diversity (richness, abundance, and taxonomic diversity), and (3) ecosystem diversity. Ecosystem diversity encompasses the variety of habitats, biotic communities, and ecological processes (Caribbean Fishery Management Council 1998).

4.0 ENVIRONMENTAL CONSEQUENCES

Chapter 4 is organized to parallel the previous chapter, which describes baseline conditions—the state of the environment before the proposed action is implemented—and provides the information needed to evaluate the impacts of the alternatives presented in this chapter. This chapter evaluates impacts to: habitat and ecosystem (Section 4.1), affected species and stocks (Section 4.2), protected species (Section 4.3) the public sector (which includes the management system) (Section 4.4), and socioeconomic impacts (Section 4.5). (A socioeconomic cost-benefit analysis in support of Regulatory Flexibility Act and EO 12866 requirements can be found in Section 2.4.) (See Chapter 6 for the findings related to these requirements.) The National Environmental Policy Act (NEPA) requires seven types of effects to be evaluated: direct and indirect, cumulative, short and long term, and irreversible and irretrievable effects. Direct, indirect, and cumulative effects are described in sections 4.1 through 4.5. Section 4.6 reviews and addresses additional impacts and issues that must be covered in an EIS. This includes a summary of short and long term impacts, irreversible and irretrievable impacts, and other impacts. Section 4.6 also discusses mitigation, describes unavoidable adverse impacts, provides a rationale for the selection of the preferred alternative, and identifies the environmentally preferred alternative.

4.1 Habitat and Ecosystem

4.1.1 Criteria Used to Evaluate Impacts

The proposed action will directly and indirectly affect the level of fishing activity, which—to the degree certain types of fishing gear adversely affect essential fish habitat—could result in differential impacts among the alternatives. Increased fishing effort could lead to an increase in fishing-related impacts while a decrease in fishing effort would have the opposite effect. Thus, changes in fishing effort could be one way to evaluate the relative effects of the alternatives. However, there are limited data available on the distribution, intensity, and duration of fishing effort associated with the groundfish fisheries.[19/] Furthermore, different gear types have different kinds of impacts to habitat, although bottom trawl gear is likely to have the greatest impact because of its extensive contact with substrate. The effects of fishing gear on different types of habitat is not well understood either. For example, in high energy environments (e.g., strong wave action or currents) the relative effect of fishing gear may be modest compared to more stable, low energy environments. Currently, there is insufficient information to fully evaluate the effects of the proposed action on essential fish habitat.

Impacts of the proposed action at the ecosystem level are at least as difficult to predict. The direct effect of fishing authorized under the proposed action is to remove fish from ecosystems. This may change the relative abundance of species at different trophic levels, affecting ecosystem structure and contributing to follow-on indirect and cumulative effects. However, the nature, intensity, and location of these effects are not well-understood, especially across the range of marine ecosystems potentially affected by changes in the abundance of harvested groundfish species.

Given these limitations, projected groundfish landings and proposed closed areas are used as proxies for fishing effort as criteria to assess the relative effects of the alternatives on essential habitat and ecosystem function.

19/ Fishing locations are reported in logbooks required for limited entry trawl vessels. Similar reporting is not required for other sectors catching groundfish. To date, a model has not been developed to predict the distribution and intensity of fishing effort for a given set of management measures. As part of the EFH EIS referenced below, NMFS is developing a model to predict impacts on EFH includes a component for predicting fishing effort distribution and intensity.

When an agency is evaluating reasonably foreseeable significant adverse effects, there is incomplete or unavailable information, and the costs of obtaining it are exorbitant or the means unknown, the agency must: (1) so state, (2) describe the importance of the unavailable information to the assessment, (3) summarize any existing scientific information, and (4) evaluate impacts based on generally accepted scientific principals (40 CFR Part 1502.22), which may accord with the best professional judgement of agency staff. NMFS acknowledges that the information necessary to fully evaluate impacts to protected species, as described in the preceding paragraph, cannot be reasonably obtained at this time, and impacts are generally unknown. Necessary information may become available at a future date. NMFS is preparing an EIS to comprehensively evaluate groundfish habitat and the effects of groundfish fishing on that habitat, in response to litigation (*American Oceans Campaign v. Daley et al.*, Civil Action No 99-982(GK)). This EIS is gathering more information about the effects of fishing in order to evaluate alternatives to minimize fishing effects on EFH to the extent practicable, as required by the Magnuson-Stevens Act. A predictive risk assessment model is being developed for this project, which will be used to develop alternatives for the designation and protection of EFH. In addition to any direct outcome of this EIS, such as establishing additional protection measures for EFH, it may be possible to adapt the assessment model to predict the effects of other actions, such as setting harvest specifications the DEIS is scheduled for release in February 2005, and the EIS process will be completed (by signing of the ROD) in February 2006. (Given the schedule for the EFH EIS and the transition to a multi-year management system for groundfish harvest specifications, the earliest that any predictive use of this model might be used would be for the 2007-2008 management cycle.) The following evaluation is based on best professional judgement of NMFS staff.

4.1.2 Direct and Indirect Effects

Appendices to the Groundfish fishery management plan (FMP) describes adverse impacts of fishing gear to essential fish habitat (EFH), including ecosystem effects, in general terms. Ecosystem effects are, almost by definition, indirect. Overfishing has reduced some fish stocks to levels that are a small fraction of estimated unfished biomass and may affect trophic relationships: these species are less available both as prey and predators. Direct effects to habitat result from the deployment of fishing gear that damages benthic habitat. Habitat modification can also have indirect ecological effects because different species may be better adapted to the altered habitat, displacing other species. Bottom trawl footrope restrictions implemented by the Council make it difficult for fishers to access rock piles and other areas of complex topography (due to the risk of gear damage). This helps protect important, complex habitat and creates defacto refugia for species preferring that habitat type. Biodiversity impacts are directly and indirectly related to overfishing. Overfished species may become locally extinct in a part of their former range, and there is some risk of actual species extinction. It is unlikely such extinctions would be a direct result of overfishing, in the sense that all organisms were removed by fishing. However, the population could be reduced to such a low level that unfavorable environmental conditions or biological and behavioral constraints (inhibiting successful reproduction for example) could subsequently result in localized or species extinction. Given the current state of knowledge and available data, it is not possible to quantitatively evaluate the ecosystem, habitat, and biodiversity effects of the alternatives. Instead, the alternatives are evaluated qualitatively below.

The effects of fishery management practices on the physical environment typically include such things as fishing gear effects on the ocean floor, changes in water quality associated with vessel traffic, and fish processing discards as a result of fishing practices. There are no data to suggest that characteristics of the California Current System or topography of the coast change with fishery management or fishing practices. However, there is information to indicate fishery management and fishing practices may have an effect on EFH.

In general, potential bottom trawl fishing-related impacts to groundfish habitat take the form of lost or discarded fishing gear and direct disturbance of the seafloor from contact by trawl nets. While the effects of fishing on groundfish habitat have not been directly investigated, there is some research exploring how gear affects habitat. Auster and Langton (1999) reviewed a variety of studies reporting habitat effects due to fishing for a wide range of habitats and gear types. Commonalities of all studies included immediate effects on species composition and diversity and a reduction of habitat complexity.

Bottom trawling gear is known to modify seafloor habitats by altering benthic habitat complexity and by removing or damaging infauna and sessile organisms (Freese *et al.* 1999; Friedlander *et al.* 1999). In a study on the shelf and slope off California, high-resolution sidescan-sonar images of the Eureka area revealed deep gouges on the seafloor believed to be caused by trawl doors (Friedlander *et al.* 1999). The effects of bottom trawling on a "hard bottom" (pebble, cobble, and boulder) seafloor was also investigated in the Gulf of Alaska, and results indicated a significant number of boulders were displaced and emergent epifauna were removed or damaged after a single pass with trawl gear. Casual observations during the Freese *et al.* (1999) study revealed that Sebastes species use cobble-boulder and epifaunal invertebrates for cover. When boulders are displaced they can still provide cover, but when piles of boulders are displaced it reduces the number and complexity of crevices (Freese *et al.* 1999).

Limited qualitative observations of fish traps, longlines, and gillnets dragged across the seafloor during set and retrieval showed results similar to mobile gear, such that some types of organisms living on the seabed were dislodged. Quantitative studies of acute and chronic effects of fixed gear on habitat have not been conducted (Auster and Langton 1999).

In addition to fishing activities, humans have many direct and indirect effects on groundfish habitat. While non-fishing human impacts have not been directly assessed on groundfish habitat, a study of flatfish in Puget Sound, Washington indicated that anthropogenic stressors included chemical contaminant exposure and alteration of nearshore nursery habitats (Johnson *et al.* 1998). The New England Fishery Management Council compiled a list of human-induced threats to fish habitat that may be used as a guide to factors affecting groundfish species off the West Coast. Oil, heavy metals, acid, chlorine, radioactive waste, herbicides and pesticides, sediments, greenhouse gases, and ozone loss are thought to be chemical factors that affect fish habitat. Biological threats can include the introduction of non-indigenous species, stimulation of nuisance and toxic algae, and the spread of disease. Human activities that may physically threaten fish habitat are dredging and disposal, mineral harvesting, vessel activity, shoreline alteration, and debris (Wilbur and Pentony 1999).

In the last few decades, marine debris has also been recognized as posing a risk to marine organisms via entanglement and ingestion. Seafloor debris was surveyed from Point Conception, California to the United States/Mexico international border at depths of 10 m to 200 m and anthropogenic debris occurred on approximately 14% of the mainland shelf. Of the debris sampled, discarded fishing gear had the largest spatial coverage, followed by plastic, metal, and other debris (e.g., shoe soles and automobile parts) (Moore and Allen 1999). Less is known about the quantity of marine debris off Washington and Oregon, but it may be at levels that could negatively affect marine organisms.

4.1.3 Cumulative Effects

Cumulative effects result primarily in changes in the productivity of ecosystem components, which itself may be a result in fishery-induced changes in ecosystem structure. These factors include:

<u>Climate variability.</u> Climate cycles affect population productivity. Since predictions about future productivity are based on past relationships, between stock size and recruitment for example, if underlying conditions change, these predictions may be inaccurate. Thus, if climate is not or cannot be accounted for when modeling population dynamics, scientists may under or over predict population growth and sustainable fishery removals.

Ecosystem structure. Structural change becomes an effect itself (if resulting from fishery removals) that could interact cumulatively with the effects of the alternatives. Ultimately, it is the presence and differing abundances of species that constitutes ecosystem structure. The abundance of a given species is in turn the result of physiographic conditions (water temperature, relief, depth, etc.), processes external to an arbitrarily bounded system (e.g., fishing mortality) and interactions between system components (trophic relationships). Structure can change as a result of internal feedback. For example, scientists have posited "cultivation/depensation effects" that may lead to recruitment failure even though one would expect compensation to declines in biomass (MacCall 2002a; Walters and Kitchell 2001). (Compensatory response assumes that growth and survival are density dependent.)

Non-fishing impacts to habitat. These change physiographic conditions, which may produce changes in ecosystem structure. (Appendices to the groundfish FMP describes these effects.) Activities such as dredging, oil and gas exploitation, wastewater discharge, aquaculture and coastal development generally affect inshore habitats. With some notable exceptions (such as the live fish fishery in Southern California) most limited entry and directed open access fisheries do not occur in the inshore areas directly affected by these activities. However, according to EFH descriptions in the groundfish FMP, early life stages of some target species—such as Pacific cod, whiting, bocaccio and English sole—use estuarine habitat, so these stocks could be affected if nearshore non-fishing activities reduce productivity by damaging habitat.

Past and future fishing activity and related management actions. Groundfish landings (excluding at-sea deliveries) peaked in 1996 and have declined since then. (See Table 3.5.1-3, which provides data through 2001, when landings were 32% below the 1996 peak. Landings in 2002 and 2003 were lower still.) Using landings as a proxy for changes in fishing effort, past effort was substantially higher than is likely to occur in 2003. This activity likely resulted in substantial impacts to EFH. The trawl vessel buyback program implemented in December 2003 retired about one third of the limited entry fleet. Although this may allow increases in landing limits and more fishing effort by the remaining vessels, the net effect is likely to be a reduction in total trawl effort. In the foreseeable future, the need to rebuild overfished groundfish stocks will likely constrain fishing effort to levels near or modestly above the level occurring at present. The distribution and intensity of fishing effort, and therefore impacts to EFH, could be affected by measures implemented pursuant to the EFH EIS mentioned above. Any such measures would likely come into effect in 2006.

4.1.4 Summary of Direct, Indirect, and Cumulative Effects of the Alternatives

Currently, there is insufficient information to distinguish the relative effects of the alternatives on the different habitats and ecosystems. Using the criterion described in Section 4.1.1, the alternatives are assessed in terms of their effect on EFH and ecosystems as a whole.

The *Low OY* alternative is expected to have the least impact, as it will likely result in the least fishing effort. Because trip limits under the *No Action* alternative, *Medium OY* alternative, and *Council OY* alternative are similar, these alternatives will likely result in comparable levels of fishing activity and effects. It is expected the *High OY* alternative would have the greatest effect on protected species, because it provides for the highest trip limits, which may result in the highest intensity of fishing effort.

All alternatives include similar area closures on the continental shelf (GCAs), bottom contacting groundfish gear will not disturb benthic habitat in these areas. This is likely to cause a shift in the distribution of fishing effort into deep water (depths greater than 150 fm) and nearshore areas (depths less than 75 fm) in response. However, as discussed above in Section 4.1.3, the overall level of fishing effort in comparison to historic levels is likely lower. The cumulative effect may be, therefore, a reduction in impacts to EFH when compared to past impacts. Otherwise, the external factors described in Section 4.1.3, which could cumulative affect EFH, apply to all of the alternatives equally. Therefore, cumulative impacts have the same relative intensity as the direct and indirect impacts discussed above.

4.2 Fish Stocks

4.2.1 Overfished Groundfish Stocks

Impacts of the proposed action and considered alternatives on West Coast overfished groundfish stocks are evaluated in this section. The Proposed Action (*Council OY*) analyzed in this EIS is primarily influenced by the overarching conservation mandate to rebuild the nine overfished groundfish species (bocaccio, canary rockfish, cowcod, darkblotched rockfish, lingcod, Pacific ocean perch, Pacific whiting, widow rockfish, and yelloweye rockfish) so declared under the framework provisions described in the groundfish FMP. The Council also adopted rebuilding plans for canary rockfish, darkblotched rockfish, lingcod, and Pacific ocean perch under FMP Amendment 16-2 in June, 2003. The other overfished groundfish species' rebuilding plans will be adopted in subsequent amendments in 2004.

Harvest levels for overfished groundfish species considered and analyzed in this EIS for 2004 West Coast fisheries comport with rebuilding constraints specified in the Magnuson-Stevens Act, groundfish FMP, National Standards Guidelines (NSGs), and other legal mandates. Among these mandates are consideration of rebuilding strategies that have at least a 50% probability of rebuilding (P_{MAX} or probability of achieving a spawning abundance of $B_{40\%}$) within the maximum allowable time (T_{MAX}). The NSGs specify that rebuilding must occur within 10 years even if all sources of fishing-related mortality need to be eliminated (F=0). If rebuilding is estimated to take longer than 10 years at F=0, then the maximum allowable rebuilding time specified in the NSGs is the minimum possible rebuilding time (T_{MIN} = rebuilding at F=0) plus one mean generation time. One mean generation time is the average length of time it takes for a spawning female to replace herself in the population and is an index of relative productivity. All of these rebuilding specifications are determined in rebuilding analyses generated from peer reviewed stock assessments and a rebuilding simulation program developed by Punt (2002). The standards, procedures, methodological approaches, and other terms of reference for conducting stock assessments and rebuilding analyses are formally reviewed, endorsed, and recommended by the Council's SSC. These documents, once formally endorsed by the Scientific and Statistical Committee (SSC) and adopted by the Council, are considered the best available science for rebuilding overfished groundfish species and prescribing harvest levels and management measures for the West Coast groundfish fishery.

Successful stock rebuilding (achieving B_{MSY} ($B_{40\%}$) within T_{MAX}) depends on the ability of management/rebuilding measures to effectively control all sources of fishing-related mortality, including landed catch and bycatch. All alternatives analyzed in this EIS have a calculated total catch OY for the overfished groundfish stocks[20/] to accommodate landings of unavoidable incidental catch. These total catch OY projections are estimated in approved rebuilding analyses based on the most recently approved stock assessment. The scientific uncertainties in these analyses are well characterized and considered in the analysis of EIS alternatives. Associated risk and uncertainty of alternative harvest levels on successful stock rebuilding are estimated as P_{MAX} in the Punt (2002) program used for West Coast groundfish.

Strategic rebuilding parameters are policy choices available to the Council for rebuilding overfished groundfish species. These policy choices are: 1) T_{TARGET}, the target rebuilding year; 2) F, the harvest control rule; and 3) P_{MAX}, the probability of achieving B_{MSY} within T_{MAX}. These parameters are expected to change with new assessments and rebuilding analyses. The process for and implications of changing strategic rebuilding parameters are discussed at length in groundfish FMP Amendments 16-1 and 16-2 , respectively). According to the framework process and standards established with Amendment 16-1, T_{TARGET} and the harvest control rule are the two strategic rebuilding parameters that control the establishment of the annual (or biennial) total catch OY of each overfished species and are codified in the Code of Federal Regulations

20/ Except Pacific whiting where there is no proposed action to set a harvest specification. This decision is deferred until March, 2004 pending a new stock assessment and rebuilding analysis.

(CFR). If, after a new stock assessment, the Council and NMFS conclude that these should be revised, the revision will be done through a rulemaking, and the updated values codified in the CFR. Four overfished groundfish species have a Council-adopted rebuilding plan under Amendment 16-2. The harvest control rule (F) and T_{TARGET} for these four species are intended to be codified in the rulemaking facilitated by this EIS. Of these, two of the species (darkblotched rockfish and Pacific ocean perch), have been subsequently re-assessed. In both cases, the proposed action is to change the harvest control rule, but not $T_{TARGET,}$ from that specified in Amendment 16-2. All other species' rebuilding plans are anticipated next year as Amendments 16-3 and 16-4 are developed and subsequently adopted. The rulemaking facilitated by this EIS will specify the total catch OY and harvest control rule (F) for these species for 2004 management, but not T_{TARGET} or a longer term harvest control rule, pending adoption of Amendments 16-3 and 16-4.

4.2.1.1 Criteria Used to Evaluate Impacts

The choices of a target harvest level (total catch OY) and harvest control rule for overfished stocks imply different rebuilding risks. The scientific uncertainty in the science guiding rebuilding and the potential effectiveness of alternative management measures to stay within total catch OYs are equally important considerations when evaluating impacts. Therefore, the "biological" criteria used to evaluate impacts of the alternatives on overfished species include: 1) estimates of P_{MAX}, 2) relative uncertainty of assessment models, and 3) relative effectiveness of alternative management measures to minimize fishing-related mortality.

Rebuilding probability (P_{MAX}) is an appropriate metric to gauge rebuilding risks since it is the estimated probability of rebuilding within the maximum allowable timeframe under the NSGs and the FMP. It is important to note that P_{MAX} estimates are dependent on the assumed assessment model and the recruitment function used to project future recruitment in the rebuilding analysis.

Alternative assessment models that have been approved for use in groundfish management decision-making are analyzed herein in structuring harvest levels for those overfished species with new assessments. In most cases, alternative assessment models are offered to bracket the assessment uncertainty with a base case model recommended as the best available science. However, in other cases, they represent differential and unresolved assumptions about a stock's inherent productivity or the data used to assess the stock. While there is great uncertainty in any marine fish stock assessment, the relative uncertainty of assessment models differs among stock assessments. These uncertainties are discussed and used as criteria to evaluate impacts.

The relative effectiveness of alternative management measures to minimize fishing-related mortality is also used as an evaluation criteria despite the uncertainty of catch monitoring/estimating systems in the current management regime. This is because current catch monitoring systems are differentially effective and/or reliable by fishery sector. For instance, the recently-implemented NMFS West Coast Groundfish Observer Program is mandated for the limited entry trawl and the limited entry and open access fixed gear sectors, but not for recreational or tribal fisheries[21/]. Also, observer data is only available for the limited entry trawl sector with the limited entry and open access fixed gear observations anticipated in early 2004. Given that some species are differentially impacted by different fishing gears/sectors (i.e., darkblotched rockfish and Pacific ocean perch are primarily caught in the limited entry trawl fishery which has the most intensive at-sea monitoring programs in place), data systems used in management by fishery sector and the precautions structured in alternative management measures are important considerations when evaluating impacts.

21/ There are limited observation programs in place for recreational and tribal groundfish fisheries. These initiatives are not part of the NMFS West Coast Groundfish Observer Program, but are considered in management decision-making.

4.2.1.2 Direct and Indirect Effects

Bocaccio

The bocaccio alternative total catch OY specifications vary by both the choice of assessment models analyzed in the latest rebuilding analysis (MacCall 2003a) and rebuilding probabilities. Therefore, strategic rebuilding parameters in Table 4.2.1-1 are not directly comparable across alternatives. Three models are presented in the rebuilding analysis: STARb1 and STARb2 were recommended by the bocaccio Stock Assessment Review (STAR) Panel to bracket the uncertainty in the assessment, and STATc which combines the assumptions in the two STAR Panel-recommended models (MacCall 2003a; MacCall 2003b). Model STARb1 omits data from the NMFS triennial surveys and holds estimated recruitment constant to 1959, whereas model STARb2 omits the recreational catch per unit of effort (CPUE) data and holds estimated recruitment constant to 1969. Model STATc omits neither data source, holds estimated recruitment constant to 1959, and places a low emphasis on the stock-recruitment relationship to stabilize estimates of recent (post-1999) recruitment. The alternative bocaccio harvest levels recommended by the Council for analysis were ranged to capture uncertainty in these models as well as the different rebuilding likelihoods represented by probabilities of rebuilding within the maximum allowable time (P_{MAX}). The *Low OY* alternative harvest level is based on the use of model STARb2 with a P_{MAX} of 80%. The *Medium OY* alternative assumes model STATc with a P_{MAX} of 70%. The *High OY* alternative assumes model STARb1 with a P_{MAX} of 60%. The *Council OY* alternative bocaccio harvest specifications (ABC = 400 mt, OY = 250 mt) are part of the preferred alternative with a total catch OY intermediate to those specified in the *Low OY* and *Medium OY* alternatives. Additionally, under the *Council OY* alternative, the Council directed that management measures stay within a 199 mt total catch OY (same as in the *Low OY* alternative) to create a buffer given the uncertainty in inseason catch accounting, especially with respect to recreational catch accounting.

One major uncertainty in the 2003 bocaccio assessment and rebuilding analysis is reconciling the contrasting recruitment signals from the low 2001 triennial shelf survey data, which drove the pessimistic result in the 2002 assessment (MacCall 2002b) and rebuilding analysis (MacCall and He 2002b), and the high recent recreational CPUE and CalCOFI index data. The STARb1 and STARb2 models bracket this major uncertainty by sequentially omitting each data source. Both models are much more optimistic than the assessment model presented in 2002, which was strongly influenced by the 2001 triennial survey data indicating low stock abundance and no sign of the 1999 year class. The decision to re-assess the stock in 2003 was based, in part, by the need to validate the strength of the 1999 year class, which was reported to be abundant by California fishers who were encountering large numbers of juvenile bocaccio, but not expected to show up in the 2001 triennial survey due to the selectivity of the trawl survey gear and depths where the survey was conducted (juvenile bocaccio occur in shallower depths). The fishery-dependent indices used in the 2002 assessment also did not pick up the 1999 year class, largely due to the fact that data through 2001 were used, before the 1999 year class would be expected to significantly recruit into fisheries. The addition of 2002 fishery-dependent data in the 2003 assessment resulted in a sharp increase in abundance and our understanding of the strength of the 1999 year class. Strong recent recruitment was corroborated by the CalCOFI larval index of spawning output.

Another significant change in the 2003 bocaccio assessment was a lower assumed natural mortality rate (M = 0.15 rather than 0.20). Ralston and Ianelli (1996) reported the maximum age of bocaccio to be 45 years. MacCall (2003b) used the Hoenig (1983) method to compute a natural mortality rate of 0.10 for the southern bocaccio stock based on the estimated maximum age. However, the bocaccio STAR Panel (Helser *et al.* 2003) recommended a natural mortality rate of 0.15, the value used in the 1996 bocaccio stock assessment (Ralston *et al.* 1996b) as more plausible than either 0.10 or 0.20.

While the 2003 assessment validates the improved status of the southern bocaccio stock, there is still large uncertainty among the assessment models that are the basis for the analyzed EIS alternatives. The wide range of considered OYs under these alternatives (199-526 mt) still leaves doubt in the analyses herein. This uncertainty was a major consideration in deciding the proposed action. The Council adopted a 250 mt bocaccio OY, with direction to target the *Low OY* harvest level of 199 mt. Recreational impacts in 2000-2002 were much higher than expected, which contributed to the pessimistic result in the 2002 assessment (MacCall 2002b). The 51 mt buffer under the proposed action may help mitigate the uncertainty in recreational catch accounting and projections. Additionally, season and depth restrictions analyzed under the all alternatives project a 2004 bocaccio catch close to or under 199 mt (Tables 2.2.2-1, 2.2.3-1, 2.2.4-1, and 2.2.5-1). Projected bocaccio mortality under the proposed action is 135.6 mt, well below the specified OY and the 199 mt guideline adopted by the Council (Table 2.2.5-1). If the entire 250 mt OY under the proposed action was attained in 2004, the resulting rebuilding probabilities would be greater than 70%, irrespective of which model represented the true state of nature (MacCall 2003a). Specifically, the P_{MAX} values associated with a 250 mt OY would be 70%, 79%, and 96% using models STARb2, STATc, and STARb1, respectively (Table 3 in MacCall 2003a).

The proposed harvest specification under the *Council OY* alternative does not infer a preference for assessment models. This will be further analyzed in an EIS that will be prepared to facilitate adoption of a bocaccio rebuilding plan under FMP Amendment 16-3. Scoping for that rebuilding plan EIS begins during the November, 2003 Council meeting with a scoping session scheduled for Sunday, November 2, 2003 in San Diego, California.

Canary Rockfish

The canary rockfish stock is the most constraining to West Coast groundfish fisheries. The level of stock depletion (8% of unfished biomass in 2002) and low potential productivity require very low fishing mortality rates to rebuild the stock (Methot and Piner 2002a). It is particularly challenging to provide sustainable fishing opportunities in 2004 given the number of fisheries and fishing gears that incidentally catch canary rockfish. All EIS alternatives are fundamentally influenced by the need to reduce fishing mortality in order to rebuild canary rockfish.

All the alternative harvest specifications for canary rockfish have the same rebuilding impact, but the management measures associated with the alternatives are variably effective at staying within the OY. The management measures specified under the *Low OY*, *Medium OY*, and *High OY* alternatives have the cumulative effect of exceeding the canary rockfish OY (Tables 2.2.2-1, 2.2.3-1, and 2.2.4-1). Therefore, these alternatives fail to meet the canary rockfish rebuilding targets specified under Amendment 16-2. The proposed action under the *Council OY* alternative is estimated to be about 10% under the total catch OY (Table 2.2.5-1). Such a buffer is important in managing such a small target harvest level, especially given the uncertainty assessing the impacts for some of the fishery sectors. The *No Action* alternative is also about 10% under the OY, but the difference is some of the 2003 EFPs have been completed and the impacts shown in Table 2.2.1-1 are actual and not the EFP caps established in 2003. The buffer under the *Council OY* alternative includes the full EFP caps decided for 2004. It is unlikely that these caps will be attained, creating the largest buffer between expected canary rockfish impacts and the total catch OY of the alternatives considered.

Various precautionary management measures designed to prosecute fisheries while minimizing canary rockfish impacts are considered in this EIS. Depth-based restrictions in trawl fishery alternatives are shaped with some discard information from the West Coast Groundfish Observer Program. While data-sparseness from the first year of trawl observer data was an issue when it was decided to use these data to manage the fishery inseason in 2003, there was discard information available and an analytical basis for a management decision. It is also noted that the second trawl observer data report is expected early in 2004. These additional data should ameliorate some of the sample size problems inherent in the first year's data and will be coincident with depth-based management that was initiated in late 2002 (the second year of trawl data is expected to include observations made through August 2003). No such data currently exists for most of the other fishery sectors, so a prudent management decision needs to consider the uncertainty in the impact analyses presented herein. More conservative management measures should be considered for fisheries where canary rockfish impacts are highly uncertain.

Canary rockfish and the other overfished shelf rockfish species are easily targeted using line gears. Non-retention regulations for most shelf rockfish are designed to eliminate targeting. This measure alone is probably not adequate to protect overfished shelf rockfish since important target species for fixed gear fisheries are also found seasonally on the shelf. Fisheries targeting sablefish, Pacific halibut, and other valuable shelf species would likely encounter canary rockfish and incur an unacceptably high incidental mortality. The extent of the nontrawl RCA is predicated by the depths where overfished shelf rockfish such as canary rockfish reside. The size of the current nontrawl RCA (out to 100 fm under *No Action*) is designed to avoid canary rockfish, which most frequently occur between 50 and 100 fm (Table 3.2.0-1). The northern nontrawl RCA under the *Low OY* alternative has a 125-fm seaward boundary line and provides the most protection for canary rockfish[22/], which are found as deep as 150 fm. If the new observer data suggests that canary rockfish impacts are unacceptably high in commercial line fisheries, then the Council proposes an option of implementing the 125-fm boundary in the north inseason in 2004.

Recreational fishery impacts on overfished shelf rockfish species are highly uncertain (see section 4.5.4). Non-retention regulations in recreational fisheries (as in commercial fixed gear fisheries) are designed to eliminate targeting. However, if anglers target other species in areas where canary rockfish occur, there is an incidental mortality, whether or not retention is allowed. When retention is not allowed, incidental catch is discarded and wasted. The benefit of non-retention regulations is to discourage targeting and reduce any incremental fishing-related mortality from targeting. A 1-canary rockfish daily bag sublimit in 2003 recreational fisheries north of Cape Mendocino was allowed under *No Action*, coupled with fewer depth and season restrictions than contemplated in any of the considered 2004 alternatives. Anglers were asked to avoid canary rockfish; however, some targeting did occur as evidenced by at least one recreational charter advertising canary rockfish fishing opportunities. Therefore, alternatives other than *No Action* and *High OY*, where canary rockfish retention is not allowed, might be expected to reduce canary rockfish mortality accordingly. However, there is no quantifiable estimate of this "savings" and there is clearly a cost of increased wastage when the canary catch is truly incidental. The Council weighed the issue and decided to recommend starting the season with no retention in coastwide recreational fisheries under the proposed action. They would like to revisit this issue in April 2004 and explore other methods for changing angler behavior as potential inseason actions.

Strategic rebuilding parameters depicted in Table 4.2.1-1 under alternatives analyzed for canary rockfish are consistent with the Council-adopted rebuilding plan for canary rockfish specified in FMP Amendment 16-2. Alternative harvest specifications are due to alternative recreational:commercial fishery catch sharing scenarios. The proposed action (*Council OY*) does not change the harvest control rule nor the target rebuilding year specified for West Coast canary rockfish with FMP Amendment 16-2.

Cowcod

The cowcod stock assessment (Butler *et al.* 1999) and rebuilding analysis (Butler and Barnes 2000) are highly uncertain. The premise of all alternatives analyzed in this EIS is that the Cowcod Conservation Areas (CCAs) south of Pt. Conception and no retention regulations are adequate protection for cowcod. Butler *et al.* (2003) reviewed the ability of current management measures to stay under the very small amount of annual harvest allowed under interim rebuilding measures. They studied fishing removals of cowcod following the strict measures adopted since the stock was declared overfished in 2000. They concluded that

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22/ A quantitative assessment of the affect of variable nontrawl RCAs is currently unavailable. The lack of any information relative to discards in fixed gear fisheries will be rectified with the first data report for this sector from the West Coast Groundfish Observer Program, which is expected in early 2004.

cowcod removals north and south of Pt. Conception were under the specified ABC/OY (same as status quo since 2000) each year except in 2000 south of Pt. Conception, when bycatch in the spot prawn trawl fishery exceeded expectations. This fishery was eliminated by state regulatory action in 2003. The Butler *et al.* (2003) cowcod rebuilding review did not take into account the incremental protections afforded by establishing commercial and recreational depth-based restrictions off California. Depth-based management is the centerpiece management strategy considered for all 2004 alternatives in California.

Darkblotched Rockfish

Darkblotched rockfish alternative harvest levels are based on variable rebuilding projections from the new stock assessment and rebuilding analysis (Rogers 2003). Harvest projections are influenced by recent strong recruitment (the 2000 and 2001 year classes), which has not been completely validated in the data used to assess the stock. The SSC STAR Lite Panel requested progressive inclusion of 1997-1999, 2000, and 2001 recruitment estimates (Ralston *et al.* 2003). Risk of error progressively increased from including those recruitment estimates because they were based on increasingly limited data. Rebuilding results were sensitive to the high 2000 and 2001 recruitment estimates and including them allowed much greater 2004 OYs because those recruits are projected to enter the fishery in the future and help rebuild the stock before the maximum allowable year. The ABCs, on the other hand, were not as affected because the 2000 and 2001 recruits were too small to have entered the fishery in 2004. This led to 2004 OY estimates which were higher than the ABC, even given a 90% probability of rebuilding by T_{MAX}. When the ending year for projecting future recruitment was 1999 (2000 and 2001 estimates not included), the ABC was lower than the OY at an 80% probability of rebuilding by 2031.

The *Low OY* harvest level projects future recruitment and the 2004 darkblotched OY by resampling recruits from the 1983-1999 period, the *Medium OY* harvest level projects the OY by resampling recruits from the 1983-2000 period, and the *High OY* harvest level projects the OY by resampling recruits from the 1983-2001 period. To reiterate, the *Medium OY* and *High OY* ABCs are lower than the projected OYs for these alternatives. Since the Magnuson-Stevens Act does not allow harvest greater than the ABC, these ABC values are the harvest limits for these 2004 alternatives. The Council chose the *Medium OY* darkblotched rockfish harvest level (total catch OY = ABC = 240 mt) as its preferred alternative. If recruitment of the 1999 and 2000 year classes is at least as strong as predicted by Rogers (2003), then the P_{MAX} would be about 90% if the entire OY of 240 mt was taken and the fishing mortality rate of 0.032 was realized in the long term (i.e., during the entire course of rebuilding). The P_{MAX} would be much greater than 90% (approaches 100%) if the 2001 year class survives as well as predicted under the *High OY* alternative. However, if the 2000 and 2001 year classes recruit with average survival (i.e., less than predicted) and the fishing mortality rate of 0.032 was realized in the long term, then the resulting P_{MAX} would be less than 50%.

Estimated darkblotched impacts depicted in Tables 2.2.2-1, 2.2.3-1, 2.2.4-1, and 2.2.5-1 are much more certain than those estimated for most of the other overfished groundfish stocks. This is because darkblotched, like Pacific ocean perch, are primarily trawl caught (more than 97% of average landings in the last 20 years occurred in the trawl fishery) and trawl impact estimates benefit from direct discard observations from the West Coast Groundfish Observer Program. The Council also decided conservative trawl RCA boundaries in the north (out to 200 fm during most of the year) to minimize darkblotched and Pacific ocean perch impacts. Predicted darkblotched impacts under all alternatives are less than 200 mt (192 mt under *High OY*) and 124 mt under the proposed action. It is noted that the 172 mt OY under the *Low OY* alternative is slightly exceeded under the trawl management measures specified for that alternative (Table 2.2.2-1). None of the other alternatives exceed the OY. The 124 mt impact under the proposed action is predicted to have a P_{MAX} greater than 90%, even assuming the most pessimistic recruitment model presented by Rogers (2003) and analyzed under the *Low OY* alternative.

The proposed action (*Council OY*) for darkblotched is to raise the harvest control rule (F) from 0.027 estimated in the previous rebuilding analysis (Methot and Rogers 2001) and specified in FMP Amendment

16-2 to 0.032 estimated in the recent rebuilding analysis (Rogers 2003). However, the target rebuilding year of 2030 is not being revised as part of the proposed action, resulting in an increased probability of rebuilding by T_{MAX} (P_{MAX} increases from 80% to >90%).

Lingcod

The 2004 lingcod ABC (1,385 mt) and OY (735 mt) are projected from the most recent rebuilding analysis (Jagielo and Hastie 2001). The same OY is analyzed under each alternative and is consistent with the Council's adoption of a lingcod rebuilding plan as part of FMP Amendment 16-2, which specifies rebuilding targets consistent with a P_{MAX} of 60% (the T_{TARGET} specified in FMP Amendment 16-2 is 2009 and the harvest control rule (F) is 0.0531 for the Columbia and U.S./Vancouver INPFC areas and 0.0610 in the Conception, Monterey, and Eureka INPFC areas). No departure from this rebuilding plan is contemplated in this EIS.

All alternatives analyzed in this EIS project lingcod mortalities close to the OY (1.2% - 7% under the OY for 2004 alternatives other than *High OY*). The OY is projected to be exceeded by 3 mt under the *High OY* alternative (Table 2.2.4-1). Liberalization of the depth and season restrictions specified for California fisheries, a higher Oregon recreational lingcod bag limit, and greater nearshore fishing opportunities with a higher black rockfish OY contribute to proportionally higher lingcod impacts under the 2004 alternatives compared to *No Action*. The proposed action under *Council OY* is predicted to result in a 2004 lingcod fishing mortality about 7% under the OY (Table 2.2.5-1).

A new coastwide lingcod stock assessment and rebuilding analysis are expected to be adopted for management decision-making (for the 2005-2006 management period) in November 2003. Results from these analyses should verify whether stock rebuilding is progressing according to the rebuilding plan adopted under FMP Amendment 16-2.

Pacific Ocean Perch

Alternative harvest levels for Pacific ocean perch were derived from a new rebuilding analysis done this year (Punt *et al.* 2003). Many cases were presented in the rebuilding analysis, and, based on SSC advice, the Council chose the one based on the full Bayesian posterior distribution where recruits were resampled to project future recruitment (Case C). Using the full Bayesian posterior distribution captured more of the assessment model uncertainty than using the maximum of the posterior density function. Resampling recruits rather than recruits per spawner was recommended because only the southern fringe of the stock occurs in waters off the U.S. West Coast. One would want to resample recruits per spawner if measured recruitment is a function of measured stock size. However, it is unlikely that the recruitment measured off the U.S. West Coast is wholly from the portion of the parental stock occurring in these same waters. Therefore, resampling recruits was advised. Harvest alternatives were therefore ranged using Case C with different rebuilding probabilities. The *Low OY*, *Medium OY*, and *High OY* alternatives are based on rebuilding probabilities of 80%, 70%, and 60%, respectively. The *Council OY* POP harvest specification is 444 mt, the same as that specified under *Medium OY*.

Estimated POP impacts depicted in Tables 2.2.2-1, 2.2.3-1, 2.2.4-1, and 2.2.5-1 are much more certain than those estimated for most of the other overfished groundfish stocks. This is because POP, like darkblotched, are primarily trawl caught (more than 96% of average landings in the last 20 years occurred in the trawl fishery) and trawl impact estimates benefit from direct discard observations from the West Coast Groundfish Observer Program. The Council also decided conservative trawl RCA boundaries in the north (out to 200 fm during most of the year) to minimize POP and darkblotched impacts. Predicted POP impacts under all alternatives are less than 165 mt (163 mt or 29% of the OY under *High OY*, Table 2.2.4-1). Predicted POP impacts under the *Low OY* alternative is 140 mt or 44% of the harvest level specified for that alternative (Table 2.2.2-1). The *Medium OY* and *Council OY* alternatives specify the same level of harvest; however, the specified management measures differ under each alternative. The predicted impact of *Medium OY* measures is 153 mt or 34% of the OY (Table 2.2.3-1), while about 121 mt of POP (27% of the OY) is predicted under the proposed action (Table 2.2.5-1). These alternative impacts compare to an 89 mt of POP, or 24% of the 2003 OY, under *No Action* (Table 2.2.1-1), where a trawl RCA out to 250 fm was specified for much of the year. The harvest rate (F) corresponding to the 121 mt impact predicted under the proposed action has a P_{MAX} greater than 90% (F = 0.0094 produces an OY of 163 mt, which has a P_{MAX} of 90%).

A Pacific ocean perch rebuilding plan was adopted by the Council and submitted for incorporation in the groundfish FMP under Amendment 16-2. The rebuilding plan established a target rebuilding year of 2027 and the harvest control rule of F = 0.0082 (with a P_{MAX} of 70%). The proposed action (*Council OY*) is to change the harvest control rule (F) from 0.0082 estimated in the previous rebuilding analysis (Punt and Ianelli 2001) and specified in FMP Amendment 16-2 to 0.0257 estimated in the most recent rebuilding analysis (Punt *et al.* 2003). However, the target rebuilding year of 2027 is not being revised as part of the proposed action (*Council OY*) resulting in an increased probability of rebuilding by T_{MAX} (P_{MAX} increases slightly from 70%). The harvest control rule (F) under *No Action* would result in a P_{MAX} >90% given the current understanding of POP productivity.

Pacific Whiting

No formal rebuilding analysis has been approved for use in managing the stock and directing a rebuilding program. Furthermore, the SSC recommended that the 2002 assessment (Helser *et al.* 2002) not be used to project future harvest levels. A new assessment and rebuilding analysis are expected to be completed this winter and brought to the Council for approval in March 2004 prior to the April 1, 2004 start of the whiting fishery. These new analyses will form the basis for managing the 2004 whiting fishery. In lieu of a more informed range of possible 2004 whiting harvest levels, the Council initially decided to range whiting OYs ±50% of the status quo (2003) harvest level for analytical purposes. Therefore, the *Low OY* harvest level is -50% of the 2003 OY, the *Medium OY* is equal to the 2003 OY, and the *High OY* harvest level is +50% of the 2003 OY. The *High OY* alternative (total catch OY in U.S. waters) was subsequently increased to 250,000 mt for the EIS analysis. It is expected that this range is adequately broad to encompass the range of outcomes from the new assessment and rebuilding analysis anticipated early next year. A rebuilding plan for Pacific whiting, based on a new assessment and rebuilding analysis, will be analyzed in an EIS contemplated for groundfish FMP Amendment 16-4 scheduled for 2004.

Widow Rockfish

A new widow rockfish stock assessment (He *et al.* 2003b) and rebuilding analysis (He *et al.* 2003a) were approved this year for use in 2004 management. The models and simulations presented in the rebuilding analysis and recommended by the SSC were used to range 2004 widow rockfish ABCs and OYs for analysis in this EIS. The SSC recommended the rebuilding simulations presented in the rebuilding analysis under models 7, 8, and 9. These models 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 2.0 and 4.0 in the Santa Cruz midwater juvenile survey. Models 7, 8, and 9 assume a midwater survey power coefficient of 2.0, 3.0, and 4.0, respectively. All harvest level alternatives chosen by the Council have a rebuilding probability (P_{MAX}) of 60%. The *Low OY*, *Medium OY*, and *High OY* harvest level alternatives are based on models 7, 8, and 9, respectively. The Council chose the *Medium OY* harvest specification (284 mt) as part of its preferred alternative.

Assessment model uncertainty is significant for the widow rockfish stock. There is considerable uncertainty in current stock status and recent trends due to the absence of a fishery-independent stock size index and the recent absence of fishery-dependent indices (Conser *et al.* 2003). The past assessment (Williams *et al.* 2000) relied on an index of widow rockfish bycatch in the whiting fishery. However, since widow rockfish have been declared overfished, the whiting fleets have tried to avoid this bycatch. The midwater trawl juvenile index is available from 1984-2002, but the area sampled is small in relation to stock distribution. The functional form of the midwater trawl juvenile index, which samples 100-day old juveniles, to stock recruitment three years later is unknown. While the 2002 midwater trawl juvenile index does indicate a strong 2002 year class, the actual strength of this year class is still uncertain. This lack of reliable stock and recruitment data is problematic when attempting to develop rebuilding strategies.

Model 8 was the base model used in the 2003 assessment (He *et al.* 2003b) and was the intermediate of the three models in the rebuilding analysis (models 7, 8, and 9, He *et al.* 2003a) recommended by the SSC. A direct comparison of the alternative harvest specifications using model 8 indicates the *No Action* (832 mt) and *High OY* (501 mt) optimum yield specifications would have a P_{MAX} much less than 50%, and therefore, not in compliance with the NSGs if model 8 represented the true state of nature. The *Low OY* (181 mt) and *Council OY* (284 mt) yields would correspond to rebuilding strategies with P_{MAX} values of about 74% and 60%, respectively. However, it is noted that the proposed harvest specification under the *Council OY* alternative does not infer a preference for assessment models.

The sectors of the West Coast groundfish fishery that have traditionally realized the highest take of widow rockfish have been non-whiting trawl and whiting trawl. Most widow rockfish were taken in midwater trawl fisheries targeting both widow and yellowtail rockfish. The last non-whiting midwater trawl fishery occurred in 2002 when the allowable take of widow was much higher. Such a fishery could only have been accommodated under the *No Action* alternative in 2003 if canary rockfish impacts were low enough to allow a period 6 opportunity (there is an association of canary and yellowtail rockfish). Regulations at the start of 2003 did specify a period 6 midwater trawl opportunity, but accumulated canary rockfish impacts precluded that fishery, which was eliminated in an inseason action. None of the 2004 alternatives contemplate such a non-whiting midwater trawl fishery due to the expected canary rockfish impacts and the significantly lower widow rockfish OYs.

Therefore, the whiting trawl fishery is the sector with the greatest expected impact on widow rockfish in 2004. The Council directed that widow rockfish bycatch be managed primarily in the whiting fishery sectors. The bycatch scorecard under the *No Action* alternative (Table 2.2.1-1) uses widow rockfish bycatch rates by sector observed in the 2003 whiting fishery, while the 2004 alternative scorecards (Tables 2.2.2-1, 2.2.3-1, 2.2.4-1, and 2.2.5-1) use average bycatch rates by sector observed during 1998-2003. Widow rockfish bycatch rates were much lower in 2003 than in previous years, presumably due to high whiting abundance and less searching behavior by the whiting fleets (see section 4.5.2.2). Although more accurate widow rockfish impacts under the proposed action (*Council OY*) are not available until the Council decides whiting harvest specifications and management measures in 2004, the cumulative widow impacts are estimated for the *No Action*, *Low OY*, *Medium OY*, and *High OY* alternatives. Management measures under the *Low OY* and *Medium OY* alternatives exceed the widow rockfish OYs under the assumption that the method used (1998-2003 average widow rockfish bycatch rates in the whiting fishery applied to alternative whiting OYs) is a reasonable predictor of 2004 widow impacts. The *No Action* management measures indicate a very low cumulative widow rockfish impact (109 mt, Table 2.2.1-1) that is less than the *Low OY* optimum yield. However, as previously stated, the 2003 impact analysis used bycatch rates observed in 2003 and not the 1998-2003 average. If whiting fleet behavior and stock dynamics in 2004 are similar that observed in 2003, the expected widow impacts should be about a third of those depicted in tables 2.2.2-1, 2.2.3-1, 2.2.4-1, and 2.2.5-1.

A rebuilding plan for widow rockfish will be analyzed in an EIS contemplated for groundfish FMP Amendment 16-3 scheduled for 2004.

Yelloweye Rockfish

The 2004 yelloweye rockfish ABC and OY were projected from the 2002 rebuilding analysis (Methot and Piner 2002b). Both the ABC and OY are projected higher in 2004 relative to 2003; however, the increase is so small that the OY rounds to the same value as the 2003 OY while the ABC rounds to one mt higher. This slow increase in projected rebuilding yields is indicative of the stock's low productivity and long rebuilding schedules. The low harvest levels considered for rebuilding yelloweye rockfish create many of the same concerns expressed in the canary rockfish discussion above. Any significant harvest exceeding Council interim rebuilding strategies is more likely to set back rebuilding progress to a more serious degree for yelloweye rockfish than for most any other stock under rebuilding, with the possible exception of cowcod.

The reason yelloweye rockfish rebuilding measures do not constrain West Coast fisheries as much as canary rockfish is they are not as ubiquitously distributed and are not as readily caught in fisheries. They are less pelagic than canary rockfish, more sedentary, and are found in higher relief habitats that are more difficult to fish. However, they are susceptible to targeting by line gears, particularly baited longlines and angling gear. Given the high market value of yelloweye rockfish, eliminating targeting opportunities is the primary precautionary strategy recommended by the Council to limit harvest.

Gear restrictions and area closures have been imposed to limit yelloweye harvest. Small footropes on bottom trawls, which cannot effectively fish high relief habitats, are required to land shelf species under all the alternatives including *No Action*. The recommendation to prohibit fixed gears in waters shallower than 100 fm (except for the opportunities in nearshore areas) was based on the results of the IPHC Halibut longline survey where 99.1% of the yelloweye rockfish were caught inside 100 fm (Table 4.2.1-2). The GMT also recommended prohibiting retention of yelloweye rockfish in 2003 and 2004 fixed gear fisheries and restricting most of these fisheries to outside the 100 fm management line. No retention regulations were considered important by the GMT, because they believed even small landing limits for yelloweye rockfish in the fixed gear sectors would provide an incentive to target. All alternatives in this EIS prescribe a seaward 100 fm boundary for the nontrawl RCA, except *Low OY*, which prescribes a 125 fm seaward line in the north. While the IPHC survey indicates most of the fixed gear impacts might be expected in waters shallower than 100 fm, yelloweye are distributed deeper (out to 220 fm, Table 3.2.0-1). In that sense, the *Low OY* alternative provides the deepest nontrawl RCA and the most protection for yelloweye rockfish. If the new observer data suggests that yelloweye rockfish impacts are unacceptably high in commercial line fisheries, then the Council proposes an option of implementing the 125-fm boundary in the north inseason in 2004.

Recreational fishery impacts on overfished shelf rockfish species are highly uncertain (see section 4.5.4). Non-retention regulations in recreational fisheries (as in commercial fixed gear fisheries) are designed to eliminate targeting. However, if anglers target other species in areas where yelloweye rockfish occur, there is an incidental mortality, whether or not retention is allowed. When retention is not allowed, incidental catch is discarded and wasted. The benefit of non-retention regulations is to discourage targeting and reduce any incremental fishing-related mortality from targeting. A 1-yelloweye rockfish daily bag sublimit in 2003 recreational fisheries in northern California north of Cape Mendocino and Oregon was allowed under *No Action*, coupled with fewer depth and season restrictions than contemplated in any of the considered 2004 alternatives. Alternatives other than *No Action* and *High OY*, where yelloweye rockfish retention is not allowed, might be expected to reduce mortality accordingly. However, there is no quantifiable estimate of this “savings” and there is clearly a cost of increased wastage when the yelloweye catch is truly incidental. The Council weighed the issue and decided to recommend starting the season with no retention in coastwide recreational fisheries under the proposed action. They would like to revisit this issue in April 2004 and explore other methods for changing angler behavior as potential inseason actions.

A further concern in northern recreational fisheries is yelloweye bycatch when targeting Pacific halibut. Pacific halibut and yelloweye inhabit similar habitats, making it difficult in some areas to cleanly target Pacific halibut. Therefore, there is an incidental mortality of yelloweye that cannot be addressed solely by eliminating target opportunities. The WDFW proposed closing an area off the north Washington coast to recreational groundfish and Pacific halibut fishing in 2003. This Yelloweye Rockfish Conservation Area (YRCA), described in section 2.2.1.5, is an area of known high density of yelloweye. Yelloweye and Pacific halibut were targeted in this area in past years. All alternatives specify the same YRCA closure. However, incidental mortality of yelloweye is still a concern when targeting groundfish and Pacific halibut outside the YRCA. In 2003, the WDFW interviewed anglers completing trips targeting Pacific halibut, groundfish (aka bottomfish), and salmon in each of the four coastal Washington ports where they were asked the number of yelloweye incidentally caught and discarded at sea. These anglers were shown color photos of yelloweye to aid in species identification. The WDFW also routinely estimates total angler effort by port and target species type. To estimate the weight of yelloweye caught and discarded, the estimated number of yelloweye caught in each sampling stratum (4 ports, 3 target species types, 2 boat types (charter and private)) was multiplied by 3.4 kg, the mean weight of yelloweye estimated from RecFIN. The estimated yelloweye catch, based on sampling through July 31, 2003, is 767 fish weighing 2.6 mt (Table 4.2.1-3). Most of this catch occurred in the Neah Bay area, which is consistent with the northerly distribution of yelloweye. Nearly half this catch occurred in the recreational groundfish fishery. The WDFW estimates that the Washington recreational yelloweye harvest guideline of 3.5 mt will not be attained since results through the end of July account for most of the expected take in recreational fisheries. It is noted that yelloweye impacts are expected to be greatest in fisheries occurring off northern Washington.

The proposed harvest specification under the *Council OY* alternative does not infer a preference for assessment models. A rebuilding plan for yelloweye rockfish will be analyzed in an EIS contemplated for groundfish FMP Amendment 16-3 scheduled for 2004.

TABLE 4.2.1-1. Harvest specifications and strategic rebuilding parameters for overfished West Coast groundfish species under alternatives considered by the Council for 2004 management. (Page 1 of 2)

Species	Alternatives	2004 Total Catch OY (mt)	Strategic Rebuilding Parameters [a/]		
			Exploitation Rate (F)	Target Rebuilding Yr. (T_{TARGET})	Rebuilding Probability (P_{MAX})
Bocaccio [b/]	*No Action*	#20	#0.0043	$2012	$96%
	Low OY	199	0.0430	2023	80%
	Medium OY	306	0.0498	2023	70%
	High OY	526	0.0670	2018	80%
	Council OY	250	#0.0541	$2014	$70%
Canary [c/]	*Low OY*	42	0.0220	2074	60%
	No Action, Medium OY, High OY	46	0.0220	2074	60%
	Council OY	47.3	0.0220	2074	60%
Cowcod [d/]	All alternatives	4.8	0.0136	2095	55%
Darkblotched [e/]	*No Action*	172	0.027	2030	80%
	Low OY	172	0.025	2030	80%
	Medium OY, Council OY	240	0.032	2030	>90%
	High OY	247	0.032	2030	>90%
Lingcod [f/]	*No Action*	651	<0.0510 N <0.0533 S	2009	>70%
	All other alternatives incl. *Council OY*	735	0.0531 N 0.0610 S	2009	60%
Pacific ocean perch [g/]	*No Action*	377	0.0082	2027	>70%
	Low OY	318	0.0184	2027	>80%
	Medium OY, *Council OY*	444	0.0257	2027	>70%
	High OY	555	0.0322	2027	<60%
Pacific whiting [h/]	*Low OY*	74,100	NA	#2012	NA
	No Action, Medium OY	148,200	NA	#2012	NA
	High OY	250,000	NA	#2012	NA
	Council OY	Decision deferred until March, 2004			
Widow [i/]	*No Action*	832	>0.0170	>>2042	<<50%
	Low OY	181	0.0067	2038	60%
	Medium OY, Council OY	284	0.0093	2037	60%
	High OY	501	0.0146	2033	60%
Yelloweye [j/]	All alternatives	22	<0.0153	<2058	>80%

TABLE 4.2.1-1. Harvest specifications and strategic rebuilding parameters for overfished West Coast groundfish species under alternatives considered by the Council for 2004 management. (Page 26 of 2)

a/ Strategic rebuilding parameters are the policy choices available to the Council for rebuilding overfished groundfish species. These policy choices are discussed at length in groundfish FMP Amendments 16-1 and 16-2 (PFMC 2003a and PFMC 2003b, respectively). These parameters are expected to change with new assessments and rebuilding analyses.

b/ The bocaccio alternative total catch OY specifications vary by both the choice of assessment models analyzed in the latest rebuilding analysis (MacCall 2003b) and rebuilding probabilities. Therefore, strategic rebuilding parameters in this table are not directly comparable across alternatives. The *Low OY* alternative is based on model STARb2, the *Medium OY* alternative on model STATc, and the *High OY* alternative is based on model STARb1. The proposed harvest specification under the *Council OY* alternative does not infer a preference for assessment models.

c/ Strategic rebuilding parameters are consistent with the Council-adopted rebuilding plan for canary rockfish specified in FMP Amendment 16-2. Alternative harvest specifications are due to alternative recreational:commercial fishery catch sharing scenarios. The proposed action (*Council OY*) does not change the harvest control rule nor the target rebuilding year specified for West Coast canary rockfish with Amendment 16-2. See sections 2.1.1.3 and 4.2.1.2 for more details.

d/ Cowcod rebuilding parameters are based on the rebuilding analysis by Butler and Barnes (2000).

e/ Darkblotched rockfish OY alternatives are based on varying recruitment assumptions regarding recent year classes (see sections 2.1.1.4 and 4.2.1.2 for more details. Alternative strategic rebuilding parameters for darkblotched rockfish are estimated in the most recent rebuilding analysis (Rogers 2003), except for *No Action*, where parameters were estimated in the previous analysis (Methot and Rogers 2001). The proposed action (*Council OY*) is to raise the harvest control rule (F) from 0.027, estimated in the previous rebuilding analysis and specified in FMP Amendment 16-2, to 0.032, estimated in the recent rebuilding analysis (Rogers 2003). However, the target rebuilding year of 2030 is not being revised as part of the proposed action (*Council OY*), resulting in an increased probability of rebuilding by T_{MAX} (P_{MAX} increases from 80% to >90%).

f/ Strategic rebuilding parameters are consistent with the Council-adopted rebuilding plan for lingcod specified in FMP Amendment 16-2. The 2004 OY was projected from the most recent rebuilding analysis (Jagielo and Hastie 2001).

g/ Alternative strategic rebuilding parameters for Pacific ocean perch are estimated in the most recent rebuilding analysis (Punt *et al.* 2003), except for *No Action*, where parameters were estimated in the previous analysis (Punt and Ianelli 2001). The proposed action (*Council OY*) is to change the harvest control rule (F) from 0.0082, estimated in the previous rebuilding analysis and specified in FMP Amendment 16-2, to 0.0257, estimated in the most recent rebuilding analysis. However, the target rebuilding year of 2027 is not being revised as part of the proposed action (*Council OY*), resulting in an increased probability of rebuilding by T_{MAX} (P_{MAX} increases from 70% to >70%).

h/ Alternative harvest specifications analyzed for Pacific whiting are broadly ranged to encompass the outcome of a new Pacific whiting assessment and rebuilding analysis anticipated in March, 2004. The proposed action (*Council OY*) does not include a Pacific whiting harvest specification. Strategic rebuilding parameters are unspecified since a rebuilding analysis has not been endorsed by the SSC. A rebuilding plan for Pacific whiting, based on a new assessment and rebuilding analysis, will be analyzed in an EIS contemplated for groundfish FMP Amendment 16-4 scheduled for 2004.

i/ The widow rockfish alternative total catch OY specifications vary by both the choice of assessment models analyzed in the latest rebuilding analysis (He *et al.* 2003b) and rebuilding probabilities. Therefore, strategic rebuilding parameters in this table are not directly comparable across alternatives. The *Low OY*, *Medium OY*, and *High OY* harvest level alternatives are based on models 7, 8, and 9, respectively. The proposed harvest specification under the *Council OY* alternative does not infer a preference for assessment models. A rebuilding plan for widow rockfish will be analyzed in an EIS contemplated for groundfish FMP Amendment 16-3 scheduled for 2004.

j/ The 2004 OY for yelloweye rockfish was projected from the most recent rebuilding analysis (Methot and Piner 2002b). The proposed harvest specification under the *Council OY* alternative does not infer a preference for assessment models. A rebuilding plan for yelloweye rockfish will be analyzed in an EIS contemplated for groundfish FMP Amendment 16-3 scheduled for 2004.

TABLE 4.2.1-2. Yelloweye rockfish distribution by depth from the IPHC Survey. Halibut distribution by depth from IPHC commercial fishery logbooks. Halibut catch from 1996-2000 commercial logbooks. (Page 1 of 1)

Depth (fm)	**Percent Weighted Yelloweye Catch [a]**	**Percent Commercial Halibut Catch**
0-50	0.5%	2.3%
51-100	99.1%	7.7%
101-150	0.1%	35.2%
151-200	0.3%	36.5%
>200	0.0%	18.2%
All depths	100.0%	100.0%

a/ Yelloweye catch weighted by the number of hooks set per depth stratum (first 20 hooks per skate sampled).

TABLE 4.2.1-3. Estimated catch of yelloweye rockfish in 2003 Washington recreational fisheries by port and month through July 31. (Page 1 of 1)

Port	Month	Charter Fishery Angler Trips	Charter Fishery YE per Trip	Charter Fishery Number of Yelloweye	Private Boat Fishery Angler Trips	Private Boat Fishery YE per Trip	Private Boat Fishery No. Of Yelloweye	Total No.	Weight (Kg)	% of Total
Estimated Catch of Yelloweye Rockfish in the Halibut Fishery										
	May	487	0.005	2	31	0.000	0	2	7	0.3
ILWACO	June	11	0.000	0	0	0.000	0	0	0	0.0
	July	94	0.000	0	0	0.000	0	0	0	0.0
	May	1,737	0.010	17	14	0.000	0	17	58	2.2
WESTPORT	June	406	0.006	2	19	0.000	0	2	7	0.3
	July	400	0.020	8	45	0.000	0	8	27	1.0
	May	378	0.050	19	512	0.060	31	50	170	6.5
LaPUSH	June	71	0.050	4	144	0.040	6	10	34	1.3
	July	0	0.000	0	0	0.000	0	0	0	0.0
	May	1,102	0.030	33	3,239	0.020	65	98	333	12.8
NEAH BAY	June	173	0.080	14	1,209	0.030	36	50	170	6.5
	July	0	0.000	0	0	0.000	0	0	0	0.0
TOTAL		4,859	0.020	99	5,213	0.027	138	237	806	30.9
Estimated Catch of Yelloweye Rockfish in the Bottomfish Fishery										
	May	161	0.000	0	80	0.000	0	0	0	0.0
ILWACO	June	37	0.000	0	53	0.000	0	0	0	0.0
	July	247	0.000	0	133	0.000	0	0	0	0.0
	March	191	0.010	2	130	0.000	0	2	7	0.3
	April	786	0.040	31	60	0.000	0	31	105	4.0
WESTPORT	May	1,327	0.010	13	240	0.000	0	13	44	1.7
	June	205	0.010	2	154	0.030	5	7	24	0.9
	July	2,227	0.003	7	282	0.000	0	7	24	1.0
	May	9	0.000	0	148	0.070	10	10	34	1.3
LaPUSH	June	12	0.000	0	111	0.080	9	9	31	1.2
	July	8	0.000	0	200	0.000	0	0	0	0.0
	April	4	0.000	0	415	0.002	1	1	3	0.1
NEAH BAY	May	73	0.000	0	2,840	0.040	114	114	388	14.9
	June	164	0.200	33	2,218	0.020	44	77	262	10.0
	July	45	0.000	0	1,525	0.070	107	107	364	14.0
TOTAL		5,496	0.016	88	8,589	0.034	290	378	1,285	49.3
Estimated Catch of Yelloweye Rockfish in the Salmon Fishery										
ILWACO	June	230	0.000	0	226	0.000	0	0	0	0.0
	July	4,773	0.000	0	9,950	0.000	0	0	0	0.0
WESTPORT	June	2,115	0.000	0	2,158	0.000	0	0	0	0.0
	July	11,899	0.000	0	8,934	0.000	0	0	0	0.0
LaPUSH	June	50	0.190	10	195	0.103	20	30	102	3.9
	July	355	0.000	0	1,450	0.010	15	15	51	2.0
NEAH BAY	June	174	0.000	0	1,217	0.010	12	12	41	1.6
	July	1,029	0.003	3	9,213	0.010	92	95	323	12.4
TOTAL		20,625	0.001	13	33,343	0.004	139	152	517	19.8
GRAND TOTAL								767	2,608	

4.2.2 Target Groundfish Stocks and Other Groundfish Stocks

While controlling the total mortality of overfished groundfish stocks is a primary objective in the proposed action analyzed in this EIS, the Magnuson-Stevens Act and groundfish FMP also mandate harvest control rules (or a framework for deciding these rules) for non-overfished groundfish stocks. Prevention of overfishing (defined as exceeding the specified F_{MSY} harvest rate, which is used to derive the total catch OY) is a primary objective in groundfish management. Some groundfish stocks that are between the biomass threshold that supports MSY (B_{MSY} or 40% of initial, unfished biomass), but above the overfished threshold (minimum stock size threshold or MSST or 25% of initial, unfished biomass) are considered in the precautionary zone. The framework harvest control rule for these stocks is a precautionary reduction of the ABC that derives the total catch OY using the 40-10 rule. The OY is progressively decreased for stocks that are farther from B_{MSY}, until at 10% of initial, unfished biomass, the OY is set to zero. In actuality, harvest specifications for stocks that are below the MSST are governed by rebuilding strategies adopted through rebuilding plans or interim rebuilding measures decided through the annual specifications process. Finally, the harvest target for healthy groundfish stocks that are at or above B_{MSY} is the calculated ABC.

Most of the stocks managed under the groundfish FMP have never been assessed. These stocks are managed under various stock complexes. Harvest specifications for these stock complexes are based on historical catch trends, usually with a precautionary reduction of the OY to account for uncertainty in the status of the stocks making up the complex.

4.2.2.1 Criteria Used to Evaluate Impacts

Relative uncertainty of a stock's status is an important evaluation criterion. Most stocks managed under the groundfish FMP have never been assessed. These stocks may need a greater level of precautionary management to prevent overfishing. In cases where other constraints, such as management measures designed to rebuild overfished stocks, limit fishing access to unassessed stocks, precautions may be implicit in the alternatives. However, in other cases, where access to an unassessed stock is not so limited, stock status uncertainty may need to be directly factored into management decisions.

The relative effectiveness of alternative management measures to control fishing-related mortality (to attain but not exceed total catch OYs) is also used as an evaluation criteria despite the uncertainty of catch monitoring/estimating systems in the current management regime. This is because current catch monitoring systems are differentially effective and/or reliable by fishery sector. For instance, the recently-implemented NMFS West Coast Groundfish Observer Program is mandated for the limited entry trawl and the limited entry and open access fixed gear sectors, but not for recreational or tribal fisheries. Also, observer data is only available for the limited entry trawl sector with the limited entry and open access fixed gear observations anticipated in early 2004. Given that some species are differentially impacted by different fishing gears/sectors, data systems used in management by fishery sector and the precautions structured in alternative management measures are important considerations when evaluating impacts.

4.2.2.2 Direct and Indirect Effects

Groundfish Stocks in the Precautionary Zone

Dover Sole

The Dover sole harvest specification was derived from the most recent assessment (Sampson and Wood 2001) calculated using the current F_{MSY} proxy ($F_{40\%}$) and the 40-10 adjustment. Unlike shortspine thornyhead and sablefish, projections were not used to derive the 2004 specifications; the *No Action* alternative was re-specified. Therefore, there are no alternative harvest specifications.

All alternatives except *No Action* utilize trawl discard rates of Dover sole to derive management measures designed to attain but not exceed the OY. The alternative trawl and nontrawl RCAs structured in the EIS alternatives will probably not have an effect on controlling Dover sole mortality in 2004 since this stock is abundant in deeper waters seaward of the RCAs.

Sablefish

The GMT recommended updating the sablefish ABC and OY ranges analyzed in last year's EIS for 2003 management. Therefore, updated harvest level alternatives are presented as derived in the 2002 assessment update (Schirripa 2002). The *Low OY* harvest level is based on an $F_{60\%}$ harvest rate under the assumption that sablefish recruitment is driven by the density of the parental stock (density-dependence hypothesis). The $F_{60\%}$ harvest rate is one predicted to result in increased abundance of the spawning stock biomass in the next ten years after the strong 2000 and 2001 year classes have finished contributing to stock productivity. The *Medium OY* harvest level also assumes a density-dependence recruitment hypothesis but is derived using the stock's default F_{MSY} harvest rate of $F_{45\%}$. The *High OY* harvest level is based on the default $F_{45\%}$ harvest rate but assumes recruitment variability is driven more by environmental regime shifts (regime shift hypothesis) than parental stock density. The 40-10 adjustment is applied to all the alternative OYs since the stock's spawning biomass is predicted to be less than 40% of its initial, unfished level ($B_{32\%}$ under a density-dependence hypothesis and $B_{39\%}$ under a regime shift hypothesis).

The proposed harvest specification under the *Council OY* alternative is the same as the *Medium OY* or 7,786 mt coastwide. This OY is an increase from the *No Action* alternative beyond that attributed to a projected increase in spawning stock biomass. The specification under *No Action* was slightly less than the 2003 OY estimated assuming a density-dependence recruitment hypothesis derived using the stock's default F_{MSY} harvest rate of $F_{45\%}$. The rationale for this increase is an expectation of more accurate total catch accounting in 2004 with the next observer data report, which will provide fixed gear discard estimates based on direct observations. All 2004 alternatives are based on trawl discard estimates of sablefish and other target species from the first observer data report. However, the second trawl observer data report should augment those observations and alleviate some of the sample size concerns raised when the first data report was made available.

A higher optimum yield under *Council OY* (relative to *No Action*) was also rationalized based on a higher expectation that the environmental regime shift hypothesis controlling sablefish recruitment represents the true state of nature. As groundfish and other West Coast marine species respond favorably to an obviously more productive marine environment (as evidenced by increased recruitment, larger biomasses of forage fish or coastal pelagic species, dramatic improvements in salmon survival, etc.), more credence is given to the regime shift hypothesis. Our current understanding of groundfish productivity is tempered by observations of recruitment under the unfavorable environmental conditions of the last twenty years when El Niño events and other oceanographic anomalies were unusually frequent. Higher OYs can be accommodated if recruitment and potential productivity is expected to improve.

The alternative sablefish harvest specifications are estimated to build sablefish spawning stock biomass at different rates. Schirripa (2002, model 6, Table 4D) presented OY and spawning stock biomass projections under the two states of nature that characterize the *Medium OY* (same as *Council OY*) and *High OY* alternatives. In these cases, spawning stock biomass is predicted to decrease in the near future after the strong 1999 and 2000 year classes begin to wane in the population. The *Low OY* alternative was structured using a harvest rate ($F_{60\%}$) predicted to increase or keep spawning stock biomass at a high equilibrium. In all of these cases, average recruitment is assumed after 2000. Given those assumptions, the relative effectiveness of alternative management measures to increase sablefish abundance is correlated to the amount of specified harvest; the order being *Low OY*, *No Action*, *Medium OY* = *Council OY*, and *High OY*.

The alternative trawl and nontrawl RCAs structured in the EIS alternatives will only have a small effect on controlling sablefish mortality in 2004 since this stock is seasonally found in both shallower shelf areas that are encompassed in the RCAs and deeper slope areas outside the RCAs. There may be a reduction in market-based discard rates of small sablefish, which are more prevalent on the shelf, under the most risk-averse alternative (*Low OY*). If this does occur and represents a significant reduction in stock impact, then the *Low OY* alternative, which specifies the largest RCAs, would reduce total impacts the most.

Shortspine Thornyhead

The 2004 shortspine thornyhead ABC and OY are projected from the 2001 assessment (Piner and Methot 2001). The 40-10 adjustment was applied to the ABC to derive the OY since the stock's spawning biomass is estimated to be below 40% of its initial, unfished level. The *No Action* alternative harvest specification for shortspine thornyheads was not projected from the 2001 assessment due to an oversight. While a 2003 projection was provided in the assessment, the projected OY was not specified in regulations.

All alternatives except *No Action* utilize trawl discard rates of shortspine to derive management measures designed to attain but not exceed the OY. While target species discard rates were available in 2003, the analysis required to incorporate those rates in the Hastie trawl bycatch model was done late in the season. Implementing those rates late inseason would have significantly disrupted the fishery. Availability of fixed gear discard rates for shortspine thornyheads early next year should diminish the uncertainty in monitoring the total catch of shortspine thornyheads.

The alternative trawl and nontrawl RCAs structured in the EIS alternatives will probably not have an effect on controlling shortspine thornyhead mortality in 2004 since this stock is predominantly found in deeper water seaward of the RCAs. There is also less of a market-induced discard of shortspine thornyheads since size disparity of the catch and the value of the catch is much less than for sablefish.

Healthy Stocks At or Above B_{MSY}

For all the healthy groundfish stocks that primarily reside on the shelf, harvest impacts are correlated to the size of the RCA under each alternative. The *No Action* and *Low OY* alternatives specify the largest RCAs, followed by *Council OY*, *Medium OY*, and *High OY*.

Arrowtooth Flounder

Arrowtooth flounder are an abundant species and important trawl target. Most fishing for arrowtooth occurs on the shelf where canary rockfish bycatch in the past has disrupted the trawl fishery for this species. The WDFW conducted an Exempt Fishing Permit (EFP) fishery in 2001-2003 and has plans to continue this EFP in 2004 with the objective of exploring strategies to make this a more selective fishery. Results from this EFP hold some promise that this stock can again be fully accessed without being as constrained by shelf rockfish bycatch. Experimental flatfish trawls that were tested in Oregon in 2002 and 2003 and are expected to undergo further testing in Washington and California waters in state-sponsored EFPs in 2004 may also provide more trawl access to abundant shelf flatfish species such as arrowtooth flounder.

Bank Rockfish

Bank rockfish have been an important commercial target on the shelf and shelf/slope break. They were primarily taken in trawls and setnets. Fishing constraints imposed by rebuilding needs for overfished groundfish stocks have limited access to this species. Since this species is primarily found in the south, it is likely that exploitation will decrease as fisheries are significantly constrained by actions implemented to rebuild bocaccio, canary rockfish, and other species in the depth and latitude range of bank rockfish. The larger RCAs under the *Low OY* alternative will limit access to bank rockfish the most in 2004.

Black Rockfish

A new black rockfish assessment was done for the portion of the coastwide stock occurring off the coasts of Oregon and California (Ralston and Dick 2003). Previous assessments were done for the portion of the stock occurring off the coasts of Oregon north of Cape Falcon and Washington. Alternative harvest levels for the portion of the black rockfish stock occurring off Oregon and California were ranged to capture the major uncertainty of historical landings prior to 1978. Black rockfish catches prior to 1945 were assumed to be zero in the assessment. Many gaps in historical landings of black rockfish since 1945 were evident and these landings were reconstructed using a variety of data sources. The base model assumed cumulative landings of black rockfish from all fisheries was 17,100 mt from 1945 to 1977. This base case catch scenario formed the basis for the *Medium OY* harvest alternative and the *Council OY* preferred alternative, which specifies a 2004 ABC and total catch OY of 775 mt for fisheries off Oregon and California. The *Low OY* harvest alternative for black rockfish assumes lower landings in recreational and trawl fisheries prior to 1978 than used in the base model and assumes a cumulative catch from 1945 to 1977 of 9,400 mt. The high catch scenario in the assessment assumes a cumulative catch of 26,100 mt from 1945 to 1977 and forms the basis for the *High OY* alternative.

Harvest guidelines established for black rockfish by the three coastal states are expected to be under the coastwide OY. In Washington, black rockfish harvest opportunities are reserved for the sport fishery; guidelines are conservative to ensure long term sustainable fishing opportunities. In Oregon, black rockfish is expected to be capped at the 2000 level under the newly-implemented nearshore FMP. In California, black rockfish guidelines using a precautionary 60-20 adjustment that is analogous to the Council's 40-10 adjustment. However, under California policy, precautionary adjustment is done to the ABC at higher levels of abundance ($<B_{60\%}$).

It might be expected that impacts on black rockfish would increase with larger RCAs since effort is likely to shift to nearshore areas as the shelf is progressively closed to fishing. If that is true and significant, then the smaller RCAs specified under *High OY* and *Medium OY* might result in a greater impact on black rockfish and other nearshore species. However, the precautionary limits imposed by state's nearshore FMPs and policies, would mean the impact would be to nearshore fisheries that would suffer early guideline attainment and premature closure.

Under the proposed action, an allocation of the southern black rockfish OY of 58% Oregon and 42% California is specified.

Blackgill Rockfish

Blackgill rockfish is an important commercial slope species and is the target of southern fixed gear slope fisheries. While slope rockfish limits have been reduced to protect darkblotched rockfish, more liberal limits in the south have raised "point of concern" considerations for this species. Management has, therefore, focused on this point of concern to keep from overfishing this species. Blackgill have also been confused with darkblotched rockfish in the past leading to questions regarding species composition of some landings in the south. The Northwest Fisheries Science Center is reviewing landings and biological data to determine whether any past stock discrimination techniques can be used to reduce this confusion.

Chilipepper Rockfish

Chilipepper rockfish are an important shelf rockfish species in the south, especially in commercial trawl and fixed gear fisheries. This species co-occurs with bocaccio; harvest will, therefore, be constrained for this species under actions contemplated to reduce fishing mortality of bocaccio. There is some indications that chilipepper and bocaccio undergo some competitive interactions as evidenced by historical cycles of abundance. It appears that in years when bocaccio are more productive and abundant, chilipepper populations decline and vice versa. This potential relationship should be further explored as actions to rebuild bocaccio are investigated in the future. Options to provide access to abundant chilipepper are confounded by the need to reduce bocaccio and canary rockfish mortality with depth-based management restrictions.

Longspine Thornyhead

Longspine thornyhead are an abundant deep-water species and important trawl target as part of the DTS complex. The OY for longspine thornyhead has not been attained in recent years as the trawl fishery has been constrained by limits imposed on slope rockfish and shortspine thornyhead. The depth-based restrictions considered under the 2004 alternatives may allow increased access to and larger landing limits for longspine thornyhead since a large proportion of the stock is outside the darkblotched rockfish depth zone.

Petrale Sole

Petrale sole are an important trawl target species, especially during winter months when spawning aggregations are targeted in deep water between 150 fm and 250 fm. The 2004 trawl management alternatives are designed to reduce impacts on darkblotched rockfish while allowing some access to abundant petrale sole. The preferred alternative is conservative with respect to protecting darkblotched rockfish by maintaining a 200 fm depth restriction of the trawl fishery for most of the year. However, the *Council-preferred* alternative does prescribe a modified 200 fm line during periods 1 and 6 (November through February) to incorporate some petrale sole fishing areas. Large winter landings of petrale sole have led to market constraints in the past when markets and buyers were saturated by petrale sole.

Shortbelly Rockfish

Shortbelly rockfish are an abundant rockfish caught incidentally in trawl fisheries, but are not targeted due to a relatively low market value. Exploitation on this species is expected to be reduced under the 2004 alternatives analyzed in this EIS by the need to protect bocaccio and other overfished species.

Splitnose Rockfish

Splitnose rockfish largely co-occur with darkblotched rockfish on the slope. As limits have been adjusted for slope rockfish to reduce darkblotched rockfish impacts, they have also been reduced for splitnose. It is anticipated that splitnose harvest opportunities will be reduced due to the darkblotched rockfish protective measures contemplated in 2004 management alternatives.

Yellowtail Rockfish

A new yellowtail rockfish stock assessment (Lai *et al.* 2003) was approved for 2004 management. The 2004 ABC and OY are derived using model YT2003N in the assessment which updates the catch series used in the previous assessment (Tagart *et al.* 2000) with a newly revised series from Pacific Coast Fisheries Information Network (PacFIN), revised Canadian catches in INPFC area 3C, and new estimates of 1967-1976 foreign catches (Rogers In prep). The OY equals the ABC since the stock is estimated to be above the abundance level that supports maximum sustainable yield (or 40% of initial, unfished biomass). The yellowtail rockfish stock was estimated to be at 46% of its initial, unfished biomass in 2002 (Lai *et al.* 2003).

Yellowtail rockfish are an important target of midwater trawl fisheries and is a common species incidentally caught in trawl whiting fisheries. Canary rockfish bycatch has been a concern in trawl fisheries targeting yellowtail rockfish which has limited access to the species. They also co-occur with widow rockfish which is another species under rebuilding. The Council does not contemplate a winter midwater trawl opportunity next year due to canary and widow rockfish bycatch concerns. Yellowtail rockfish have also been incidentally caught in shrimp trawls. This bycatch is anticipated to be reduced with mandatory use of finfish excluders in shrimp trawls coastwide under all alternatives in 2004.

None of the alternatives are expected to result in yellowtail OY attainment in 2004.

Other Groundfish Stocks

Other groundfish include abundant shelf flatfish species such as English sole, sand sole and other species. Efforts to access these species under the current management regime are explored in this EIS, where depth-based restrictions reduce access, may depend on refining fishing gear configurations to make them more selective for these species. Such an effort is planned in further EFP studies of selective flatfish trawls sponsored by CDFG and WDFW.

Spiny dogfish, a federally-managed groundfish species, has become a fixed gear target in the north. Access to this species will be constrained under the proposed action with the imposition of a 100 fm depth restriction for fixed gears. However, access may be more significantly limited under the *Low OY* alternative that imposes a 125 fm management line since most of the effort occurs near the 100 fm contour. The WDFW is proposing continuing an EFP in 2004 to test potentially risk-averse strategies for targeting dogfish with longlines to provide access to the species and allow fixed gear fishers to exploit this specialized market.

4.2.3 Nongroundfish Stocks

4.2.3.1 Criteria Used to Evaluate Impacts

The same criteria used to evaluate impacts to non-overfished groundfish stocks (section 4.2.2.1) are used for those nongroundfish stocks affected by the proposed and alternative 2004 actions.

4.2.3.2 Direct and Indirect Effects

Salmon

Groundfish catch is not a significant component in salmon troll fisheries, although some incidental groundfish catch is landed. None of the 2004 alternatives are expected to affect salmon stocks, except in cases where diminished groundfish fishing opportunities might result in effort shifts into salmon fisheries. However, the result of this would potentially be earlier salmon quota attainment.

Pacific Halibut

The Pacific halibut fishery is affected by depth restrictions. The proposed action to rebuild canary rockfish and yelloweye rockfish north of the Cape Mendocino management line at 40°10' N latitude are anticipated to severely limit fishing effort on the continental shelf inside of the 100 fm line, with a more serious affect under the *Low OY* alternative, where the nontrawl RCA extends out to 125 fm. The YRCA closure off northern Washington will also limit Pacific halibut catch; however, the alternatives analyzed do not vary the size of this closed area.

Coastal Pelagic Species

Coastal Pelagic Species are taken incidentally in the groundfish fishery. Incidental take is well documented in the at-sea and shore-based whiting fishery. Preliminary data for 2001 indicates that approximately 80 mt of squid was incidentally taken in the at-sea whiting fishery through October. There is little information on the incidental take of CPS by the other segments of the fishery; however, given that CPS are not associated with the ocean bottom, the interaction is expected to be minimal.

Highly Migratory Species

Highly migratory species (HMS), such as tunas and billfish, are largely pelagic, open-ocean species infrequently caught in groundfish-directed fisheries. None of the alternatives analyzed should affect HMS species.

Dungeness Crab

Dungeness crab, which are typically harvested using traps (crab pots), ring nets, by hand (scuba divers) or dip nets, are incidentally taken or harmed unintentionally by groundfish gears. Very little bycatch of rockfish and other overfished West Coast groundfish species has been noted in pot and trap fisheries, including those targeting Dungeness crab. It is not anticipated that this fishery would need to be constrained or modified to rebuild any of the overfished West Coast groundfish species of concern.

Other Nongroundfish Species

Other nongroundfish species would not be significantly affected by changes in fisheries resulting from the alternatives.

4.2.4 Cumulative Effects

Cumulative effects must be considered when evaluating the alternatives in an EIS. These effects are the result of "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions," including those of other agencies, organizations and individuals (40 CFR 1508.7). In its guidance on evaluating cumulative impacts the Council on Environmental Quality (CEQ 1997) emphasizes the following principals:

- Cumulative effects are the aggregate of past, present and reasonable foreseeable actions.
- Cumulative effects are the total effect, or combination of direct and indirect impacts with external factors affecting components of the human environment.
- Cumulative effects are analyzed in terms of the specific resources, ecosystem components, and communities affected by the action.
- Cumulative impact analysis should focus on those effects that are truly meaningful rather than cataloging the universe of potential external factors.
- Cumulative effects are rarely aligned with political or administrative boundaries, so the actions of other agencies should be considered.
- Cumulative effects can be the additive effect of one type of impact occurring repeatedly, or synergistic—resulting from different factors combining to produce a sum greater than the parts.
- Cumulative effects can last much longer than the proposed action.
- Each affected resource, ecosystem component, and community should be evaluated in terms of its capacity to accommodate additional effects.

4.2.4.1 Methodology

Summarizing the above principals, the direct and indirect effects of the proposed action (implemented through any of the alternatives, including the preferred alternative, described in Chapter 2) may produce cumulative effects in combination with other factors that are not a consequence of the proposed action. The next section identifies and describes other, external factors that may contribute to cumulative impacts. These effects fall into a set of broad domains similar to the resource categories used to describe direct and indirect impacts. However, they may cumulatively affect a range of system components (or resource categories). These external factors are considered in the evaluation of impacts, including cumulative impacts.

4.2.4.2 External factors

Meso-scale Climate Events and Climate Change

Scientists have identified cyclic changes in ocean conditions that are more or less favorable to groundfish populations, which can last for a year or two, as in the case of El Niño and La Niña, to much longer cycles of 25 years to about 60 years, which are different phases of the Pacific Decadal Oscillation regime shift. A more general warming trend, commonly referred to as climate change and linked to anthropomorphic carbon dioxide emissions, is likely to have profound and essentially permanent effects (in the most directly measurable effects, like average surface temperature, exhibit a generally unidirectional upward trend). The ecological effects of cyclic climate change are becoming better understood; periods with warmer sea surface temperatures seem to be unfavorable for many groundfish species' population growth.

As would be expected, climate produces many broad-scale effects that can interact directly and indirectly with fishing activity. Climate regime effects are related to the proposed action through their effects on the productivity of stocks caught in fisheries. Different groundfish species may respond to these changes in different ways. Recruitment surveys also show that adverse environmental conditions during the 1990s affected some species, such as shortbelly rockfish, chilipepper rockfish and bocaccio much more than other species, such as widow, canary and black rockfish, as evidenced in fishery independent recruitment surveys (Dr. Alec MacCall, NMFS, pers. comm. 12/13/2002). Even shortbelly rockfish, a relatively pelagic species that is not exploited, has experienced severe declines during the last decade. Differential effects of climate regime likely correlate with the ecological habit of a particular species so that, for example, pelagic species show similar responses in comparison to neritic species. However, at present there is neither a strong theoretical basis or observational evidence that would allow prediction of such differential responses.

Changes in productivity are by themselves only relevant as another source of variation in a complex system. They become meaningful in the management context if an understanding of system response is critical to the desired outcome (maximum or optimum yield, for example). Fishery management is largely an exercise in prediction based on accumulated knowledge about how stocks have responded in the past to fishery removals. In developing assessment models it may be explicitly or implicitly assumed that past relationships—between stock size and recruitment, for example—are reasonably static and may apply in the future. (Bearing in mind that there may be considerable parametric uncertainty). If underlying conditions change, components of the predictive model may be wrong, resulting in the mis-specification of harvest levels.

MacCall (2002a) describes a simulation of stock response to the kind of low frequency environmental variability produced by the PDO. In the absence of fishing long-lived species are "remarkably insensitive to the magnitude of environmental fluctuations" due to their longevity and late recruitment age. These characteristics give the population a resilience to long periods of unfavorable environmental conditions. MacCall's simulation shows that a constant fishing rate harvest policy, as currently employed in managing groundfish, would be preferable for long-lived species because of the long lag in biomass response to environmental change. However, once overfished low frequency environmental variability can complicate rebuilding efforts.

The relationship between environmental regime, productivity and the management process is particularly relevant to rebuilding overfished stocks, because management is now largely structured around minimizing their harvest (both retained and bycatch). MacCall simulated rebuilding trajectories from the start of both a favorable and unfavorable environmental regime, in the absence of fishing. If started at the beginning of a favorable period, population increases faster than under unfavorable conditions, but the increase stalls just as the target is reached because of the advent of an unfavorable period. If initiated at the onset of unfavorable conditions it takes 70 years, as opposed to 40 years, for the population to reach target biomass and again stalls as a second unfavorable period begins. Thus, in both cases "little happens during the first 10 yrs, because the recruiting cohorts already exist in the population and are little affected by the cessation of fishing" and in both cases "the population enters an unproductive period just as the target is reached, and no further rebuilding occurs fo the 30-yr duration of the unfavorable regime" (MacCall 2002a, p. 620). Any level of fishing would, of course, lengthen the rebuilding period, with the population stalling for an additional unfavorable phase in the environmental cycle, adding at least another 30 years to the trajectory. It is very important to recognize that these are models of idealized systems used to illustrate possible effects of environmental phenomena on population dynamics. They exclude the "noise," or stochasticity, of real world systems, which can mask the underlying dynamic and make outcomes more erratic. In most cases, fishery managers do not yet have the time series data to build predictive models for actual fish stocks. Once this data were available, rebuilding analyses could be refined to incorporate predicted recruitment variability. But even if fishery scientists were in a position to reliably correlate environmental conditions and stock productivity in predictive models, management policies would have to account for environmentally induced variations in productivity over very long cycles, something that the current system is not well-equipped to do.

Ecosystem Structure

Ecosystem structure may change as a result of both natural and anthropomorphic effects. Structural change becomes an effect itself that could interact cumulatively with the effects of the alternatives. Ultimately, it is the presence and differing abundances of species that constitutes ecosystem structure. The abundance of a given species is in turn the result of physiographic conditions (water temperature, relief, depth, etc.), processes external to an arbitrarily bounded system (e.g., fishing mortality) and interactions between system components (trophic relationships). Structure can change as a result of internal feedback. For example, scientists have posited "cultivation/depensation effects" that may be lead to recruitment failure even though one would expect compensation to declines in biomass (Walters and Kitchell 2001). (Compensatory response assumes that growth and survival is density dependent). In the paper cited above (MacCall 2002a), MacCall also simulates this phenomenon, which has been posited for large rockfish species, which may be displaced by smaller rockfish species in some habitats. Large species have declined due to exogenous factors (including fishing mortality); the greater relative abundance of fish preying on juveniles—primarily other, smaller species of rockfish—depresses recruitment of the larger species. MacCall calculated surplus production curves for a single species and a two-species model and points out, that at low exploitation rates, the two curves are similar and "the collapse in productivity would be unexpected under most conventional single-species fishery-management policies." Furthermore, because higher short-term yields could be achieved during a period of fishing down an unexploited population, "the change in productivity of the large species could be mistakenly attributed to low-frequency climate change" (MacCall 2002a, p. 634). Thus in the simulated two-species system the harvestable surplus for the larger species is much smaller and B_{MSY} is much larger in comparison to a single species model. The same qualifications and caveats made in the preceding section need to made here: fishery scientists cannot yet incorporate these ecological effects into predictive models for real world species. Because these interspecific dynamics substantially lengthen rebuilding time periods once the larger species become depleted, the management system has to adapt to very long planning horizons. MacCall (2002a, p. 626) concludes "The growing emphasis on rebuilding of depleted stocks may have an unexpected benefit to fishery management. In addition to the economic benefit of restoring fish productivity, stock rebuilding requires adoption of much longer planning horizons; specifically, planning horizons associated with the scale of long-term variability in fish stocks."

In addition to interspecific effects, a range of non-fishing impacts can affect essential fish habitat; these change physiographic conditions, which may produce changes in ecosystem structure. (Section 11.10.4 of the groundfish FMP describes these effects). These activities—such as dredging, oil and gas exploitation, wastewater discharge, aquaculture and coastal development—generally affect inshore habitats. With some notable exceptions (such as the live fish fishery in Southern California) most limited entry and directed open access fisheries do not occur in the inshore areas directly affected by these activities. However, according to EFH descriptions in the groundfish FMP, early life stages of some target species—such as Pacific cod, whiting, bocaccio, and English sole—use estuarine habitat, so these stocks could be affected if nearshore non-fishing activities reduce productivity by damaging habitat.

Past Federal Groundfish Management and Fishing Activity

Annual management measures are part of an ongoing process that must account for the effect of past measures and anticipate future stock response. Past management measures indirectly affect total fishing mortality in a given past year by constraining fisheries to some catch level. Past catches cumulatively affect fish stocks, contributing to current stock size. The need to sharply reduce harvest levels in recent years, culminating in severe and qualitatively different measures for 2003 is largely due to past overfishing, itself a result of mis-specification of harvest levels. This was a result of both scientific uncertainty and changes to the regulatory framework. Uncertainty results from missing or inaccurate information, which in turn contributes to a misunderstanding of causal relationships (model uncertainty). These problems are exacerbated, because few stocks have been fully assessed and data have been limited. A prime example is the historical reliance on landed catch for accounting, instead of total catch (which includes discards or bycatch). Further, until recently, landings for many rockfish species were reported in aggregate, making individual assessments difficult. It is also important to note that actual harvests can exceed the OY, because of the difficulty in monitoring catches in season. These varied sources of uncertainty contributed to scientists' conclusions about stock size and productivity, which in some cases were overestimated. Variable recruitment of some overfished species—such as whiting and bocaccio—due to poorly understood and difficult to predict environmental factors, also reduces certainty about future stock status. Most of the overfished species are rockfish, a group that, generally, are long-lived and not very productive. These characteristics makes it easy to "mine" stocks: high harvest rates can be sustained for several years before population collapse becomes obvious. It also results in slow recovery. For this reason, past harvests, in some cases—like Pacific ocean perch—going as far back as fishing in the 1960s by foreign distant-water trawlers, can have a major cumulative effect on stock size and productivity.

The changing regulatory framework has also contributed to overfishing. Before implementation of the Magnuson-Stevens Act extended U.S. jurisdiction, there was limited monitoring or control over foreign fishing of the West Coast, and as noted, essentially unregulated harvests before and immediately after passage of the Act contributed to current stock status. Also, the Magnuson-Stevens Act was more focused on "Americanization" of fisheries in the newly created EEZ (or Fisheries Conservation Zone as it was then known). Increasing domestic fishing capacity and "fishing stocks down to MSY" were emphasized. (The MSY model predicts maximum surplus production at a population level below carrying capacity or unfished biomass. Current harvest policy sets fishing rates to produce a biomass from 40% to 50% of unfished biomass, depending on the species.) More specific and stringent measures for preventing overfishing and rebuilding stem from the Sustainable Fisheries Act, passed in 1996. Pursuant National Standards Guidelines establish a more explicit framework for defining overfished stocks and actions to rebuild stocks to an MSY-producing size. In summary, faced with a lack of information (because fewer stocks were assessed) or inaccurate estimates of sustainable harvest rates, incomplete data (on bycatch for example), and a less explicit regulatory framework, managers permitted, in hindsight, harvest levels that were too high for some species, resulting in overfished stocks.

Past fishing and related management measures also cumulatively affect ecosystem structure by contributing to changes in the abundance of different species and the living and non-living physical structure of fish habitat. (The effect of habitat impacts on ecosystem structure and function is not well understood, however.) Because benthic organisms affected by fishing gear are at the base of food webs leading to trophically higher fish targeted in fisheries, habitat damage may be amplified for target species (Pauly *et al.* 2002). As discussed above, these impacts may in turn affect diversity and productivity. Before implementation of the groundfish FMP in 1982 no trawl gear restrictions were in place specifically intended to reduce habitat damage. The recently implemented small footrope regulation prohibits landing shelf rockfish when using bottom trawls with large rollers and chafing gear. These restrictions are intended to discourage fishing in and around rocky habitat, in order to reduce fishing related habitat damage.

Future Groundfish Management Measures

As with past management measures, future annual management may be viewed as part of a continuing set of connected actions intended to achieve sustainable groundfish harvests. In addition, there are broader groundfish management initiatives that will cumulatively interact with annual management. The institution of depth-based management measures, which began in mid-2002 as part of inseason changes to management and is a central component of the alternatives considered for 2004, will likely be continued in future years, producing cumulative effects. As intended, this management regime will re-distribute fishing effort over the long term as residual effort shifts to open areas. This could concentrate fishing, and particularly bottom trawling, intensifying habitat impacts in these open areas. At the same time, ongoing impacts to habitat in closed areas will be reduced. (NMFS is currently preparing an EIS evaluating measures to protect essential fish habitat. This future action will likely evaluate habitat-related effects in greater detail while potentially affecting annual management if new habitat-related measures are adopted.)

Implementation of a VMS, while not part of the proposed action, is a connected action crucial to effective enforcement of depth-based restrictions, intended to reduce bycatch of overfished species. VMS implementation will, therefore, have an indirect effect on bycatch reduction if compliance is a major factor. The monitoring and enforcement benefits of VMS come with the direct cost of purchasing and installing transmitting units on participating vessels. However, these costs can also be compared to the cost of an increase in aerial and at-sea surveillance necessary to achieve the same level of monitoring, if these were even feasible given available resources. The hardware and software within NMFS Enforcement necessary for receiving, processing, interpreting and storing vessel data has already been set up, representing a sunk cost. The Council recommended that NMFS pay for purchase and installation of onboard units, beginning with the limited entry sector. The system being contemplated can track up to 10,000 vessels, so it may be possible to expand coverage to other sectors, such as the directed open access fleet, in the future. VMS may also have some safety benefits, depending on the type of unit installed on fishing vessels. Some units are capable of sending text messages or distress calls.

Capacity reduction initiatives are reasonably foreseeable. Congress has appropriated the needed funds in the form of a loan to the West Coast trawl industry for purchasing and retiring trawl permits and vessels. While the referendum of trawl permittees to decide whether to accept this loan and incur this debt has not occurred yet, it is possible to predict the general affect that trawl capacity reduction might have on West Coast fish stocks. With fewer trawlers vying for trawl allocations of important groundfish stocks, the resulting cumulative bycatch should dramatically decrease. The Council is also in the early stages of developing an individual quota (IQ) system for the trawl sector (and subsequently, the other fishery sectors). Both trawl capacity reduction initiatives should reduce regulatory discards for overfished and target groundfish species.

A less-evolved, yet important capacity reduction initiative the Council is starting to develop is limiting entry in the open access fishery. Nearshore open access opportunities have been recently limited by state actions (through permitting systems and establishment of nearshore species' harvest guidelines) in California and Oregon)Washington does not allow a nearshore commercial groundfish opportunity). However, the open access opportunity outside the nontrawl RCA is still only regulated by trip limits. Regulatory discards may be lessened next year by inseason modification of the nontrawl RCA and trip limits based on new observer data, but there is a limit to the effectiveness of management measures when participation in that fishery is unregulated.

Two amendments to the groundfish FMP will affect annual management and there are a range of other potential actions that are more or less "reasonably foreseeable." The Council is currently preparing Amendment 16-3, which will incorporate rebuilding plans for bocaccio, cowcod, widow rockfish and yelloweye rockfish into the FMP. These overfished species are currently managed under interim rebuilding measures, and it is not expected the final rebuilding plans will differ substantially, taking into account any changes that would be made to either type of plan as a result of new data on overfished stocks' parameters. However, once Amendment 16-3 is implemented, rebuilding measures and the parameters on which they are based (such as the target year the harvest control rule) will be part of the groundfish FMP (and regulations) and thus, less easily changed. Amendment 16-4, which is intended to incorporate a Pacific whiting rebuilding plan into the FMP and regulations, is also reasonably foreseeable. However, it is possible a proposed treaty with Canada will be implemented that authorizes an international commission to make management and long-term rebuilding decisions for this trans-boundary stock. If a treaty is ratified prior to development of Amendment 16-4, then this obviates the need for the amendment.

Amendment 17, which was adopted by the Council at its November 2002 meeting, establishes a two-year management cycle for groundfish. This change has two main purposes. First, NMFS was challenged in court over its process of publishing its final action in the *Federal Register* late in the calendar year with public comment occurring after the measures had been implemented. This accommodated Council decision making, in which annual management measures were adopted at its November meeting. In losing this legal challenge NMFS must now establish a public notice and comment period that concludes before measures are implemented at the beginning of the new year. This is very difficult to achieve under the current cycle, because the stock assessment findings needed for decision making usually do not become available until mid-year, leaving a narrow window for the Council decision making process. (For 2002 through 2004 NMFS is using emergency rulemaking to implement management measures for the first two months of the year in order to allow public comment on measures for the rest of the year.) In devising a new management cycle, this need for about five months after the Council has adopted management measures for public notice and comment and the fishing industry's preference for a January 1 start date; the management cycle had to be reconciled. The proposed action under Amendment 17 is a three-meeting process (November, April, and June) for management measures implemented in the two years after a June decision. The disadvantage with this cycle is that stock assessments, which would have to be completed in time for the first November decision point, would be developed from data that would not be very recent, increasing the risk of mis-specifying OYs.

Although not as foreseeable as the amendments described above, the declaration of additional overfished species is possible, although a recent memo updating the status of fisheries report Congress states that no new declarations are anticipated within the next two years (Lohn 2002). As noted elsewhere, a minority of managed groundfish species have been assessed. As data become available and previously un-assessed species are assessed, new overfishing declarations may result. This will exacerbate the current management dilemma where overfished stocks are a limiting factor in allowing harvests of healthy stocks. It is expected that fishing effort will intensify in nearshore areas, particularly south of Cape Mendocino. This increases the risk of overfishing nearshore species. Conversely, if a nearshore stock is assessed and determined to be overfished, still more restrictive depth-based management could be implemented, potentially closing remaining inshore areas. A wide range of commercial and recreational fisheries would be affected.

Non-federal Management and Other Fisheries

Many West Coast fisheries catch groundfish incidentally and most are not directly managed by the groundfish FMP or other federal management regimes. The groundfish FMP does allocate OY amounts among limited entry and so-called open access sectors. ("Open access" is somewhat of a misnomer in this context, because, although these fisheries are not license limited under the groundfish FMP, many are subject to other, fishery-specific limited entry regimes.) As noted above, in the past, groundfish were managed based on landed catch without accurate accounting for discards. The increase in the number of overfished stocks has necessitated better bycatch accounting, but most attention has been focused on those directed fisheries, such as limited entry trawl, that catch most groundfish. In order to structure 2004 management measures, total catch of overfished species in all West Coast fisheries was estimated. However, these estimates are approximate, because landed catch of incidental species may not be well monitored, and there is very little information on bycatch. Unaccounted historical fishing mortality in these fisheries may have had an important cumulative effect, even if bycatch rates in individual fisheries were small. The accuracy of future estimates will have a similar effect. Because these fisheries are not federally managed, the ability of the states to implement necessary management measures for those fisheries, as identified in the alternatives, is a critical external factor that will cumulatively affect 2004 management.

Listing of Overfished Species Under the Endangered Species Act

Overfished stocks could be listed under the ESA. Such a listing has already been petitioned for bocaccio. A management framework based on that mandate could take precedence over Magnuson-Stevens Act-mandated rebuilding measures. Under the ESA, NMFS would have to authorize any incidental take of a listed species and as part of this process determine an incidental take that does not "jeopardize the continued existence of the species." These "no jeopardy standards," if stricter than rebuilding measures, would be used to determine harvest levels and resulting management measures.

Data Availability, Reliability, and Uncertainty

Uncertainty with respect to past management decision making contributed to past overfishing and is a crucial factor in ongoing management. Significant uncertainties in the data include bycatch amounts across all fisheries and reliable catch estimates for recreational fisheries. NMFS implemented an observer program for groundfish fisheries in 2001, and data from that program was first available in early 2003. The next observer data report, expected in early 2004, will augment the trawl observer data, which was sparse for many of the traditional time/area strata used to manage the fishery, and provide the first fixed gear observer data. These data will allow much more accurate bycatch estimation (rather than full accounting since observer coverage is not 100%) and will be progressively integrated into the models currently used to project total catch under alternative management measures. However, considerable data uncertainty in recreational fisheries will remain.

4.2.5 Summary of the Direct, Indirect and Cumulative Effects of the Alternatives on Fish Stocks

4.2.5.1 The No Action Alternative

The *No Action* alternative closes much more of the RCA to fishing than any of the other alternatives, especially south of Cape Mendocino where bocaccio rebuilding needs necessitated large area shelf closures in 2003. Fishing mortality rates for many of the southern shelf species were much lower than anticipated in 2004, but at a cost to increased mortality of nearshore species due to inshore effort shifts. Fishing mortality rates for trawl-caught slope species targeted north of Pt. Reyes, such as darkblotched and POP, would also be much less with the larger trawl RCA under *No Action*. The larger widow rockfish OY specified under the 2003 regulations does not comport with the new rebuilding analysis and, as such, does not comport with NSGs and the groundfish FMP framework for rebuilding overfished species.

4.2.5.2 The Low OY Alternative

The *Low OY* alternative specifies the largest RCAs of the 2004 alternatives considered. The most significant difference is the size of the nontrawl RCA which extends out to 125 fm under this alternative. Management measures under *Low OY* are predicted to exceed specified OYs for canary rockfish, darkblotched rockfish, and widow rockfish (assuming 1998-2003 average bycatch rates for widow rockfish in 2004 whiting fisheries).

4.2.5.3 The Medium OY Alternative

The *Medium OY* alternative specifies an intermediate area closure (in terms of seasonally-adjusted RCAs) of the 2004 alternatives considered. Management measures under *Medium OY* are predicted to exceed specified OYs for canary rockfish and widow rockfish (assuming 1998-2003 average bycatch rates for widow rockfish in 2004 whiting fisheries).

4.2.5.4 The High OY Alternative

The *High OY* alternative specifies the smallest area closure (in terms of seasonally-adjusted RCAs) of the 2004 alternatives considered. Management measures under *High OY* are predicted to exceed specified OYs for canary rockfish, cowcod, and lingcod. Some of the stock-specific harvest levels under *High OY* are relatively much riskier than those specified under the other alternatives, especially for those stocks analyzed under varying modeling assumptions.

4.2.5.5 The Council OY or Preferred Alternative

The preferred *Council OY* alternative specifies intermediate harvest levels of the alternatives considered. Area closures (in terms of seasonally-adjusted RCAs) are more conservative than those specified under *Medium OY* and *High OY*. Season and depth restrictions are more conservative in recreational fisheries than under the other alternatives except *No Action* in the south, which was largely influenced by the more pessimistic 2002 bocaccio assessment. Management measures under *Council OY* are predicted to stay within the specified OYs for overfished groundfish species and, in fact, provides a significant buffer for the most constraining stocks. These management measures were significantly affected by the outcomes estimated under the other alternatives analyzed. The *Council OY* alternative, therefore, best meets the purpose and need for action by meeting the objectives of the MSA and NSG.

4.3 Protected Species

4.3.1 Criteria Used to Evaluate Impacts

Presumably, effects on protected species correlate with changes in the level of fishing effort. Increased fishing effort could lead to an increase in interactions between fishing vessels and protected species while a decrease in fishing effort would have the opposite effect. Thus, changes in fishing effort could be one way to evaluate the relative effects of the alternatives. However, there are limited data available on the distribution, intensity, and duration of fishing effort associated with the groundfish fisheries (see footnote #19 on page 4-1). Furthermore, different gear types would affect protected species differently, so the relative level of fishing effort by gear type would have to be accounted for. Even if such data were available, this distribution and intensity level of fishing effort would have to be correlated with the distribution of protected species. Finally, the effects of resulting interactions (aside from observed mortality) need to be better understood. Given these limitations, projected groundfish landings and proposed closed areas are used as proxies for fishing effort as criteria to assess the relative potential effects of the alternatives on protected species.

When an agency is evaluating reasonably foreseeable significant adverse effects, there is incomplete or unavailable information, and the costs of obtaining it are exorbitant or the means unknown, the agency must: (1) so state, (2) describe the importance of the unavailable information to the assessment, (3) summarize any existing scientific information, and (4) evaluate impacts based on generally accepted scientific principals (40 CFR Part 1502.22), which may accord with the best professional judgement of agency staff. NMFS acknowledges that the information necessary to fully evaluate impacts to protected species, as described in the preceding paragraph, cannot be reasonably obtained at this time. Necessary information may become available at a future date. NMFS is implementing a vessel monitoring system (VMS) program for limited entry groundfish vessels, which will gather information on the location of vessels. However, it has not been decided whether this information will be made available to resource managers for the kinds of purposes discussed here. NMFS is also preparing an EIS addressing the identification and protection of essential fish habitat. A predictive risk assessment model is being developed for this project, which includes a fishing effort component (see Section 4.1). When completed, it may be possible to adapt this model to predict likely protected species interactions. As discussed below, the West Coast groundfish fisheries observer program is gathering data on interactions with protected species. As more data are gathered, the spatial and temporal distribution of interactions will be better understood.

Given the available information and the requirements of NEPA regulations, the remainder of this section describes the available scientific information on interactions, and based on the best professional judgement of agency staff, qualitatively assesses the predicted environmental impacts of the proposed action and alternatives on protected species.

4.3.2 Direct and Indirect Effects on Protected Species

The potential effects of this proposed action and the differences between alternatives on endangered and/or threatened marine mammals, seabirds, sea turtles, and salmon will be discussed below.

4.3.2.1 ESA Listed Species

Salmon

As described in Section 3.3.1.1, the Biological Opinion addressing impacts to ESA-listed salmon in the whiting fishery (which accounts for the bulk of these impacts) establishes a limit on the average fleet-wide bycatch rate of 0.05 chinook salmon per metric ton of whiting caught, with an 11,000 fish threshold for the entire whiting fishery (at-sea and shore-base sectors combined). Applying this maximum bycatch rate to the whiting OYs listed in Table 2.1.1-1 results in values of 3,705 chinook salmon for the *Low OY* alternative and 7,410 for the *Medium OY* alternative. The 11,000 fish threshold would apply to the *High OY* alternative since applying rate threshold to the whiting OY under that alternative would exceed 11,000 fish. (The Council deferred choosing a preferred OY for whiting until their March 2004 meeting.) The actual number of salmon that will be caught in the whiting fishery is likely to be less than these values under any OY chosen, given that bycatch rates have been lower than the 0.05 in all but two of the years between 1991 and 2002 (see Table 3.3.1-3). The *Low OY* and *Medium OY* alternatives include whiting OYs within the range of landings over the past 11 years. The *High OY* alternative whiting OY slightly exceeds the highest value for these years (249,000 mt in 1994.) As long as bycatch rates are at historic levels, impacts should not differ greatly in 2004. Recognizing the monitoring programs in place, the bycatch reduction efforts being applied in this fishery, and the framework of the Biological Opinion used to manage impacts, it is unlikely that the whiting fishery, and groundfish fisheries in general, will have a significant impact on listed salmon stocks, except under the *High OY* alternative if the threshold established in the BO were exceeded.

Sea Turtles

There is limited information about interactions between sea turtles and West Coast commercial fisheries. Sea turtles are known to be taken incidentally by the California-based pelagic longline fleet and the California halibut gillnet fishery (which are not groundfish fisheries). Because of gear and fishing strategies differences between those fisheries and the groundfish fisheries, the expected take of sea turtles by groundfish gear is minimal. In addition to being incidentally taken in fishing gear, turtles are vulnerable to collisions with vessels and can be killed or injured when struck, especially if struck with an engaged propeller. Entanglement in abandoned fishing gear can also cause death or injury to sea turtles by drowning or loss of a limb. The discard of garbage at sea can be harmful for sea turtles, because the ingestion of such garbage may choke or poison them. Sea turtles have ingested plastic bags, beverage six-pack rings, Styrofoam, and other items commonly found aboard fishing vessels. The accidental discharge of diesel and oil from fishing vessels may also put sea turtles at risk, as they are sensitive to chemical contaminates in the water.

In the Pacific Coast groundfish fisheries, groundfish observers collect information on interactions between sea turtles and groundfish fisheries. To date, there have been no incidental takes of sea turtles or interactions between sea turtles and groundfish fisheries observed along the Pacific Coast. Therefore, it is predicted that there would be no impacts or negligible impacts of the groundfish fishery on sea turtles.

The discussion in Section 4.3.1 on of the evaluation criteria and limitations on available information applies to assessing the impacts of the alternatives on sea turtles.

4.3.2.2 Marine Mammals

There is limited information documenting the interactions of groundfish fisheries and marine mammals, but marine mammals are probably affected by many aspects of groundfish fisheries. The incidental take of marine mammals, defined as any serious injury or mortality resulting from commercial fishing operations, is reported to NMFS by vessel operators. In the West Coast groundfish fisheries, incidental take is infrequent and primarily occurs in trawl fisheries (Forney *et al.* 2000). Additional effects of groundfish fisheries on marine mammals are more difficult to quantify due to a lack of behavioral and ecological information about marine mammals. However, marine mammals may be affected by increased noise in the oceans, change in prey availability, habitat changes due to fishing gear, vessel traffic in and around important habitat (i.e., areas used for foraging, breeding, raising offspring, or hauling-out), at-sea garbage dumping, and diesel or oil discharged into the water associated with commercial fisheries.

In the Pacific Coast Groundfish Fisheries, groundfish observers collect information on interactions between marine mammals and groundfish fisheries. Observer coverage varies between different components of the Pacific Coast groundfish fisheries. The at-sea component of the Pacific Coast whiting fishery, which consists of catcher-processors, motherships, and the catcher-vessels delivering to the motherships, has had observer coverage since the mid-1970s. Currently, there is 100% observer coverage of the at-sea Pacific whiting fleet and the fleet-wide average annual take of marine mammals between 1997 and 2001 was as follows: 0.71 California sea lions, 0.80 Steller sea lions, 0.63 Harbor seals, 0.91 Northern elephant seals, 2.56 Dall's porpoise (M. Perez, National Marine Mammal Lab, Seattle, 2003, personal communication). By comparison, observer coverage of the limited entry portion of the Pacific Coast groundfish trawl fishery began in the fall of 2001. In the limited entry groundfish fisheries, there have been minimal interactions with marine mammals (Table 4.3.2-1). Of the marine mammal species incidentally caught in West Coast groundfish fisheries, the Steller sea lion is listed as threatened under the ESA, the northern elephant seal may be within its optimum sustainable production (OSP) range, and there is insufficient data to determine the status of the harbor seal, California sea lion, Dall’s porpoise, and Pacific white-sided dolphin relative to their OSPs. None of these species are classified as strategic stocks under the Marine Mammal Protection Act (MMPA)(Forney *et al.* 2000). West Coast groundfish fisheries are in Category III, denoting a remote likelihood of, or no known, serious injuries or mortalities to marine mammals.

The discussion in Section 4.3.1 on of the evaluation criteria and limitations on available information applies to assessing the impacts of the alternatives on marine mammals. As more information about the spatial and temporal overlap of groundfish fisheries and marine mammal populations along the Pacific Coast is gathered, a more comprehensive understanding of marine mammal/fishery interactions is possible and additional management measures may be taken to mitigate the effects of Pacific Coast groundfish fisheries, if necessary. Despite the lack of information on interactions, it is predicted there would not be any adverse impacts on marine mammals from the groundfish fishery.

4.3.2.3 Seabirds

Interactions between seabirds and fishing operations are wide-spread and have led to conservation concerns in many fisheries throughout the world. Abundant food in the form of offal (discarded fish and fish processing waste) and bait attract birds to fishing vessels. Of the gear used in the groundfish fisheries on the West Coast, seabirds are occasionally taken incidentally by trawl and pot gear, but they are most often taken by longline gear. Around longline vessels, seabirds forage for offal and bait that has fallen off hooks at or near the water's surface, and are attracted to baited hooks near the water's surface during the setting of gear. If a bird becomes hooked while feeding on bait or offal, it can be dragged underwater and drowned. Of the incidental catch of seabirds by longline groundfish fisheries in Alaska, northern fulmars represented about 66% of the total estimated catch of all bird species, gulls contributed 18%, Laysan albatross 5%, and black-footed albatross about 4% (Stehn *et al.* 2001). Longline gear and fishing strategies in Alaska are similar to some, but not all, of those used in WOC longline fisheries.

Besides entanglement in fishing gear, seabirds may be indirectly affected by commercial fisheries in various ways. Change in prey availability may be linked to directed fishing and the discarding of fish and offal. Vessel traffic may affect seabirds when it occurs in and around important foraging and breeding habitat and increases the likelihood of bird storms. In addition, seabirds may be exposed to at-sea garbage dumping and the diesel and oil discharged into the water associated with commercial fisheries.

In the Pacific Coast Groundfish Fisheries, groundfish observers collect information on interactions between seabirds and groundfish fisheries. Observer coverage varies between different components of the Pacific Coast groundfish fisheries. The at-sea component of the Pacific Coast whiting fishery, which consists of catcher-processors, motherships, and the catcher-vessels delivering to the motherships, has had observer coverage since the mid-1970s. Currently, there is 100% observer coverage of the at-sea Pacific whiting fleet. The incidental take of seabirds by the at-sea fleet is rare and infrequent. The species that have been taken by the at-sea fleet include: black-footed albatross, northern fulmar (*Fulmarus glacialis)*, and unidentified puffin. By comparison, the limited entry portion of the Pacific Coast groundfish trawl fishery first had observer coverage since the fall of 2001. In the limited entry groundfish fisheries, there have been minimal interactions with seabirds (Table 4.3.2-2).

The discussion in Section 4.3.1 on of the evaluation criteria and limitations on available information applies to assessing the impacts of the alternatives on sea birds. As more information about the spatial and temporal overlap of groundfish fisheries and seabird populations along the Pacific Coast is gathered, a more comprehensive understanding of seabird/fishery interactions is possible and additional management measures may be taken to mitigate the effects of Pacific Coast groundfish fisheries if necessary.

4.3.3 Summary of the Direct, Indirect, and Cumulative Effects of the Alternatives on Protected Species

Currently, there is insufficient information to distinguish the relative effects of the alternatives on the different protected species described above. Using the criteria described in Section 4.3.1, the alternatives are assessed in terms of their effect on protected species as a whole. It is expected the *Low OY* alternative will have the least impact on protected species as it will likely result in the least fishing effort. Because trip limits under the *No Action* alternative*, Medium OY* alternative*,* and *Council OY* alternative are similar, these alternatives will likely result in comparable levels of fishing activity and effects on protected species. It is expected the *High OY* alternative would have the greatest effect on protected species, because it provides for the highest trip limits, which may result in the highest intensity of fishing effort. Because all alternatives include similar area closures on the continental shelf (Groundfish Conservation Areas), protected species would benefit from a decreased likelihood of interactions with groundfish vessels in these areas. Because it is likely that the distribution of fishing effort will shift in response to changes in these shelf closed areas, there may be an increased likelihood of interactions between protected species and groundfish vessels in deep water (depths greater than 150 fathoms) and nearshore areas (depths less than 75 fathoms).

Cumulative impacts to protected species result from the combination of past, present and future direct and indirect impacts of management measures combined with the effects of other activities. A variety of human activities affect protected species and contribute to their listing under relevant laws. These effects include habitat loss and the direct effects of marine activities not related to fishing, such as vessel traffic and at-sea dumping and discharges. As with ecosystem and habitat impacts, cumulative effects cannot be distinguished among the alternatives except in relation to the intensity of direct and indirect impacts. Thus the relative cumulative impacts have the same relative intensity as the direct and indirect impacts discussed above.

TABLE 4.3.2-1. Interactions between marine mammals and the Pacific Coast groundfish fisheries documented by West Coast Groundfish Observers[a/] between September 2001 and October 2002.

Species	Gear Type	Type of Interaction
California Sea Lion (*Zalophus californianus*)	Trawl	7 Individuals Taken
Unidentified Pinniped	Longline	1 Individual Taken
Unidentified Sea Lion	Trawl	1 Individual Taken
Steller sea Lion *(Eumetopias jubatus*)	Trawl	2 Individuals Taken
California Sea Lion (*Zalophus californianus*)	Both Trawl and Longline	Feeding on Discard
Steller sea Lion *(Eumetopias jubatus*)	Both Trawl and Longline	Feeding on Discard
Pacific white-sided Dolphin (*Lagenorhynchus obliquidens*)	Trawl	Feeding on Discard

a/ Between September 2001 and October 2002, approximately 10% of the coastwide limited entry trawl landed weight and 30% of the limited entry fixed gear landed weight was observed.

TABLE 4.3.2-2. Interactions between seabirds and the Pacific Coast groundfish fisheries documented by West Coast Groundfish Observers[a/] between September 2001 and October 2002.

Species	Gear Type	Type of Interaction
Unidentified Gull (*Larus species)*	Trawl	1 Individual Taken
Unidentified Sea bird	Trawl	4 Individuals Taken
Short-tailed Albatross (*Phoebastria albatrus*)	Longline and Trawl	Feeding on Discard
California Brown Pelican (*Pelecanus occidentalis californicus*)	Rod and Reel	Feeding on Discard
Marbled Murrelet (*Brachyramphus marmoratus*)	Trawl	Landed on Deck
Black-footed Albatross (*Phoebastria nigripes*)	Trawl, Longline, and Pot	Feeding on Discard
Leach's storm-petrel *(Oceanodroma leucorhoa*)	Trawl	Landed on Deck
Cassin's auklet *(Ptychoramphus aleuticus)*	Trawl	Landed on Deck
Pigeon guillemots *(Cepphus columba*)	Pot	Feeding on Discard
Laysan albatross *(Phoebastria immutabilis)*	Pot	Feeding on Discard
Unidentified Cormorant (*Phalacrocorax species)*	Rod and Reel	Feeding on Discard
Unidentified Storm Petrel (*Oceanodroma species*)	Longline	Landed on Deck
Unidentified Shearwater (*Puffinus species*)	Pot	Feeding on Deck

a/ Between September 2001 and October 2002, approximately 10% of the coastwide limited entry trawl landed weight and 30% of the limited entry fixed gear landed weight was observed.

4.4. *The Public Sector*

4.4.1 Criteria Used to Evaluate Impacts

Effects on the public sector correlate with changes in the level of regulatory complexity. Regulatory complexity affects the public costs of implementing a management regime by increasing the burden of monitoring, enforcing, and adjusting fisheries to meet but not exceed intended impact levels. Thus, costs to governmental entities associated with increased regulatory complexity could be one way to evaluate the relative effects of the alternatives on the public sector. Intrinsic to the costs to the public sector is the assessment of risk to the resource. Management alternatives with a high degree of regulatory complexity or a substantial reliance on accurate and timely inseason fishery data not only increase the expense of enforcement and monitoring, they also increase the risk of non-compliance and overfishing. Managing fisheries in a cost-effective manner while balancing risks to the resource with socioeconomic benefits is often the objective of public agencies charged with fishery management and enforcement. Therefore, costs, enforcement feasibility, risk to the resource, and reliance on fishery data are the criteria used in the following qualitative evaluation of the impacts to the public sector.

4.4.2 Direct and Indirect Impacts

4.4.2.1 Fishery Management

Constraining OYs and Bycatch Monitoring

The *No Action* alternative, as well as all of the action alternatives, include restrictive OYs for overfished species that have wide ranging constraining effects along the entire coast and across many fisheries. Alternatives with projected impacts that completely utilize or exceed the available OY are considered to be more costly from a fishery management perspective. State, federal, and tribal agencies charged with monitoring fishery-related impacts have increased responsibilities in terms of inseason catch accounting, bycatch projection, and timely reporting. This is particularly true when the amount of available OY is low and is attributable to bycatch rather than landed catch. Bycatch accounting often requires costly and time-consuming at-sea observation, shore-based sampling, and logbook programs. The West Coast Groundfish Observer Program has completed two years of at-sea observation of the limited entry trawl and fixed gear fisheries, and trawl logbooks have been in place for several years. Although valuable to resource management, these data require extensive analysis and are not designed for real-time, inseason tracking of impacts. The effects of the alternatives to the public sector are evident in the expense of inseason fishery monitoring, as well as the risks associated with uncertainty. Alternatives with projected impacts which meet the available OY for constraining species, such as canary rockfish, require careful monitoring and frequent inseason management actions and have relatively high costs and risk when compared to alternatives with projected impacts below the OY. Alternatives that are not expected to meet the OYs for constraining species, such as the *Council OY* alternative on canary rockfish, can utilize the remaining OY as a "buffer" against the cost of intensive inseason management and the risk of exceeding the OY.

Bycatch accounting and control has been one of the weaker elements in groundfish management. However, bycatch accounting in the commercial sectors is improving rapidly. With the advent of data from the NMFS West Coast Groundfish Observer Program, it is anticipated that more accurate bycatch accounting data from the limited entry trawl, limited entry fixed gear, and directed open access sectors will soon be available for management. These data will allow much more accurate bycatch estimation and will be progressively integrated into the models currently used to project total catch under alternative management measures

Until the recent development of an observer program, it has been difficult to effectively monitor discards, confounding the ability to accurately estimate total catch. The first data report from the first year of the West Coast Groundfish Observer Program (September 2001 through August 2002) was used for 2003 inseason management, and analyses demonstrated higher-than-anticipated bycatch rates for overfished species(Hastie [2003]; NMFS 2003e). Application of the observer-based bycatch rates led the Council to adopt extensive inseason changes to commercial trawl fisheries, including modifying RCAs to increase the areas closed to trawl fishing, limiting nearshore open periods, and altering trip limits. Not without adverse socioeconomic effects, decreased fishing opportunity will result in decreased fishery-related mortality, and increased likelihood of rebuilding.

In addition to bycatch rates for overfished species, observer-based discard rates for trawl non-overfished, target species were incorporated from the first year of the program. Target species' discard rates were also higher for several species than what had been previously modeled. These new rates were incorporated into modeling preliminary trawl management measures for the 2004 annual specifications.

The second year's observer data (September 2002 through August 2003), will be reviewed and incorporated into fishery management in March 2004. The West Coast Groundfish Observer Program was expanded considerably from the first year and is anticipated to include sufficient data to provide insight into bycatch in the limited entry fixed gear fleet in addition to adding another year of new information on the trawl fleet. About 10% of the limited entry trawl and fixed gear trips were observed in the first few months of the program. Observations increased to about 20% of limited entry trips and expanded to portions of the directed groundfish open access fleet. Accumulation of additional years of data and expanded sampling will further improve the accuracy of bycatch rates and estimates of total mortality. As occurred in 2003, inseason adjustments in 2004 management measures may be necessary if the new information substantially changes existing fishery modeling results.

There have been concerns about the orderly use of this new information for active fishery management decision making. To help gain a higher degree of order and stability in the use of new observer information, the Council has considered a proposed long-term schedule showing when new observer data will be available for decision-making during the first multi-year management cycle. Further, the Council requested an ad hoc committee prepare a report for the March 2004 Council meeting on policy regarding the use of new information from the observer program (and other sources) for fisheries management.

Rebuilding strategies should always use the best available estimates of bycatch, and managers should always seek to improve bycatch accounting and control mechanisms. Data and resulting analyses from the West Coast Groundfish Observer Program have already demonstrated an ability to provide valuable knowledge where limited information and difficult assumptions have existed in the past. Improved understanding of bycatch rates and total mortality will improve fishery modeling by replacing assumptions and surrogate values with fishery-related mortality estimates from direct observation. Additionally, historic catch data could be adjusted to incorporate new methods of estimating bycatch. Stock assessments and rebuilding analyses will benefit from more accurate sources of data on total fishery removals over time. Reducing the uncertainty in stock status and rebuilding projections will more effectively support sound harvest policy and sustainable fishery resource management.

Such measures as full retention of bycatch and/or bycatch caps could significantly reduce fishing-related mortality of overfished groundfish species. The West Coast Groundfish Observer Program could be linked with a program of mandatory full retention of rockfish (or other overfished species that would otherwise be discarded dead at sea) during commercial fishing activities to increase accuracy in estimating total catch. This could ensure rebuilding total catch OYs are not exceeded while attempting to access harvestable groundfish species. Mandatory rockfish retention and observer coverage might allow greater flexibility for managers to consider fishing opportunities that might otherwise be considered risky. As long as total catch controls are reliable and responsive to rapid changes in the fishery, such explorations may be acceptably risk-averse. Full rockfish retention would incur a cost to the processing sector since unmarketable rockfish, due to size or condition, would need to be handled and disposed. Bycatch accounting of retained species that would otherwise be discarded at sea may be considered an additional marginal cost, since dockside sampling of landed catch occurs anyway. Sampling the fully retained catch would add to the time and effort involved in dockside sampling, but would not require the implementation of a new sampling system.

A management strategy of bycatch caps (the fishery is closed once landings plus bycatch reach a critical threshold, notably, the total catch OY) would probably entail the need for a significantly higher observer coverage rate, perhaps 100%, if the caps are imposed at the vessel and not the fleet-wide level[23/]. This is because the distribution of fishing efforts resulting in significant bycatch is skewed to a few efforts. Given the nature of highly variable bycatch by time, area, gear, and fishing strategy, the allocational aspects of a management system relying on bycatch caps creates potentially serious repercussions. Such a system might promote derby fisheries where fishermen would compete to get their fish first before a cap is attained. This creates safety risks, a poor supply and demand marketing situation, and a contracted stream of fishery-dependent data (landings and bycatch information) that might be difficult to assimilate and react to in a timely fashion. One mitigative measure to consider in rationalizing a management strategy that depends on bycatch caps may be to develop ITQs for the overfished groundfish species. An ITQ system could be used to buy and sell overfished species' OY, which could leverage more healthy target species landings while maintaining better accounting and control of overfished species' bycatch. The Congressional ITQ ban was lifted last year enabling the Council and NMFS to pursue such a strategy.

Data Collection

The availability of data is critical to the effective management of fishery resources. Fishery impact modeling, stock assessments, and socioeconomic analyses are not directly affected by the management alternatives, but rely on long-term data sources. Longstanding, fishery-dependent data sources are compromised as OYs decrease and directed groundfish fishing opportunities diminish. Loss of fishery-dependent data is a cost to fishery management agencies through increased uncertainty in resource analyses, such as stock assessments, and the added expense of developing new data collection methods and analytical tools. Fishery-independent data sources, such as the research fisheries described in Section 3.4.3, are anticipated to continue in 2004 under all of the action alternatives.

4.4.2.2 Enforcement

Quantitative analyses of the environmental impacts associated with enforcement under the management measure alternatives is not possible at this time. Prior to 2000, groundfish management mainly regulated the amount of landed fish, based on cumulative trip limits. This type of measure has the advantage that monitoring and enforcement can be shore-based because limits are based on landings. But this approach is problematic because discarded bycatch cannot be directly monitored from shore. Depth-based closed areas are part of the *No Action* alternative and are proposed in all of the action alternatives as a way to reduce bycatch by keeping vessels out of areas where overfished groundfish species occur. However, depth-based management introduces a new set of enforcement issues because compliance must occur at sea, requiring additional, more costly at-sea monitoring and enforcement methods. The efficacy of management measures hinges on the degree to which fishers comply with them. Environmental impacts associated with enforcement therefore mainly result from the degree to which catch levels are exceeded because of non-compliance. Furthermore, management of overfished groundfish relies on depth-based closures to minimize bycatch of these species. Illegal fishing activity in closed conservation areas could result in increased bycatch. The degree to which these catches in excess of limits or in closed areas remain unmonitored or under-reported is of crucial importance to effective management. While recognizing that most fishers comply with the rules, the overall level of compliance is influenced by the tradeoff between risk

23/ The current management regime essentially manages for the total catch OY and includes best estimates of landings and discard. This management strategy may be likened to a bycatch cap on a fleet-wide basis.

and reward. Fisheries enforcement generally seeks to deter fishers from violating the rules through severe penalties because the cost of constant and comprehensive monitoring using conventional means is high. This strategy relies on a sufficient level of monitoring and enforcement so that the tradeoff between the risk of being caught and severely penalized and the benefits from harvesting fish illegally is tipped in favor of compliance for the great majority of fishers.

Geographic Extent of Closed Areas and Transiting Requirements

The geographic extent and the number of the GCAs (which includes the RCA, YRCA, and CCA) can have a profound effect on regulatory complexity. Their boundaries are complex, involving hundreds of points of latitude and longitude to delineate nearshore and offshore fathom curves. The areas are vast, extending along the entire West Coast from Canada to Mexico, and weather and sea conditions are frequently harsh. As a result, ensuring the integrity of conservation areas using traditional enforcement methods (such as aerial surveillance, boarding at sea via patrol boats, landing inspections, and documentary investigation) is difficult. However, as displayed in Figure 2.2.1-1, the extent of the RCAs, the most extensive and complex of the closed areas, does not vary greatly among the alternatives. Therefore, regulatory complexity and costs to the public sector, due to the size of commercial closed areas and their distance offshore, are not anticipated to differ substantially between the alternatives. Recreational fishery alternatives propose additional use of depth-based closed areas for 2004 (see Chapter 2). One new aspect of these recreational closures is the establishment of waypoints specified by latitude and longitude which define large closed area boundary lines. Previous depth-based closures in the recreational fisheries have only specified a depth contour as a boundary or had established waypoints for a relatively small geographic area (i.e., the YRCA). Although many recreational vessels carry the necessary electronic equipment to chart their location relative to the closed area, it is uncertain what effect expanding the use of specified boundary lines in recreational fisheries will have on recreational fishery compliance. Increased reliance on depth-based closed areas in recreational fisheries adds regulatory complexity and costs to the public sector.

VMS is a tool that is commonly used to monitor vessel activity in relationship to geographical defined management areas where fishing activity is restricted. VMS transceivers installed aboard vessels automatically determine the vessel's location and transmit that position to a processing center via a communication satellite. As discussed in Section 3.4.5, a separate, related action will require all limited entry groundfish vessels to carry VMS in 2004. However, as discussed in Section 2.2.5.2, transiting requirements were not required for limited entry fixed gear vessels as part of the VMS final rule (November 4, 2003 68 FR 62374). One of the major benefits of VMS is its deterrent effect. If fishing vessel operators know they are being monitored and a credible enforcement action will result, then the likelihood of a vessel using a prohibited gear in a conservation area is significantly diminished. Because the VMS final rule does not prohibit fixed gear vessels from drifting within the nontrawl RCAs, the enforcement advisors to the Council believe the integrity of both the VMS program and the RCAs could be compromised if the NMFS VMS system operators are unable to tell the difference between the VMS signatures of vessels that are drifting from those that are fishing or underway. Including a regulation as part of the *Council OY* alternative (preferred alternative) to prohibit fixed gear vessels from any activity other than continuous transit within the nontrawl RCAs would allow for more effective use of the VMS position data.

GCAs prevent vessels from operating in waters where overfished species are commonly found, reducing the overall incidental take of overfished species. If the integrity of the closed areas are not adequately maintained, harvest assumptions could be inaccurate resulting in indirect effects, such as unaccounted for removals. The RCA transiting restrictions for limited entry fixed gear vessels has no direct biological impacts; however, if the integrity of the closed areas cannot be maintained, the risk of exceeding an OY is increased. This risk is greatest for overfished species that are vulnerable to the types of fixed gears used by the limited entry fleet and that the closed areas are intended to protect (primarily yelloweye rockfish, canary rockfish, bocaccio, cowcod, and lingcod). Incursions into the conservation areas and the use of prohibited gear types could result in higher catch of the protected species than had been estimated, and the OYs could unknowingly be exceeded.

Trawl B Platoon

Alternatives can be divided into two categories based on platoon provisions in the limited entry trawl sector. This provision allows the limited entry trawl fishery to operate as to platoons, referred to as A and B. Management measures (trip limits, closed areas, etc.) for the B Platoon are offset approximately two weeks later than the A Platoon as a means of dispersing landings over a longer period of time, increasing the value of the product and improving the stability of the supply (see Section 2.1.3). Fishermen also argue that the platoon system makes it easier for them to avoid bad weather when deciding when to fish, so its elimination could have an effect on weather-related vessel safety (see Section 4.5). But with the implementation of GCAs this system has complicated enforcement because GCA boundaries can change between cumulative limit periods. As a result, two different sets of boundaries have to be simultaneously monitored and enforced according to which platoon a vessel is in. Dual platoons also complicate some management functions, such as catch accounting and scheduling fishery observer trips. The *Council OY* alternative that eliminates the B Platoon would have a generally positive effect on impacts to the public sector by reducing the regulatory complexity associated with the limited entry trawl fleet thereby reducing the costs associated with enforcement and monitoring of this fishery.

4.4.3 Cumulative Impacts

Cumulative impacts to protected species result from the combination of past, present and future direct and indirect impacts of management measures combined with the effects of other activities. Ongoing and dramatic changes in the management, enforcement, and monitoring of groundfish fisheries in response to significant reduction in the amount of available resources have combined to force management agencies to consider changes to the management regime. Three cumulative effects are identified below.

4.4.3.1 VMS Expansion

Enforcement methods of patrolling sea areas either by airplane or ship (carried out primarily by the U.S. Coast Guard, although state agencies have some capacity in this regard), and using fishery observers to monitor vessel position, can be used to monitor and enforce closed areas. However, VMS is a superior enforcement technology because the position of vessels with transmitting units can be tracked at all times. NMFS, in consultation with the Council and the VMSC, published a final rule in the *Federal Register* on November 4, 2003 that requires VMS on all limited entry trawl and limited entry fixed gear vessels beginning January 1, 2004. A complete analysis of the alternatives considered for this program can be found in the *Environmental Analysis/Regulatory Impact Review/Regulatory Flexibility Analysis for A Program to Monitor Time-Area Closures in the Pacific Coast Groundfish Fishery* (available online at: http://www.nwr.noaa.gov/1sustfsh/groundfish/VMS/VMS_EA_Final.pdf)(NMFS 2003b).

The risk of exceeding OYs due to non-compliance would be greater without the VMS monitoring program in place. Enforcement relying on monitoring by airplanes and ships to identify incursions into the closed areas would not be as effective as VMS. A lot of time and considerable cost would have to be spent investigating any vessel appearing on enforcement radar, whether or not they are legitimately fishing in an area or not. This would reduce the ability of enforcement vessels to cover a large proportion of the closed area in a timely manner, reducing total monitoring and deterrence.

The risk of exceeding OYs would be less if VMS were implemented under any of these alternatives. One of the major benefits of VMS is its deterrent effect. If fishers know they are being monitored, and a credible enforcement action will result, they are less likely to fish illegally in closed areas. In addition, the data collected with a VMS system can be used to better understand the distribution of fishing effort, which is likely to be affected by closed areas.

Depth-based management started in 2002 and became a major tool in the management of overfished groundfish species. Moving fisheries away from areas critical to the health of rebuilding stocks has quickly become a central aspect of West Coast groundfish management. The need to maintain the integrity of groundfish conservation areas through effective monitoring and enforcement is critical if fishery management agencies aim to provide fishing opportunity for healthy stocks while rebuilding overfished species in the future. The cumulative effect of declining fishery resources, increasing reliance on depth-based closed areas, and the long rebuilding time frames for overfished rockfish species have led management agencies to consider expansion of VMS to fishery sectors beyond limited entry fleets.

4.4.3.2 Fishery Monitoring and Biennial Management

Fishery management tools recently implemented, such as depth restrictions for recreational fisheries if caps on impacts to overfished species are attained, and tools considered for the future, such as individual quotas or bycatch caps, require timely, inseason catch and bycatch information. A cumulative effect of decreasing fishing opportunity and tightened regulations that rely on inseason tracking of fishery impacts is development of data sources that are timely and accurate. Among the tools being developed or considered are electronic logbooks to improve the speed and ease of incorporating at-sea fishery data into management, redesigning the MRFSS program by putting an emphasis on dock-side sampling for more effective inseason use, and expanding the West Coast Groundfish Observer Program. As these data sources expand and our knowledge of the stocks and fisheries improve, management agencies will need to consider mechanisms for incorporating this new information into biennial management. The Council has proposed forming a group to look into the use of these new data during a two-year management cycle. Fishery management agencies strive to use the best available science when establishing fishery resource policy, but frequent adjustments to the harvest specifications or management measures could erode the benefits of biennial management.

4.4.3.3 Fleet Reduction and Fishery Rationalization

Fleet reduction and fishery rationalization have been considered by state and federal management agencies since the 1980's. Overcapitalization of the fishery and optimistic expectations of groundfish stock productivity led to overfished species and compromised fishing industries and communities. In response, the Council and NMFS are pursuing a trawl vessel buyback program to reduce the size of the limited entry fleet. Additionally, the Council will begin to explore the potential for individual quotas, in part, as a means of providing regulatory flexibility and economically viable fishing communities. The cumulative effects of past management practices, current fishery crises, and the foreseeable need to rebuild overfished species and coastal economies have combined to make these dramatic changes to the management regime attractive to the fishery regulatory agencies.

4.4.4 Summary of the Direct, Indirect and Cumulative Effects of the Alternatives on the Public Sector

The table below summarizes, where possible, the effects of the alternatives from the perspective of the public sector.

TABLE 4.4.4-1 Effects of alternatives on the public sector. (Page 1 of 1)

	No Action Alternative	*Low OY Alternative*	*Medium OY Alternative*	*High OY Alternative*	*Council OY*
			Fishery Management		
-Constraining OYs ("Buffers") and Bycatch	No canary rockfish or bocaccio "buffer" with frequent inseason adjustment.	Exceeds canary rockfish, widow rockfish, and darkblotched rockfish OYs. Adjustments likely.	Exceeds canary rockfish, widow rockfish, and cowcod OYs. Adjustments likely.	Exceeds canary rockfish, cowcod, and lingcod OYs. Adjustments likely.	Use of "buffers", manages for less than the OY for all overfished species except widow.
-Data Collection	Fishery-dependent data restricted by area and allowable catch.	Generally less opportunity for fishery-dependent data than 2003.	Similar opportunity for fishery-dependent data than 2003.	Greater opportunity for fishery-dependent data than 2003.	Similar opportunity for fishery-dependent data than 2003.
			Enforcement		
-Extent of Commercial Closed Areas	Extensive closed areas.	Closed areas similar across action alternatives for commercial vessels.			
-Extent of Recreational Closed Areas	Extensive in CA, potential in OR, WA	Extensive in CA and OR, potential in WA.	Extensive in CA, June-Sept. in OR, potential in WA.	Extensive in CA, July only in OR, potential in WA.	Extensive in CA, June-Sept. in OR, potential in WA.
-Trawl B Platoon	Maintains B Platoon with associated costs to the public sector.	Maintains B Platoon with associated costs to the public sector.	Maintains B Platoon with associated costs to the public sector.	Maintains B Platoon with associated costs to the public sector.	Eliminates B Platoon with management and enforcement cost savings.

4.5 Socioeconomic Impacts

A screening for potentially significant socioeconomic impacts was conducted. Section 1.4.4.5 provides a summary of the main issues that are the subject of the socioeconomic impact analysis.

4.5.1 West Coast Groundfish Fishery - All Sectors

This section includes analysis of management measures affecting all sectors. The sectors benefitting from the resource can be placed into three groups: consumptive users (e.g. recreational fishers, commercial harvesters and processors), nonconsumptive users (e.g. divers interested in viewing wildlife), and nonconsumptive nonusers (e.g. members of the general public who derive value from knowing that fish species are being maintained at healthy biomass levels). Subsequent sections of the analysis address in more depth the impacts of the management alternatives on each sector.

4.5.1.1 Criteria Used to Evaluate Impacts

This section addresses two issues that cut across all sectors. The first is the overall level of harvest mortality planned for the 2004 fishery (total OY levels). The second is how the resource benefits will be divided up among sectors (allocations).

Total OY Levels

In this analysis the short- and long-term economic effects of harvest policy decisions are assessed. These harvest policy decisions determine the level at which ABCs and OYs are set. The harvest policy issues before the Council for the 2004 fishery primarily involve stocks with new assessments. The issues include questions of whether to adopt the new assessment in place of the previous assessment, the assumptions to use in the assessment, and for some overfished stocks, the level at which the rebuilding probability should be set. For most species for which a change in the OY is being considered, there are a range of options being considered. For the following species the range of OY options is not related directly to trade-offs between long- and short- term biomass and harvest opportunities: canary rockfish, Pacific whiting, lingcod, shortspine thornyheads, and yelloweye rockfish. For canary rockfish the range of OYs in the EIS is based on a recreational commercial allocation issue, greater proportions of harvest allocated to the commercial fishery require lower OYs to maintain the same long-term effects on biomass. For Pacific whiting the range of OYs is intended to include the range of possible OYs that may come from a stock assessment that has yet to be produced. For lingcod, shortspine thornyheads and yelloweye, the changes in OY from status quo reflect expected growth of the stock between years and continuation of the status quo harvest policies used for the 2003 fishery.

With respect to the harvest policy issues for the 2004 fishery, the trade-off between production in the current year and probable levels of harvest in future years will be examined. While, one year’s harvest will not usually have a significant impact over the long-term, the current year’s harvest is generally set in the context of a harvest policy decision that is likely to be implemented over a longer term. The choice of an OY option affects current year harvests and is a strong indicator of the harvest policy that will guide the selection of OYs over the long-term. The long-term effects are generally considered “cumulative effects” and would be considered in Section 4.5.1.3, however, because of their close tie to the immediate direct and indirect impacts, they will be considered in detail in Section 4.5.1.2 on direct and indirect effects.

In economic terms from a societal point of view, the choice between alternative harvest policies generally entails a fundamental tradeoff between current versus future costs and benefits. The individuals point of view may vary from the societal view. For some of the individuals benefitting from harvest, the time horizon of concern may extend only to the point at which they expect to stop relying on fishery harvest. If these individuals expect to participate in the fishery for only a relatively short time, they may not experience the future harvest reductions that would be the consequence of excessive harvest in the near term. On the other hand, many if not most of those who benefit from current harvest also value the resource as something to bequeath to future participants in the fishery and to the benefit of the general public. There are also those who derive benefit from not harvesting the resource. The view of these individuals also varies from the societal view as for them there is no trade-off: lower harvest levels bring higher present biomass levels and result in larger future biomass levels as well. All of these different types of views, in aggregate, comprise the societal point of view with respect to economic effects.

For the discussion of short-term effects of the OY options, net social benefits are the primary type of impact evaluated using rough indicators that summarize relative differences between OY levels of the management alternatives. Other relevant types of socioeconomic impacts listed in Table 1.4.4-1 will be covered in the sections on each sector. The following is a summary of the indicators of net benefits that will be used in the analysis of total OY levels. The indicators are divided into those which will be used to look at the cumulative effects of the individual species OY decisions when taken together and those used to assess the effect of the decision on they OY for each species separately.

Indicators of Net-benefit	Management Alternatives (All Low OYs together, All *Med OY*s together, etc.)	Individual Species
	Short-term	
Commercial &Tribal	Total Revenue	OY for the sector. Indicator of whether the species is a constraint on harvest of the complex.
Recreational	Number of Groundfish Trips (Quality indicators: Change in Harvest, Change in Restrictions)	OY for the sector (quality indicator)
Non-consumptive Use	Total Biomass Removed Under OYs	Total Biomass Removed Under OY
	Long-term	
Harvesters and Non-consumptive Use	Qualitative discussion of effects on biomass and harvest for groundfish fishery in aggregate (reference to biological impacts)	Where available from stock assessments, quantitative information on the effects of erroneous assumptions on future biomass and harvest.

The analysis provides only an approximate indicator of the effects of the OY decisions on net benefits for two reasons. First, the indicators do not capture all of the factors necessary to calculate net benefits. For example, a complete calculation of net benefits needs to include an assessment of costs. The reasons for the shortcomings in the indicators used for analysis will be discussed in sections on each sector. Second, the analysis of the alternatives does not isolate the effects of the OY decisions from the effects of other management decisions. Due to the large number of management measures that vary between alternatives, it is not practicable to compare every permutation. For example, there are 1,296 potential combinations of OY and allocation options (more if combinations are considered that would use the high OY for one species and the medium or *Low OY* for another species). Consideration was given to omitting the summary indicators for management alternatives from this portion of the analysis and providing only a qualitative analysis of the OY options, however, we believe the summary values of the management alternatives provide useful information regarding the general direction and magnitude of differences between the OY options (the management "alternatives" include both the OYs and the management measures to achieve them, as distinct from the OY "options," which refers only to the OY levels and not the management measures used to achieve the OY levels).

Short-term Impacts

Short-term socioeconomic impacts arising from the choice of harvest mortality level (OY) for the current year are evaluated for the fishery in aggregate and for each sector. The evaluation of fishery wide effects is provided in this section and the sector specific effects are covered in the sections on each sector (Sections 4.5.2 through 4.5.7).

For consumptive-use sectors, the best available proxies for net social benefits of harvest are estimates of total expected revenue for the commercial fishery and number of recreational trips for the recreational fishery. Explanation of factors limiting our ability to provide a quantitative assessment of net social benefits is provided in sections on each sector. Also provided in those sections are further discussions that qualitatively, and in some cases quantitatively, elucidate changes in net benefits related to each sector under the alternatives.

For the commercial fishery, an estimate of total revenue is provided for each management alternative. Additional indicators are provided on the choice of individual species OYs including: change in the OY for the commercial sector, whether or not the species is expected to be a major constraint on harvest of the groundfish complexes, 2002 exvessel value for the species, 2002 exvessel value for the complexes in main depth strata in which the species is taken, exvessel value for the 2004 OY based on 2002 prices and assuming the total commercial OY is landed. The indicators of whether or not the species is a constraint on harvest and the ratio of the value of the OY species to the aggregate value of the complexes in the depth strata in which the species is taken provide a sense of how marginal changes in the OY for that species might affect the aggregate result for the management alternative. One precaution in interpreting the ratio of the OY species to the harvest for the depth strata is that the depth strata may have complexes that can be targeted and managed separately that include the species of interest to greater and lesser degrees. This ability to regulate the complexes might allow reductions to be achieved with less effect on the harvest for the depth strata than would be implied by the aggregate ratio. Additionally, applying a ratio to evaluate a marginal effect presumes that the species is a constraint on harvest and that there is not a means of reducing impacts without reducing harvest of the complex. Reducing the OY for a species may have no effect on harvest of the complex if the species in question is not a binding constraint, i.e. total harvest of the complex is constrained by the need to conserve some other species in the complex. While the initial indication in this analysis may be that a species is not a binding constraint on harvest at a particular OY level, it may become a constraint as the OY is incrementally reduced; or a species that is constraining may become nonconstraining as the OY is increased. Further, a nonconstraining species may become a constraint as the OYs for other species are increased, and a constraining species may become nonconstraining as the OYs for other species are reduced. If there is a means of reducing impacts on a species other than reducing harvest of a complex (such as an area closure), operating costs would likely increase, while revenue from the complex remains stable with the exception of a decline in revenue from the species being conserved.

For the recreational fishery, estimates of changes in the number of trips are provided for each management alternative. However, the more significant effect may be changes in the quality and value of the individual trip as management measures, such as bag limits, become more or less restrictive. For the analysis of the effect of individual species OYs on recreational fishing, 2002 trips taking groundfish in the depth strata in which the species of interest occurs will be used as an indicator of the breadth of effect of any change in quality of the trips resulting from a change in trip restrictions. Change in the OY allocated to the recreational fishery will be used to indicate the amount of change in recreational harvest required. This change will have to be achieved either through a change in the number or quality of trips. A third indicator shows how regulations will achieve the desired change in catch. A change achieved primarily through a closure reduces effort in an area while changes in harvest that are achieved through trip catch limits affect the quality of trips. In the former case, trips are not necessarily eliminated, but rather the timing or location of the trips may change, changing their quality. In the latter case, the change in trip quality may also affect effort, however, the degree of effort changes in response to changes in restrictions of this nature are uncertain and generally not part of the preseason management modeling used to assess the effect of the regulation on total harvest. Additional information on the effect of regulations on effort and trip quality is provided in Section 4.5.4.

Non-consumptive use sectors and nonuse sectors both derive greater benefit when harvest is forgone in favor of increasing biomass. Absent the data necessary to produce dollar estimates for non-consumptive values, change in total biomass provides proxy information on the relative differences in nonuse values between the alternatives. With respect to the short term, the differences in OY between the options reflect the differences in the amounts of biomass that would be left, with lower OYs leaving greater total biomass in the ocean (in the very short term). Based on the concept that marginal utility diminishes with each additional unit of a good acquired, for most nonconsumptive users the importance of the additional biomass left in the oceans diminishes as total biomass increases. Thus, ideally it would be useful to put the proposed removal in the context of the amount of biomass presently in the ocean. However, each option is based on a different set of modeling assumptions and each set of modeling assumptions implies a different current biomass. If it were known that the *High OY* alternative assumptions were correct, nonconsumptive users might be as happy with the *High OY* alternative as they would be if the *Low OY* alternative were proposed and it was known that the *Low OY* alternative assumptions were correct. Some clarity can be gained from this complex situation by evaluating the outcomes from the point of view that there is one real biomass and one real level of stock productivity, both of which are unknown. Thus for any of the OYs we are not absolutely certain of the proportion of the total stock removed or, after taking into account growth, whether total biomass over the short term will increase or decrease as a result of the removal. The more significant effect on biomass is long-term in nature, related to the application of a harvest policy over a number of fishing years. The effect is related to the probability and size of negative outcomes that may result from managing under a false set of harvest assumptions. This risk to biomass is discussed under the section on long-term impacts. Additional information on nonconsumptive use values is provided in Section 4.5.7.

Long-term Impacts

In general, those assumptions that result in higher OYs in the present entail a higher risk that future biomass, and hence harvests, will be at lower than optimum levels. Lower OYs entail a risk that current harvests will be at lower than optimum levels. If frequency distributions of possible future harvest outcomes were available, the proper calculation of the costs of increased risk to future production resulting from higher harvests in the present would be to multiply the change in the potential net value of harvest for the future period by the probability of that outcome occurring. While the probability of the adverse outcomes are generally not available, for some stocks information is provided that indicates the degree of adverse effect from making the wrong assumption. That adverse effect is expressed as a change in biomass. The adverse effect would extend over a number of years as future harvests would have to be reduced to rebuild the stock. The differences between the options in the biomass resulting from erroneous assumptions will be used as a proxy indicator of the potential adverse economic impact.

Ideally, the differences in biomass would be translated into a difference in OY and a difference in net revenue in the commercial fishery or a difference in number of trips and experience value in the recreational fishery. In the commercial fishery, the change in value for the individual species would be expanded to adjust for changes in opportunities within the complex in which the individual species is taken, under the assumption that if harvest of the species is not allowed, harvest of the complex would likely be diminished or the cost of harvest increased by measures imposed to reduce incidental catch of the species. The ratio of the exvessel value of the complex to the exvessel value of the single species, as provided in the analysis of short term impacts, provides a rough multiplier that translates the single species economic effect into an effect for the complex (assuming proportional changes in costs and revenues and other caveats provided in the description under short-term impacts). If the time at which future changes in harvest might occur could be taken into account, a discount rate would be applied to determine the present value of the change. The present value of a future harvest is generally viewed to be lower than the same harvest taken in the present. For example, losing $100 of net profit 5 years from now would be viewed as the equivalent of losing $78 today (applying a 5% discount rate). In cases where the negative outcome of a wrong assumption is minor, a more risk prone stance may be warranted if there would be sufficient compensation from current production. On the other hand, where the negative outcome of a wrong assumption is substantial, a more risk averse stance may be warranted.

An attempt is made here to use biomass as an indicator of long-term risk and costs associated with harvest policy decisions. Numerous factors make quantification of socioeconomic impacts difficult over the long term, as follows. Estimates of stock biomasses and therefore OYs are not stable from one year to the next and, given ecological principles, there is likely to be some inverse correlation in the natural variation of biomass among the various species that make up the groundfish complex. Thus, the species constraining harvest of a multispecies complex is likely to change over time. Additionally, a changing socioeconomic environment is likely to change allocation decisions across time. Finally, the needed models have not been developed to relate harvest policies in a multispecies fishery to specific estimates of future harvest levels permissible for the complex as a whole.

In assessing the risk of adverse outcomes, the dynamics of the decision system need to be kept in mind. Overtime, bad assumptions in stock assessments that result in overharvest should result in lower than projected estimates of biomass in future stock assessments (barring the intervention of other factors such as trends in ocean productivity). If detected soon enough, corrective actions may be taken such that the adverse effect of the erroneous assumption is reduced in duration by an adjustment based on the actual response of the stock to the harvest policy. Under Amendment 16-1, for stocks under rebuilding plans, there are mandatory assessments of rebuilding progress with each new stock assessment.

Allocations

Decisions on how to allocate harvest among sectors have implications for net social benefits, business profits, distribution of benefits and costs, impacts on adjacent fisheries, fairness and equity, income and employment. There are also indirect affects on public health and safety. The distribution of costs and benefits among sectors will be addressed as reflected by the distribution of OY. Social costs and benefits for each sector, profits, impacts on adjacent fisheries, and impacts on public health and safety of each alternative will be addressed in the analysis for each sector. Effects on income and employment will be addressed in the section on communities.

Exvessel value and recreational trips are used as summary indicators of the net social benefits for each management alternative. These indicators provide an overview of the result from the interaction of allocation, OY and other management measure decisions. For the OY decision, biomass was also relevant to the assessment of net social benefits. However, with the exception of canary rockfish, the total harvest will not generally vary with the allocation decision. Therefore, the long-term impact on biomass resulting from the allocation decision is minimal.[24/]

Historic and proposed distribution of harvest among sectors is provided on the individual species allocation decisions to help assess social costs that are not well captured by the fishery wide exvessel value and total recreational trip proxies: (1) disruption and dislocation costs, (2) fairness and equity, (3) compliance, and (4) conservation behavior.

The following is a summary of the indicators for these social costs. Additional descriptive information on the indicators is provided in the subsequent text. The Council final action created a specific allocation only for black rockfish. Therefore a detailed assessment is provided only for that species.

	Indicators of Social Costs
Disruption and Dislocation Costs	Changes in species related economic activity (trips and exvessel revenue) and OY relative to past OY levels
Fairness and Equity	Decision basis and reasonableness (limited objective standards)
Compliance Behavior	Perceptions of fairness and equity
Conservation Behavior	Imposition of penalties or rewards from previous conservation actions.

Disruption and Dislocation

Costs associated with disruption and dislocation are part of change, a necessary element of maintaining an efficient economy. However, where change is needed, attention should be given to the attendant disruption and dislocation costs. These adjustment costs need to be balanced with the expected costs and benefits of the post change activities. If it is possible to achieve the same end result with less disruption and dislocation (lower adjustment costs), social benefits are likely to be greater. On the other hand, there may be circumstances where greater disruption and dislocation speeds or enhances the achievement of benefits or results in greater benefits, such that there is sufficient compensation to cover the greater adjustment costs.

24/ However, there may be secondary effects of allocational decisions that do have a long-term affect on biomass levels. One example may be the differences among the gear types in their impacts on habitat and consequently on productivity of the ocean environment. Habitat impacts are discussed in Section 4.1.

The groundfish FMP management objective 14 states:

> 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 environment.

The degree of change of harvest, as compared to *No Action*, provides an indicator of the relative magnitude of disruption and dislocation costs for each sector. Over the short-term, very small reductions in harvest can sometimes be absorbed as reductions in income for owners and workers in the fishery and industry related businesses and communities (workers and capital become underemployed and the rate of investment is reduced).[25/] Larger changes in harvest will likely result in some firms laying off employees or going out of business (workers and capital become unemployed). When unemployment occurs there is greater economic and social disruption as costs are incurred in the adjustments necessary to enter other employment.

Disruptive impacts of the management alternatives will be evaluated based on aggregate changes in harvest, changes in exvessel revenue and changes in recreational trips for the affected groups. Each management alternative is based on a unique combination of OY level and allocation schedule. Aggregate results for the groundfish fishery provide information on the combined effects of the management measures.

The relative magnitude of disruptive impacts with respect to individual species allocation decisions will be represented by changes in the magnitude of harvest allocated to the sector. For the OY/allocation options around which each alternative is structured, distribution of harvest among sectors and major management areas is provided in comparison to actual harvests for the species to be allocated (black rockfish, bocaccio, canary rockfish, lingcod, widow rockfish and yelloweye rockfish) for 1998 and 2002 and expected harvests for 2003.

In order to illustrate the full range of possible harvest constraints for individual sectors or geographic areas, each allocation option is applied to each species OY. This range is provided only for the individual species that are the subject of the allocation options. The resources are not available to produce, analyze and summarize quantitative economic information on the multispecies fishery for multiple combinations of OY and allocation schemes within the time frame required for the Council and NMFS decisions on the 2004 groundfish fishery. Therefore, the broader effects on exvessel value and recreational trips supported by the groundfish complex are not provided. A rough indicator of the effect of each OY/allocation combination on exvessel revenue or recreational trips can be inferred by referencing the proportional difference between the allocation level for the OY/allocation scheme in question, as compared to that for the management alternative with the most similar allocation level. If the species in question is a constraint on management (see Section 2.1) then this proportional difference can be applied to the exvessel value or recreational trips modeled for the sector in question to roughly infer a hypothesis on the effect of the OY/allocation scheme on exvessel revenue or recreational trips. If the species is not a constraint on management, then there is not likely to be a substantial effect on the sector being considered with respect to the change in allocation level. If the species is not a constraint on a particular sector under a management alternative but would become a constraint under the OY/allocation scheme in question or *visa versa*, a rough estimate cannot be inferred and additional analysis will be required to develop an estimate of the economic effect.

The value of the individual species to a sector should be put in context of the broader fishery. For the commercial sector, exvessel value is provided for the individual species and the other species in the depth strata in which the species of concern is harvested. The opportunity to harvest an individual species may be of value for the direct amount the fish can be sold as well as for the opportunity it provides to harvest other

25/ Lack of alternative employment or consideration of adjustment costs keep workers and capital from moving to another productive activity.

species in a fishery complex. For the recreational fishery, the number of trips with groundfish catch, by depth strata, is used as an indicator of the number of trips potentially harvesting a recreational species. The stringency of recreational management measures designed to reduce harvest mortality for a particular species also affects the value of the recreational experience. Absent an ability to relate a change in trip value to a change in management measures, the management measures themselves will have to serve as the primary indicator of the relative quality of trips under the different management alternatives (see Section 4.5.4 for additional discussion).

Fairness and Equity

Executive Order 12866 (*Regulatory Impact Review*) includes equity as a factor to be included in cost-benefit analyses. National Standard 4 dictates that allocations be made in a fair and equitable manner. Because of the wide-ranging views in our society about what constitutes equitable allocation, there are not generally accepted standards against which an objective analysis can conclude that one allocation decision is more fair and equitable, or of greater social value, than another. There are no widely accepted measuring sticks for equity similar to those for evaluating such factors as economic efficiency. Therefore, analysis is necessarily limited to pointing out the major decision that would likely affect the perceived fairness and equity of proposed allocations and the rationale for those decisions. It will be up to each individual involved in the process to evaluate for him or herself whether the recommended allocation are, or would be, evaluated by the general public to be, on the whole, fair and equitable.

Compliance

Perception of fairness and equity has implications for the costs of management through its impact on incentives for compliance. In general, systems that are broadly perceived to be unfair or inequitable are more likely to result in noncompliance. As such, enforcement costs will be increased.

Conservation Incentives

Impacts of allocation on incentives for precautionary conservation action was one of the issues raised during scoping. Allocations based on historic catch during a period in which harvest was voluntarily reduced may reduce future incentive for voluntary conservation actions. The disincentive for individual, sector or state agencies to voluntarily reduce harvest mortality will introduce an increased element of risk into the management system. The cost associated with that risk can be measured as the amount one would be willing to pay in the present to avoid the increased possibility of a negative outcome in the future.

4.5.1.2 Direct and Indirect Impacts

In this section the impact criteria described in Section 4.5.1.1 are discussed first for the groundfish fishery in aggregate followed by a discussion of the criteria to be evaluated at the individual species level.

OY and Allocation Options for the Groundfish Fishery by Management Alternative

The management alternatives contain OY levels different from *No Action* for black rockfish, Pacific whiting, sablefish, Pacific Ocean perch, widow rockfish, canary rockfish, bocaccio, and darkblotched rockfish. For all other species, the OY levels would remain at *No Action*. Alternative OY specifications are structured either to capture key scientific uncertainties in stock assessments, or in some cases, a range of rebuilding probabilities for an overfished stock. New allocations or changes in allocation are proposed for black rockfish, bocaccio, canary rockfish, lingcod and widow rockfish. The OY options are provided in Table 2.1.1-1. and the allocation options are provide in Table 2.1.2-1. These options have been structured together with options for other management issues into four alternatives: *Low OY*, *Medium OY*, *High OY* and *Council OY*.

For the groundfish fishery as a whole, benefits for the suites of OY and allocation options that comprise the *Medium OY* and *Council OY* alternatives would be slightly higher relative to the 2003 fishery. The *Low OY* alternative would be lower and the *High OY* alternative higher, relative to the 2003 fishery.

Exvessel value for management alternatives (includes tribal, at-sea and shoreside whiting, millions of dollars, from Table 4.5.1-J1)

2002	2003 (Projected)	*Low OY*	*Medium OY*	*High OY*	Council
$51.6	$52.9	$39.5	$55.0	$64.6	$54.6

Estimate of number of recreational trips (thousands).

2002	2003 (Projected)	*Low OY*	*Medium OY*	*High OY*	Council
3,430	3,430	4,738	5,183	5,330	4,303

The direction and magnitude of change for the harvesting sectors also reflect directions and magnitude of change for businesses relying on fish harvesters, including processors, and recreational fishery support services. In turn, communities experience social and economic impacts related to changes in the activities of harvesters and related support industries. Over the last four years the fishery has generally undergone a harvest reduction and stock rebuilding process as compared to the fishery of 1999 and the previous decades. In 2004, there may be some minor relaxation of constraints as compared to the 2003 fishery. Harvest reductions have been imposed to rebuild stocks with the expectation that these rebuilding policies will result in the greatest social good over the long-term. It is generally assumed that the long-term benefit will more than compensate for the disruption and dislocation costs associated with the change process.

At current biomass levels, those enjoying the resource through non-consumptive means will generally glean more value with more biomass in the ocean. Allowed removals of biomass (optimum yield) for nonwhiting species would be higher than in 2003 by between about 6,000 mt (*Low OY* alternative) and 10,800 mt (*High OY* alternative). It is not certain whether biomass would increase or decrease at the proposed levels of removals. In general, biomass levels would be expected to remain stable or increase under all alternatives to *No Action*, given management objectives and projections based on management models. ABCs reflect the level of removals that are acceptable based on an MSY harvest policy and OYs are not allowed to exceed the ABCs. However, there may be other stocks that are above MSY biomass, and for which the ABCs are set at a level that allows some depletion of biomass.[26/] In 2003, OYs were set at 12% below the ABC. For 2004, the estimate of ABCs is between 10,200 mt and 11,200 mt greater than in 2003. Increases are due either to new stock assessment information or predicted increases based on natural growth and conservative harvest policies from 2003 and prior years. The 2004 OYs would be 11,400 mt under the ABCs in the *High OY* alternative, 10,400 mt under the ABCs in the *Low OY* alternative and 200 mt under the 2003 ABC.

			2004 ABC and OY Alternatives							
	2003 ABCs/OYs		*Low OY*		*Med OY*		*High OY*		*Council OY*	
	ABC	OY	ABC	OY	ABC	OY	ABC	OY	ABC	OY
All Groundfish (mt)	280,885	230,038	188,613	155,096	283,066	232,656	377,607	308,119	282,880	232,600
Change frm 2003 (mt)			-92,272	-74,942	2,181	2,618	96,722	78,081	1,995	2,562
All Nonwhiting Groundfish (mt)	92,885	81,838	94,613	80,996	95,066	84,456	95,607	85,819	94,880	84,400
Change frm 2003 (mt)			1,728	-842	2,181	2,618	2,722	3,981	1,995	2,562
Change frm *Low OY* (mt)					453	3,460	994	4,823	267	3,404
Difference Between OY And ABC (mt)		-11,047		-13,617		-10,610		-9,788		-10,480
Percent		-12%		-14%		-11%		-10%		-11%

Note: For the *Council OY* alternative the status quo whiting ABC and OY have been assumed. The Council will make a decision on the ABC and OY for Pacific Whiting in the spring of 2004.

26/ For such species, greater annual surplus production is predicted at biomasses somewhat lower than present biomass.

The degree to which OY is less than ABC varies among the species. For 2003 there are 38 separate ABCs and OYs listed in Table 2.1.1-1 and 40 for 2004 (excluding whiting). For 2003, for 10 of these species/species groups, the ABC and OY were equal to one another, for 22 the OY was at least 25% less than the ABC, and for the remaining 6 the OYs were between 0 and 25% less than the ABCs. For 2004, for 12 of these species, the ABC and OY are equal to one another under all alternatives, for 24 the OY is at least 25% less than the ABC under all alternatives, and for the remaining 4 the OYs are between 0 and 25% less than the ABCs under at least one alternative.

Risks to future biomass and production for individual species will be discussed below. In general, the modeling assumptions used to develop the ABCs for the *High OY* alternatives are less risk averse than the *Low OY* alternatives. Additionally, the OYs in the *High OY* alternative are somewhat less precautionary (10% below the ABCs, in aggregate), than the *Low OY* alternative (14% below the ABCs).

Greater changes from recent harvest levels reflect greater degrees of disruption and associated adjustment costs. Levels of investment and involvement in the fishery are more likely to be reflected by a longer term average than a single recent year because individuals investing physical or human capital[27/] are more likely to base there investment decisions on information that spans more than a single year. When change in harvest levels are necessary to achieve more beneficial long term results, economic results will vary depending on how the burden of the change is distributed. If all sectors are equally efficient and have equal disruption and dislocation costs for each additional unit of harvest reduction, then the greatest net benefit might result from equally distributing the harvest reduction among all sectors. If all sectors are equally efficient but the disruption and dislocation costs are less in some sectors, then greater benefits might be imposed by allocating greater harvest reductions on sectors with lower adjustment costs. If all sectors have similar adjustment costs but some sectors generate less net benefits per unit of harvest, then greater benefits might be achieved by imposing greater harvest reductions on those sectors that generate less net benefits. Often there will be a call for equal sharing of the conservation burden among different groups. In the absence of information indicating that the net benefits generated by one sector are greater than another or the adjustment costs for one sector are greater than another, such equal sharing of conservation burden promotes perceived equity, if not economic efficiency. Under EO 12866, equity is to be considered an item of social value that should be included in considering the balance of costs and benefits resulting from a government action.

OY and Allocation Options by Species

Black Rockfish

Short-term Long-term Tradeoff

A separate ABC was specified for black rockfish for the first time in 2000 (1,200 mt north of Cape Mendocino). At that time, it was part of the minor rockfish category. An OY separate from the minor rockfish category is being established for the first time in 2004.

27/ Human capital is invested when an individual invests time in training or experience that then increases his or her proficiency at a particular job. To the degree that the training or experience cannot be used in another profession there is a displacement and investment loss that occurs with a change in careers.

	2002 ABCs/OYs		2003 ABCs/OYs		2004 ABC and OY Alternatives							
					Low OY		*Med OY*		*High OY*		*Council OY*	
	ABC	OY	ABC	OY	ABC	OY	ABC	OY	ABC	OY	ABC	OY
					Coastwide							
Coastwide	1,115	---	1,115	835	1,269	1,269	1,315	1,315	1,401	1,401	1,315	1,315
Change from 2003					154	434	200	480	286	566	0	0
2004 Regional OYs (mt)												
WA					540	540	540	540	540	540	540	540
OR & CA					729	729	775	775	861	861	775	775
					Key Stock Assessment Assumptions							
Assumed 1945-1977 Catch (mt)						9,400		17,100		26,100		17,100

The range of OYs for black rockfish are based on uncertainties about the new assessment's modeling assumptions for the 1945-1977 catch (Section 2.1.1.1). This range of historic catch assumptions generated a range of biomass estimates, ABCs and OYs. Based on the range of historic catch assumptions, all estimates of biomass were about 50% of virgin spawning biomass, well above the MSY proxy. The MSY proxy is 40% of virgin biomass levels. For 2004, black rockfish OYs under all options would increase above 2003 and 2002 levels. However, based on current estimates of year class strength, by 2006 continuation of the same harvest policy and stock assessment assumptions in subsequent years would be expected to drive biomass back down, close to or slightly below 2003 levels. However, even after 10 years of management, assuming the assumptions under the chosen option is correct, biomass would still be above the MSY proxy level. Therefore, given that the modeling assumptions are correct, none of the OY options would be predicted to adversely impact long term benefits derived from the resource.

There is some risk arising from the possibility that the modeling assumptions are incorrect. Under such circumstances the risk over the long term is greatest with the highest harvest. Economic production in the short term would have to be forgone in order to reduce risk in the long term. The amount of risk is limited to the degree that future surveys and assessments are able to detect unexpected trends in stock biomass. The degree of risk can be estimated by looking at the biomass levels expected to result from managing under erroneous assumptions. For example, if the low OY assumption is correct but the stock is managed under the *High OY* assumption, after 5 years, the biomass would be at 48.3% of the unfished level rather than the 51.7% that would be expected if the stock were managed on the basis of the low OY assumptions (see following table). Thus even under an erroneous assumption about the assumed 1945-1977 catch, stocks are projected to be above B_{MSY} and there would not be a threat to long-term production.

Harvest Policy for Oregon and California		Spawning Biomass Relative to Virgin (Proxy MSY = 40%)		"True" Conditions		
	OY Level	Current	5 yr Projec-tion	*Low OY* Assumption is Correct	*Medium OY* Assumption is Correct	*High OY* Assumption is Correct
				Expected Minus "Actual" Percent Virgin Biomass, After 5 Years		
Low OY	729	54.2%	51.7%	0.0%	1.2%	2.6%
Medium OY	775	51.9%	50.0%	-1.0%	0.0%	1.8%
High OY	861	48.1%	47.1%	-3.4%	-1.9%	0.0%

However, modification of other parameters in the model, such as the Beaverton-Holt steepness could have lead to estimates of spawning stock biomass close to the 40% level. Therefore, there is some chance that spawning stock biomass is not sufficiently above the MSY level such that the differences between the OY levels have only minor implications for long-term production and economic benefits.

Geographic and Sector Distributions

Black rockfish harvest is allocated between the states first, then between commercial and recreational fisheries, and finally between limited entry and open access segments of the commercial fisheries. Black rockfish are generally harvested as part of the nearshore complex.

For 2004, the Washington allocation of black rockfish would be 540 mt, based on the 2000 black rockfish assessment for the area north of Cape Falcon. The black rockfish OY for Washington does not vary between the alternatives. Of the 540 mt, 13.6 mt would be allocated to the tribes. The proposed tribal harvest is the same level as in 2003 and does not vary between the alternatives. Most of the remainder of the harvest is available for the Washington sport fishery. The Washington commercial fishery is restricted to operation outside of 3-miles, such that the amount of nearshore species taken in the commercial fishery is minor. For 2003, there was no Washington area commercial fishery OY. The coastwide OY was considered to be available for all three states. There are no proposals to change the 2004 harvest regulations off Washington for the purpose of conserving or increasing the harvest of black rockfish. Therefore, there will be no change in the degree of constraint that black rockfish places on Washington fisheries. Socioeconomic effects of the interaction between regulations to protect other groundfish species and commercial black rockfish harvest and recreational trips are captured in the aggregate analysis for the groundfish fishery as a whole.

For 2004, new OYs will be created for the Oregon-California area based on the 2003 stock assessment. Harvest allowed for Oregon and California in previous years was based on a coastwide OY that treated black rockfish as a single stock within the Council management area. In 2003, Oregon and California each had their own management caps for black rockfish and blue rockfish combined. These caps were used to ensure that harvest would be kept within the coastwide OY. For the 2004 fishery, the OY will be allocated between Oregon and California and each state will create its own black rockfish caps (black rockfish will no longer be combined with blue rockfish). Each state may set its caps at levels below the OY, such that the Oregon to California harvest ratio allowed under the caps may not reflect the ratios of the OYs set by the Council. These caps will not be set as part of the federal regulations. Nor will the recreational:commercial allocations be specified in the federal regulations.

Historically, Oregon's harvest level has generally run at about 60% to 80% of the combined Oregon-California harvest (Table 4.5.1-1). The black rockfish component of the 2003 combined black rockfish and blue rockfish caps, were at an Oregon:California ratio of 0.78:0.22. The *High OY* alternative would allow for an increase in harvest by both states relative to 1998 harvest, 2002 harvest, 2003 caps and the 1994-2003 average. The *Medium OY* alternative would also allow for an increase relative to all of these periods except for 1998. The *Low OY* alternative would allow for an increase relative to all of these periods except for 1998 and the 1994-2003 average.

Whether both states have an opportunity to increase their black rockfish harvest caps depends on the allocation of the OY between states (Table 4.5.1-2). The ratios for the allocation options being considered are provided in Table 4.5.1-2. Section 2.1.2.1 provides the rationale on which the ratios are based. The allocation issues based on historic harvest do not entail any issues of voluntary past harvest reduction. All OY and allocations options would allow some increase in the California harvest relative to 1998, 2002, 2003 and the 1994-2003 average (Table 4.5.1-2). For every OY/Allocation combination Oregon will experience a decrease relative to 1998, and the 1994-2003 average (except for an allocation share of 63% or greater under the *High OY* option). For every OY/Allocation combination Oregon will experience an increase relative to 2002, (except for an allocation share below 50% under the *High OY* alternative option). Relative to the 2003 cap, allocations of less than 60% under the *Low* or *Medium OY* options will result in decreases for Oregon. All other combinations result in increases.

Ranges of caps will be considered within the OY options (Table 4.5.1-3). Prior to the September 2003 Council meeting, Oregon had not proposed a cap that could be accommodated under the *Low OY* alternative or *Medium OY* alternative with less than a 60% allocation to Oregon (bolded cells of Table 4.5.1-2). For the *High OY* alternative, no cap had been proposed that could be accommodated with a 49% allocation to Oregon. Caps proposed for California could not be accommodated at the low OY level except for the alternative that would allocate 51% to California. No OY levels would accommodate the proposed California caps if the California share were set at 35% or 37%.

The *Council OY* included the 0.58:0.42 Oregon:California allocation ratio. Oregon and California will propose allocations between the recreational and commercial fisheries. These shares are generally determined by the each state's nearshore management plan. The range of state OY caps that are being considered by the states under each alternative could be structured to allow some increase for each sector relative to the black rockfish portion of the 2003 caps, depending on how the fish are allocated (Table 4.5.1-4). The greatest cap considered for the commercial fishery would be less than the 1998, 2002 and 1994-2003 average harvest. The lowest cap being considered for the recreational fishery is greater than the 2002 and 1994-2003 average harvest, slightly less than the 2003 cap and substantially less than the 1998 harvest.

While the commercial harvest of black rockfish is small relative to commercial harvest of all nearshore species, access to black rockfish is generally necessary for fishers to harvest any nearshore species. The following table shows total revenue for nearshore species harvest and revenue from black rockfish harvest for 2002.

2002 Exvessel Revenue (thousands of dollars) (Nontribal and Tribal)	LE Trawl	LE Fixed Gear	OA Vessels w/<5% Rev from Groundfish	OA Vessels w/>5% Rev from Groundfish	Total
Nearshore Species					
North of Mendocino	648	281	1,378	12	2,319
South of Mendocino	382	61	1,732	65	2,240
Black Rockfish					
North of Mendocino	2	70	433	6	511
South of Mendocino	1	7	24	1	33

Tribal included as open access.

These exvessel revenues were generated from the following harvests.

2002 Harvest (mt) (Nontribal and Tribal)	LE Trawl	LE Fixed Gear	OA Vessels w/<5% Rev from Groundfish	OA Vessels w/>5% Rev from Groundfish	Total
Black Rockfish					
North of Mendocino	2	23	181	4	210
South of Mendocino	1	2	6	0	10

Tribal included as open access.

Black rockfish are also a component of nearshore recreational fisheries. The following table shows nearshore recreational trips for 2002, black rockfish catch in 2002 and 2003 caps.

Recreational Fishery	2002 Trips with Nearshore Species	2002 Black Rockfish Catch (mt)	2003 Black Rockfish Caps b/
Washington	a/	171	N/A
Oregon	a/	242	350
California	a/	180	N/A

a/ 2002 nearshore trip information requested from RecFIN.
b/ Portion of the black and blue rockfish cap attributed to recreational black rockfish.

Bocaccio

Short-term Long-term Tradeoff

The range of OYs for Bocaccio are based on uncertainties about the new assessment's modeling assumptions and differing likelihoods (P_{MAX}) of rebuilding within the maximum allowable time (T_{MAX}) (Section 2.1.1.2).

	Low OY	*Med OY*	*High OY*	*Council OY*
OY (2003 $\leq$ 20 mt)	199 mt	306 mt	526 mt	250 mt
Assumption	Omits Recreational CPUE Data, estimated recruitment held constant to 1959 (STARb2 Model)	Omits neither, estimated recruitment held constant to 1959 (STATc Model)	Omits NMFS Triennial surveys, recruitment held constant to 1969 (STARb1 Model)	ABC was set to 400 mt (the Council stated that the ABC determination was not intended to infer a choice among the models)
Rebuilding Likelihood (P_{MAX})	80%	70%	60%	70% under STARb2 79% Under STATc 96% under STARb1

The following are the probabilities of rebuilding by T_{MAX} for combinations of the rebuilding models selected for management, and the "true" state of nature. For example, if a management decision is based on STATc but the true state of nature is better reflected by STARb1, the probability of rebuilding by $_{TMAX}$ declines to 58%.

Probability of Rebuilding in T_{MAX}	True Model (State of Nature)		
Model Used for Management Policy	STARb1	STATc	STARb2
STARb1	70%	19%	3%
STATc	94%	70%	58%
STARb2	96%	79%	70%

Overtime, if rebuilding falls behind schedule, declining stock biomass would show up in the assessments and fisheries would have to be further restricted to achieve rebuilding. Such restrictions could have significant economic consequences and result in contentious allocation battles.

The risk to future harvest is indicated through a sustainability section in the rebuilding analysis. The sustainability analysis was conducted using the base model (the STATc model). This analysis indicates that a 2004 harvest of 959 mt would provide a 50% probability of no further decline in abundance, and a 2004 harvest of 864 mt would provide an 80% probability of no further decline in abundance.

Geographic and Sector Distributions

A number of allocation alternatives were considered for bocaccio rockfish (Section 2.1.2.2). Allocational issues for bocaccio arise only south of Cape Mendocino, where the stock has been overfished, therefore there are no between-state allocation issues. Allocation options between the commercial and recreational fishery were considered (Table 2.1.2-1). However, because canary rockfish was the primary harvest constraint the Council did not need to make an allocation decision on bocaccio for the 2002 fishery. The Council explicitly stated that the harvest falling to the commercial and recreational fisheries as a result of the 2004 harvest regulations would not be considered or implied to be a precedent with respect to future allocation issues which may arise if bocaccio becomes a harvest constraint.

Canary

Short-term Long-term Tradeoff

The range of OYs for canary do not reflect differences in long term biomass and harvest opportunities, or imply different levels of risk to the resource. The range of OYs is based on the recreational commercial allocation of harvest (Section 2.1.1.3). The rebuilding probability is the same for all three OYs, P_{MAX}=60%.

	Low OY	*Med OY*	*High OY*
OY (2003 = 44 mt)	42 mt	46 mt	46 mt
Recreational:Commerical Split	50% Rec:50% Com	39% Rec: 61% Com	39% Rec: 61% Com

Geographic and Sector Distributions

Canary rockfish was one of the main management constraints shaping this year's fishery. Inside boundaries of both the trawl and nontrawl fisheries and boundaries for the recreational RCA as far south as 34º27' N latitude were driven by the need to conserve canary rockfish. In California in particular, the bocaccio OY was increased such that management regulations could have been liberalized significantly compared to 2003, had it not been for the constraints imposed by the need to conserve canary rockfish.

Numerous allocation formulas for canary rockfish were specified prior to the September 2003 Council meeting. However, none of the suites of management measures that had been developed by the time of the September meeting adequately reduced canary harvest enough to achieve the associated OY. It became apparent at that time that significant additional constraints on recreational and commercial fisheries would be required. Given the multispecies nature of the groundfish fishery, negotiations then settled around what constituted a fair and equitable distribution of all groundfish fishing opportunities rather than the allocation of the single species. It became clear that for some states, such as Washington, there was little opportunity to achieve significant reduction in canary impacts by further reducing fishing opportunities. For other fisheries in other states, more conservation benefits could be achieved at a lower cost in terms of lost fishing opportunities. In accordance with how the division of canary harvest among states and fisheries was determined, it was decided that the canary harvest shares that might be derived from this year's management regulations would not serve as allocation rules or be considered precedent setting if there are allocation controversies involving canary in the future.

Darkblotched

Short-term Long-term Tradeoff

The range of OYs for darkblotched are based on a new stock assessment and the question of whether to include more recent year classes. Reliability of the estimates of the strength of new year classes tends to be lower than for older year classes, for which more years of data are available. Preliminary indications are that the most recent year classes are strong. Inclusion of recent year classes leads to a higher ABC and OY. However, uncertainty about the most recent year classes means there is a greater probability that harvest based on preliminary data exceed that warranted by the true size of those year classes (Section 2.1.1.4). This uncertainty about year class strength is incorporated in the range of rebuilding models. The calculated rebuilding probability is the same for all three OYs, P_{MAX}=80%, the ABC will constrain the adopted OY to a more moderate level, decreasing the risk of not rebuilding that is associated with OY estimates based on more recent year classes.

Unlike black rockfish and bocaccio, a risk analysis for darkblotched rockfish to illustrate the expected long-term effect of managing under the wrong set of assumptions was not done[28/]. Harvest in excess of what would be appropriate if the true state of the stock were known will result in future restrictions in the fishery and reduced economic benefits. Harvest below what would be appropriate if the true state of the stock were known results in forgone harvest opportunities and economic benefits in the present.

28/ Terms of Reference did not stipulate that a risk analysis was required. In the future, all rebuilding analyses will include a risk analysis.

	Low OY	*Med OY*	*High OY*
ABC (2003 = 205 mt)	217 mt	240 mt	247 mt
OY (2003 = 172 mt)	172 mt	272 mt (constrained by ABC to 240 mt)	364 mt (constrained by ABC to 247 mt)
Assumption	Omits 2000 and 2001 year classes	Omits 2001 year classes	Omits no year classes.
Rebuilding Likelihood (P_{MAX}) for OYs unconstrained by ABC	80%	80%	80%

Geographic and Sector Distributions

The recreational fishery does not have significant impacts on darkblotched rockfish nor do nontrawl commercial fisheries. Placement of the outside boundaries of the RCA closures for the trawl fishery in the north is largely driven by the need to conserve darkblotched rockfish.

Lingcod

Short-term Long-term Tradeoff

There are two options being considered for the lingcod ABC and OY: (1) the status quo 2003 ABC and OY values (based on the 2001 rebuilding analysis) and (2) the projected 2004 ABC and OY based on the same rebuilding analysis (Section 2.1.1.5). The proposed change reflects the expected recovery of the stock assuming successful implementation of harvest mortality reduction measures and stock rebuilding at the rates calculated in the rebuilding model. The calculated probability of rebuilding is therefore the same as for status quo (P_{MAX}=60%). Under this current rebuilding harvest policy, rebuilding OYs should increase through 2008, at which time the OY would be 1,022 mt. In 2009 the stock is expected to be rebuilt. On the other hand, a P_{MAX} of 60% implies a 40% probability that harvest will need to be reduced in future years to achieve rebuilding. Future stock assessments will indicate whether or not rebuilding is on track and adjustments can be made.

	2004 OY
ABC (2003 = 841 mt)	1,385 mt
OY (2003 = 651 mt)	735 mt
Rebuilding Likelihood (P_{MAX})	60%

Geographic and Sector Distributions

Consideration was given to new allocation alternatives for lingcod based on 1993 to 1999 average catch shares, however, no such alternatives were generated because the groundfish fisheries were constrained largely by canary rockfish impacts. The Council stated that the lingcod harvest ratios resulting from management measures imposed for 2004 would not be considered precedent setting for future years and not constitute an allocation decision with respect to lingcod. Some adjustments were made to bag limits to take advantage of the increased harvest opportunity associated with the increased OY.

Pacific Ocean Perch

Short-term Long-term Tradeoff

The alternatives to *No Action* are based on a new rebuilding analysis, different rebuilding probabilities and target rebuilding year (Section 2.1.1.6). The *Medium OY* approximates the current level of risk but with the target year for rebuilding advanced from 2027 to 2026. The *Low OY* would decrease risk of not achieving the target rebuilding year as compared to *No Action*. The *High OY* would increase risk of not achieving the target rebuilding year as compared to *No Action*. Economically, the cost of falling behind schedule may be experienced in at least one of the following two ways (1) reduced harvest prior to the target year in order to accelerate stock rebuilding and get back on schedule, (2) delay in achievement of rebuilding until after the target year and hence deferred return to full fishing.

	Low OY	*Med OY*	*High OY*
OY (2003 = 377 mt)	318 mt	444 m	555 mt
Rebuilding Likelihood (P_{MAX}) (Status Quo = 70%)	80%	70%	60%
Rebuilding Year (Status Quo = 2027)	2026	2026	2026

Geographic and Sector Distributions

The groundfish trawl fishery is the primary sector harvesting POP. The recreational fishery does not have significant impacts on POP rockfish nor do nontrawl commercial fisheries.

Pacific Whiting

Short-term Long-term Tradeoff

The Pacific whiting OY is being ranged from the 2003 level by plus and minus 50% to provide full context to the alternative OY levels being considered for the remainder of the fishery. Absent the needed stock assessment no conclusions can be made about the long-term effect of this range. The 2004 OY for whiting will not be set until the spring of 2004 (Section 2.1.1.7). However, the OY for whiting interacts with the harvestable portion of the OY for other species. The level of harvest set in the whiting fishery will have substantial allocative implications for the total groundfish harvest opportunities in other sectors through its impact on other overfished species. The following overfished species are taken in the whiting fishery: widow rockfish, yelloweye rockfish, canary rockfish, darkblotched rockfish, POP and lingcod. Cowcod and bocaccio are taken at a very infrequent rate. There are also social and economic interactions as a result of some of the same vessels, processors and communities being involved in both the whiting and nonwhting groundfish fisheries. Therefore, in order to capture the breadth of possible biological and socioeconomic interactions with OYs set for other groundfish species, a range has been set that is expected to encompass the range of ABCs and OYs that may be considered in the spring of 2004.

	Low OY	*Med OY*	*High OY*
OY (2003 = 148,200 mt)	74,100 mt	148,200 mt	222,300 mt (increased to 250,000 at the September Council Meeting)

Geographic and Sector Distributions

Whiting is not taken as a target in the recreational fishery. There are no new allocation shares being considered for whiting. However, widow rockfish is expected to be a significant constraint on harvest opportunity in the commercial fisheries. The constraint on harvest that may result from the need to rebuild widow rockfish may generate issues regarding whether whiting restrictions to achieve reduction of widow impacts should be imposed before or after sector allocations are made. Interactions between whiting and widow rockfish are discussed in Section 4.5.2.2.

Sablefish

Short-term Long-term Tradeoff

The range of OYs for sablefish are based on the assumed F_{MSY} and recruitment relationships (Section 2.1.1.8). The biomass is predicted to be at less than 40% of its initial unfished biomass, therefore the 40-10 adjustment has been applied, reducing all OYs on a precautionary basis. No sensitivity analysis was provided on the effect of managing under a wrong assumption about the true state of nature (stock status and dynamics)[29/]. Absent additional strong year classes optimum yields are expected to decline in coming years (assuming average recruitment). As a result of recent strong recruitments biomass is expected to rise initially then decline unless a more conservative harvest policy is introduced or additional strong recruitments occur.

	Low OY	*Med OY*	*High OY*	*Council OY*
OY (2003 =6794)	4,812 mt	7,786 mt	8,423 mt	7,786
Assumptions	$F_{MSY}=F_{60\%}$ Recruitment dependent on density of parental stock	$F_{MSY}=F_{45\%}$ Recruitment dependent on density of parental stock	$F_{MSY}=F_{45\%}$ Recruitment driven more by environmental regime shifts than parental stock density	$F_{MSY}=F_{45\%}$ Recruitment dependent on density of parental stock

Geographic and Sector Distributions

No new sablefish allocation decisions were before the Council. Sablefish is primarily taken in commercial fishery and between sector allocation issues have largely been resolved.

Shortspine Thornyhead

Short-term Long-term Tradeoff

There are two options being considered for the shortspine thornyhead ABC and OY: (1) the status quo 2003 ABC and OY values (based on the 2001 assessment) and (2) the projected 2004 ABC and OY based on the same assessment (Section 2.1.1.9). The biomass is predicted to be at less than 40% of its initial unfished biomass, therefore the 40-10 adjustment has been applied, reducing the OYs on a precautionary basis.

	2004 OY
ABC (2003 = 1,044 mt)	1,030 mt
OY (2003 = 955 mt)	983 mt

Based on the current stock assessment (Piner and Methot 2001), the 2001 biomass was at 34% of virgin spawning biomass levels. The proposed harvest increase is part of a harvest policy that is expected to increase the stock to 41% of virgin spawning biomass levels by 2010, above the precautionary management level.

Geographic and Sector Distributions

The groundfish trawl fishery is the primary sector harvesting shortspine thornyhead. The recreational fishery does not have significant impacts on shortspine thornyhead nor do nontrawl commercial fisheries.

Widow Rockfish

Short-term Long-term Tradeoff

A new stock assessment was conducted for the 2004 fishery (Section 2.1.1.10). The range of OYs for widow rockfish is based on different levels of the assumed power coefficient for Santa Cruz midwater juvenile survey. Widow rockfish is overfished and the calculated probability of rebuilding is P_{MAX}=60%.

29/ Since sablefish is not assessed to be overfished, a rebuilding analysis has not been done.

	Low OY	*Med OY*	*High OY*
OY (2003 = 832 mt)	181 mt	284 mt	501 mt
Assumption	Power coefficient for Santa Cruz midwater juvenile survey = 0.2	Power coefficient for Santa Cruz midwater juvenile survey = 0.3	Power coefficient for Santa Cruz midwater juvenile survey = 0.4

The widow rockfish stock assessment included a risk analysis. Two important assumptions were varied in the base model (model generating the *Medium OY*) (1) whether or not recruitment is prespecified (RP) and (2) whether the stock-recruitment relationship is used to generate estimates of future recruitment (SR). Based on these models the following are the implications for rebuilding probabilities if the wrong assumptions were made (bold values reflect the Council's chosen management policy).

Model Used to Manage	2004 OY	Model 5 RP=No, SR=Yes	Model 2 RP=No, SR=No	Model 8 (Base Model) RP=Yes, SR=No
	Metric Tons	Probabilities of Rebuilding Within T_{MAX} Expressed as a Percent (Probability of No Decline in 100 Years)		
Model 5	35	49.9 (91.2)	80.4(100)	87.8(100)
Model 2	194	26.0 (75.4)	60.1 (100)	72.2 (100)
Model 8 (Base Model)	284	14.9 (61.8)	46.7 (100)	**60.1 (100)**
Model 9	501	2.6 (27.1)	18.1 (100)	30.9 (100)

A harvest policy resulting in a 501 mt OY for the 2004 fishery (power coefficient = 0.4) under conditions in which Model 8 best reflects the true state of nature, would result in a reduction of the rebuilding probability to 31%, but over 100 years would not be expected to result in a decline in stock biomass. If the fishery is managed under a Model 8harvest policy but the true state of nature is better reflected by Model 2, there is somewhat less than a 50% probability that the stock will be rebuilt by the target year: if Model 5 best reflects the true state of nature, that probability declines to 26%. These declines in rebuilding probabilities indicate an increased probability that future harvests would have to become more restricted in order to achieve rebuilding objectives. The current level of OY specified for widow rockfish is already creating allocation concerns in the commercial fishery and in the Pacific whiting fishery in particular. Further declines in OY would intensify the economic hardship and associated allocation disputes.

Geographic and Sector Distributions

Widow rockfish is taken largely by the commercial trawl fishery with some harvest by nontrawl gears and recreational fishers. Because of the small amounts harvested in most nontrawl fisheries and the lack of significant opportunity to gain much conservation benefits through restrictionsin these fisheries, it was decided that any constraints necessary to conserve widow would be born largely by the trawl sector and the trawl-whiting sector in particular. This has generated some allocation controversy with respect to whiting harvest. The issue of interaction of the whiting allocation and widow rockfish conservation measures is discussed in Section 4.5.2.2.

Yelloweye Rockfish

Short-term Long-term Tradeoff

While the ABC for yelloweye rockfish increased 1 mt, the change in the OY proposed for 2003 rounds to zero. Changes are based on the recovery trajectory projected in last year's rebuilding analysis (Section 2.1.1.11). The changes do not reflect any change in the expected long-term risk to the stock.

Geographic and Sector Distributions

There is some take of yelloweye rockfish in the recreational and commercial fisheries. No explicit allocation options were developed or new decisions made with respect to yelloweye rockfish allocation. The Council explicitly indicated that the default allocation of yelloweye rockfish resulting from harvest opportunities under the management measures should not be considered a precedent or otherwise bind future allocations.

Yellowtail Rockfish

Short-term Long-term Tradeoff

A new stock assessment was conducted for the 2004 fishery (Section 2.1.1.12). The stock is believed to be above B_{MSY}. The changes from the previous assessment were primarily the incorporation of updates of catch history information. The new stock assessment is considered the best available information and a range of OY alternatives to *No Action* was not generated. Stock assessment authors expressed concern that while spawning biomass has not declined since the early 1980s, the total biomass has generally declined since the 1960s. Continuation of the trend for poor recruitment seen in recent years would make it unlikely that biomass levels seen since the 1980's would be maintained. The spawning biomass is estimated to be 155% of the target spawning biomass. It therefore appears that there is some room for a decline before harvest levels and associated economic benefits would need to be cut back to maintain target biomass levels.

	2004 OY
ABC (2003 = 3,146 mt)	4,320 mt
OY (2003 = 3,146 mt)	4,320 mt

Geographic and Sector Distributions

The large majority of yellowtail rockfish is taken by trawl gear, but some is also taken with hook-and-line. Yellowtail catch is being constrained to below OY levels due to the need to conserve widow rockfish and canary rockfish. There are no new allocation issues pertaining to this stock.

4.5.1.3 Cumulative Impacts

Effects on harvest through time is considered a cumulative impact. Over the short-term, managing too conservatively under false assumptions results in forgone economic opportunity (harvest opportunity) that cannot be fully recovered by increasing harvest at a later date. Managing too liberally results in higher short-term benefit with a detrimental effect on stock biomass. Biomass depletion is not irreversible or irrecoverable as long as depletion is not too severe. Biomass levels may be rebuilt to desired levels though not without incurring the cost of future restrictions and economic hardship. The benefits illustrated in the direct and indirect impact analysis provide an indication of the size of economic benefits associated with the fishery as a whole. As overfished species recover, the groundfish fishery will expand, however, that expansion will be less than proportional to the increase in the OY of the overfished species. Specific estimates of economic impacts on fishery enterprises as a whole are difficult to develop because of natural variation in stock abundance, variation in the co-occurrence of species, changing social and economic circumstances and the wide range of management alternatives available to the Council to manage this dynamic system across the duration of stock recovery and rebuilding processes. Because of the tight relationship between the long-term cumulative impact and the short-term direct and indirect impacts, the effect of harvest through time was discussed in Section 4.5.1.2.

In addition to future actions, cumulative impacts include the effects of past management actions. To illustrate changes that have occurred in the fishery over the recent past, the summary presents projected indicators of economic activity for West Coast sport and recreational fisheries for each alternative in comparison to similar indicators for 1998; 1998 was chosen to represent the fishery as the last year before restrictions to protect and rebuild overfished species began to go into effect. In general, for the West Coast as a whole there has been a contraction in the commercial groundfish fishery while recreational fishing (all species) appears to have increased.

4.5.1.4 Summary

The following is a synaptic summary of the aggregate effects of actions pertaining to all OYs and the management measures that would achieve them under each option. Long-term economic impacts for the fishery as a whole are difficult to estimate. Important risk trade-offs (choices between short-term and long-term production) for individual species have been provided in Section 4.5.1.2.

	Alternatives					
	1998	No Action	*Low OY*	*Medium OY*	*High OY*	*Council OY*
Commercial Groundfish Exvessel Revenue (including tribal, $ millions, inflation adjusted)	$75.0	$52.9	$39.5	$55.0	$64.6	$54.6
Recreational Trips (all species) (mt)	2,878	3,430	4,738	5,183	5,330	4,303

TABLE 4.5.1-1. Harvest of black rockfish from Oregon and California north of San Francisco compared to 2004 OY options. (Page 1 of 1)

		Historic Harvests (2003 Cap)			
	OY	1998	2002	2003 (Cap)	1994-2003 Average
			Mt		
Oregon		625	368	453	515
California		202	249	131	246
Total		827	617	584	761
			Shares		
Oregon		0.76	0.60	0.78	0.68
California		0.24	0.40	0.22	0.32
OY Options			**OY Options Minus Historic Total Harvests (mt)**		
Low	729	-98	112	145	-32
Med	775	-52	158	191	14
High	861	34	244	277	100

Note: Values from 2003 Black Rockfish stock assessment.

TABLE 4.5.1-2. Black rockfish allocation and OY options (bold values are those that would not accommodate the low end of the range of cap options for the alternative specified in Table 4.5.1-3). (Page 1 of 1)

		OY Level			Change from Historic Harvest and 2003 Cap											
		Low	Med	High	1998			2002			2003 (Cap)			1994-2003 Average		
	Allocation Shares	729 mt	775 mt	861 mt	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High
					Mt											
Oregon	0.63	459	488	542	-166	-137	-83	91	120	174	6	35	89	-55	-26	28
California	0.37	**270**	**287**	**319**	68	85	117	21	38	70	139	156	188	23	40	72
Oregon	0.58	**423**	**449**	499	-202	-176	-126	55	81	131	-30	-4	46	-92	-65	-15
California	0.42	**306**	326	362	104	124	160	57	77	113	175	195	231	60	79	115
Oregon	0.56	**408**	**434**	482	-217	-191	-143	40	66	114	-45	-19	29	-106	-81	-33
California	0.44	**321**	341	379	119	139	177	72	92	130	190	210	248	74	95	132
Oregon	0.49	**357**	**380**	**422**	-268	-246	-203	-11	12	54	-96	-73	-31	-157	-135	-93
California	0.51	372	395	439	170	193	237	123	147	190	241	264	308	125	149	193
Oregon	0.65	474	504	560	-151	-122	-66	106	136	192	21	51	107	-41	-11	45
California	0.35	**255**	**271**	**301**	53	69	99	6	23	53	124	140	170	9	25	55
Oregon																
Max Alloc	0.65	474	504	560	-151	-122	-66	106	136	192	21	51	107	-41	-11	45
Min Alloc	0.49	357	380	422	-268	-246	-203	-11	12	54	-96	-73	-31	111	133	176
California																
Max Alloc	0.51	372	395	439	170	193	237	123	147	190	241	264	308	-143	-119	-76
Min Alloc	0.35	255	271	301	53	69	99	6	23	53	124	140	170	9	25	55

TABLE 4.5.1-3. Range of proposed caps (mt) on black rockfish by alternative (caps are management targets that may be set more conservatively than the OY and the allocation for each state). (Page 1 of 1)

	OY Level			Change from											
	Low	Med	High	1998			2002			2003 Cap			1994-2003 Average		
	729	775	861	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High
Oregon															
Cap (mt) - no range specified	452			-173			84			-1			-63		
Cap (mt) - Low		450	465		-175	-160		82	97		-3	12		-65	-50
Cap (mt) - High		481	534		-144	-91		113	166		28	81		-34	19
OR/CA Cap ratio (Oregon Low)		0.58	0.54												
OR/CA Cap ratio (Oregon High)		0.62	0.62												
California															
Cap (mt) - no range specified	350			148			101			219			104		
Cap (mt) - High		325	396		123	194		76	147		194	265		79	150
Cap (mt) - Low		294	327		92	125		45.3	78.3		163	196		48	81
OR/CA Cap ratio (Oregon Low)		0.42	0.46												
OR/CA Cap ratio (Oregon High)		0.38	0.38												

TABLE 4.5.1-4. Recreational and commercial harvest of canary rockfish compared to 2004 OY options. (Page 1 of 1)

	2004 OY Options	Historic Harvests (2003 Projection)[a/] 1998	2002[b/]	2003[c/]	1994-2003 Average
				Mt	
Recreational		88	18	15	78
Commercial		1,127	52	29	638
Total		1,215	70	44	716
				Shares[d/]	
Recreational		0.07	0.26	0.33	0.11
Commercial		0.93	0.74	0.67	0.89
				OY Options Minus Historic Total Harvests (mt) (excluding tribal harvest)	
OY Options					
Low	42	-1,173	-28	-2	-674
Med	46	-1,169	-24	3	-670
High	46	-1,169	-24	3	-670

a/ 1994-2001 commercial data from latest canary stock assessment (Methot and Piner, 2002)
b/ 2002 commercial data from PacFIN includes nominal canary.
c/ 2003 commercial data from Status Quo overfished species scorecard provided in Exhibit C.6. Attachment 1. The 2003 harvests and calculated shares are based on the most up-to-date projection for 2003. The 39:61 sport:commercial split proposed as an allocation option for the 2004 fishery is based on the overfished species scorecard for the 2003 fishery as it stood at the end of the September 2002 Council meeting.
d/ Shares for the 1994-2003 harvest are calculated as a weighted average. The unwaited average for the period would be 23% recreational and 77% commercial.

4.5.2 Commercial Fleets (Non-Tribal)

4.5.2.1 Criteria Used to Evaluate Impacts

Changes in exvessel revenue will be used as an indicator of the directions of change expected in net economic benefits derived from harvest by the commercial seafood vessels. Subgroups of the groundfish fleet will be examined to determine if any particular group is experiencing greater effects than others. The primary divisions will be between the limited entry trawl, limited entry fixed gear and open access fishery. The open access fishery will be divided between those vessels deriving more than 5% of their gross income from groundfish (vessels which may be more likely to engage in directed groundfish fishing) and those deriving less than 5% of their gross income from groundfish (vessels more likely to be taking groundfish incidental to other fishing activities.

A more accurate quantitative assessment of changes in exvessel revenue would require the inclusion of an assessment of the changes in fishing costs. Comprehensive information on fishing costs for the West Coast groundfish fishery is not available. There is some cost information available from surveys and studies on some segments of the fleet, however, this information is not comprehensive and has not been turned into a model that can be used to appraise effects of changes in harvest regulations on net fishing revenue. Additionally, estimates of net fishing revenue would need to be adjusted with appropriate shadow prices (the real cost after taking into account all opportunity costs) in order to use the results to generate estimates of social net economic benefits). For example, expenditures on harvest, such as the cost of labor, do not count as an economic opportunity cost if the labor would otherwise be unemployed. Additionally, if the labor would have been employed but at a lower earnings rate, then the difference between the earnings in the fishery and next best alternative employment would not be counted as a cost (i.e., only the next best wage rate would be counted as a cost). The cost of an existing vessel is another cost to the firm that would not be considered a cost from the national viewpoint of a social net benefit analysis. If firms cannot make a profit given the capital costs of an existing vessel, the vessel will tend to be resold at lower prices until the vessel price is low enough to make its operation economically viable. The vessel is likely to stay active so long as revenue is sufficient to cover the operation and maintenance costs of the vessel.) If profits in the fishery are such that a vessel is likely to be replaced if lost, the cost of the vessel would become a consideration in a long-term analysis.

Changes in operational flexibility resulting from regulatory constraints will be addressed qualitatively as an indicator of impacts on production costs.

Effects on human health and safety will be discussed primarily in terms of the effect of revenue changes on vessel maintenance and the effect of changes in the RCA on travel distances to fishing ports.

The cumulative impact section will discuss the effects of the recently implemented VMS system, the possible expansion of that system, and the possible implementation of trawl permit buyback and ITQ programs. These regulatory changes will be discussed in terms of their likely effects on vessel revenue and operational costs.

Changes in revenue will be used as an indicator of the magnitude of likely harvest pressure that may be brought to bear on adjacent fisheries as a result of reduction in opportunity in the groundfish fishery.

4.5.2.2 Direct and Indirect Impacts

Exvessel Revenue Effects

Effects on revenue have been estimated using the results from the trawl fleet participation model run by the GMT and adjusted for the low, medium, and high whiting OYs. The high whiting OY used was 222,300 mt.

At the September meeting the Council reset the high OY to 250,000 mt. Decision on the whiting OY will occur at a later date in a separate action.

For nontrawl vessels, estimates of changes in revenue have been generated based on changes in the sablefish OY, changes in the Pacific whiting OY, black and blue rockfish caps (for 2003), black rockfish caps (for 2004), and changes in the boundaries of the RCA and season closures. For each of these measures, it was assumed that every vessel was affected in proportion to its total harvest during the base period. For most of the fleet the 2002 fishery was used as the base period. Because this period included closures south of Cape Mendocino, for the nontrawl fishery fleet catch information from the 2000 fishery south of Cape Mendocino was used for the base period (the last year in which there was a year round fishery). To model the effects of the RCA, species and species groups were assigned to their primary depth strata (shallow nearshore, deeper nearshore, shelf and slope). Because species stray from the depth area with which they are primarily associated when a depth zone is closed, the regulations generally allow the retention of small amounts of the species in order to reduce bycatch. The ratio of the retention limits between the base period and the proposed management alternative was used to develop scalars which were then applied to historic catch information. This approach to estimating effects on nontrawl exvessel revenue for species other than sablefish has a number of shortcomings. On the one hand, ratios of trip limits are not necessarily good indicators of the degree to which a particular vessel will be constrained. For example, a vessel that is only taking half the limit during the base period will not be affected by a trip limit which reduces the allowable take by 50%. For this vessel a reduction based on the trip limit ratios would be overestimated. On the other hand, some vessels harvesting at close to the trip limits may choose to stop all participation in response to substantial reduction in the trip limits. For these vessels, the analytical approach presented here will under-estimate the degree of revenue reduction imposed by the trip limit reduction. While these two effects may offset each other to some degree, there is room for substantial improvement in the modeling of regulatory impacts for the nontrawl fishery. Therefore, results from this analysis are more likely to be appropriate for groups of vessels or entities affected by changes for groups of vessels (i.e. buyers/processors and communities), rather than individual vessels themselves.

Under the regulatory constraints associated with the *Council OY* and the *Medium OY* alternatives, nontribal commercial fishery revenue would be expected to be about $49 million, within a few percent of the projection for the 2003 fishery (a slight increase, Table 4.5.2-1). Under the *Low OY* alternative, groundfish revenue might decline by 24% (15% if whiting is not included). Under the *High OY* alternative, groundfish revenue might increase by 21% (9% if whiting is not included).

On average, under the *Council OY* alternative trawl vessels are projected to experience a minor decline in revenue as compared to the *No Action* (status quo) alternative (Table 4.5.2-2). Trawl vessels dependent on groundfish for between 95% and 100% of their revenue are projected to increase their groundfish revenue under the *Council OY* alternative. For fixed gear vessels, those with mid-level dependence on groundfish (between 35% and 65%) are projected to experience the greatest increase in revenue under the *Council OY* as compared to the *No Action* (status quo) alternative. Average groundfish revenue for open access vessels with more than 5% of their revenue from groundfish is much lower than for the limited entry vessels. Under the *Council OY* alternative, the largest groundfish revenue reduction for these vessels is projected for the group with 65% to 95% dependence on groundfish. This is also the group with the highest groundfish revenue per vessel. Dependence levels are calculated only based on West Coast at-sea deliveries and shoreside landings; revenue from other fisheries, such as those in Alaska or the West Pacific, is not included.

For all harvest vessel sectors, vessels with the greatest total revenue from all species are projected to have the greatest changes in groundfish income (positive or negative) compared to status quo projections. Trawl vessels with more than $200,000 of exvessel revenue from all fishing activities are projected to experience greater changes in total revenue from groundfish as compared to other trawl vessel revenue groups, under each of the alternatives to status quo (Table 4.5.2-3). A similar statement can be made with respect to limited entry longline and fishpot vessels. Compared to other open access vessel revenue groups, those with more than 5% of their income from groundfish and between $50,000 and $200,000 of exvessel revenue from all fishing activities are projected to experience greater changes in total revenue from groundfish under each of the alternatives to *No Action*.

Larger vessels are generally associated with greater capital investment than smaller vessels. For the limited entry fleet, the groundfish revenue of larger vessels is generally more affected by changes than the revenue for smaller vessels (Table 4.5.2-4). The primary exceptions to this are a few small trawl vessels. For the open access fleet, vessels in the 40' to 50' range are more affected under the *Low OY* alternative than other size ranges and vessels in the 50' to 60' range are more affected under the *High OY* alternative than other size ranges (comparing average revenue per vessel under the alternative to that projected for *No Action*).

Reduction in vessel net income can have effects beyond economic ones. Reduced investment in maintenance and safety equipment can increase hazard associated with fishing. Vessel owners seeking to maintain an economically viable fishing operation may choose to keep with current payment practices (based on shares), effectively reducing crew income. Reduced income opportunity for crews could cause dislocation for those who have the opportunity and desire to maintain or increase their income. Individuals willing to work for lower paying jobs are generally less skilled and have fewer alternative employment opportunities. This can further deteriorate safety conditions on the vessel as well as general operational efficiency. Compared with the *No Action* alternative, *Medium OY* and *Council OY* alternatives would have neutral to moderately positive impacts on vessel safety. The *High OY* alternative would allow the greatest enhancement of vessel safety, while the *Low OY* alternagive would be the least conducive to vessel safety.

Operation Costs

B Platoon

The *Council OY* alternative and *Medium OY* alternative include provisions that would eliminate the “B” platoon declaration option for the limited entry trawl fleet. The B platoon was first introduced as a management measure in the 1997 fishing year. Limited entry trawlers were allowed to choose whether they would participate in the A Platoon or B Platoon, with each platoon being subject to different fishing periods:

A Platoon	1/1 - 2/28	3/1 - 4/30	5/1 - 6/30	7/1 - 8/31	9/1 - 10/31	11/1 - 12/31	
B Platoon		1/16 - 3/15	3/16 - 5/15	5/16 - 7/15	7/16 - 9/15	9/16 - 11/15	11/16 - 12/31

Limited entry trawl permit owners are allowed to choose their platoon participation each year as part of their permit renewal process. Limited entry trawl vessels are automatically placed in the A Platoon, unless the permit owner chooses the B Platoon, which is then indicated on the permit. If a vessel is in the A Platoon, its cumulative trip limit periods begin and end on the beginning and end of a calendar month. For vessels in the B Platoon, cumulative trip limit periods begin on the 16th of the month and end on the 15th of the next month. Thus, for example, trip limits and other management measures that are effective September 1 through October 31 for the A Platoon will be effective September 16 through November 15 for the B Platoon. B Platoon vessels are prohibited from landing groundfish during the January 1 through January 15 period. For the November 16 through December 31 period, a B Platoon vessel will have the same cumulative trip limits as an A Platoon vessel would have for November 1 through December 31.

Since 1997, the number of vessels participating in the B Platoon has been fairly consistent. Out of the roughly 250 limited entry trawl permits, the following number of vessels have signed up for the B Platoon:

Year	1997	1998	1999	2000	2001	2002	2003
Number of vessels	21	23	18	24	24	31	29

Of the vessels that have participated in the B Platoon, 9 vessels have signed up as B Platoon vessels in every year the program has been offered.

A review of the effects of the B Platoon program requires a look at the periods when B Platoon vessels are fishing on cumulative limits and within allowable fishing areas that differ from those limits and areas applying to the A Platoon. Those periods in each fishing year have been March 1-15, May 1-15, July 1-15, September 1-15, and November 1-15. B Platoon vessels are not permitted to land groundfish during the January 1-15 period, although it appears from PacFIN data that some vessels have done so. The Council reviewed landings by B Platoon vessels by half-month periods for the years 1998-2002 and found that B Platoon vessels are most likely to take advantage of their lagged 15-day period in March 1-15, but that landings for the May, July, September, and November lagged periods are either not markedly different or are actually lower than their landings in the half-month periods they share with A Platoon vessels. Figure 4.5.2-1 shows landings by B Platoon vessels, by half-month periods for each year between 1998 and 2002. Figure 4.5.2-2 shows landings aggregated for each half-month period over 1998-2002. Thus, for example, Figure 4.5.2-2 shows an aggregation of all of the landings for March 1-15 for each of the years 1998-2002.

Platoon designation is essentially a regulatory measure used to separate vessel groundfish landings, a separation that in many cases could otherwise be accomplished through processor arrangements with their delivering vessels. Implementing this separation via regulation was initially challenging for fishery biologists and managers who were trying to account for landings made for the trawl fleet as a whole in different landings periods. In 2002, the use of the B Platoon became more challenging for biologists and managers because B Platoon vessels were operating out of sync with the bycatch model, which estimates bycatch levels for the fleet as a whole based on the major two-month cumulative limit periods used by the rest of the commercial fleet. The governmental costs associated with maintaining A and B Platoons increased again in 2003 with the introduction of trawl Rockfish Conservation Areas (RCAs). B Platoon vessels have had both their cumulative limits and their closed fishing areas lagged by two weeks. Thus, for 15 days every two months, B Platoon vessels have been operating with different closed area rules from A Platoon vessels. Management with RCA boundaries that change on a regular basis is already complex for the fishing fleet and for enforcement officers; allowing different closed areas for B Platoon vessel doubles this complexity for all involved in the fishery management process.

The governmental costs related to maintaining the opportunity for vessels to operate on a B Platoon schedule is a concern for the assessment of impacts to the public sector (Section 4.4). Here the concern is the effect of this policy on net value generated in the harvesting sector. The B Platoon opportunity provided some additional flexibility (harvest time options) that would be eliminated with the elimination of this provision. The elimination of the opportunity to operate in the fashion of the B Platoon will likely result in some increase in private cost associated with harvesting the same amount of fish as could be harvested on an A Platoon cycle. The principal applied here is that there is generally some cost associated with the reduction of choice (a restriction), particularly when the restriction will require a change in behavior. The presumption is that the fishing schedule afforded by the B Platoon opportunity was of some value to the vessels that exercised the opportunity. Total revenue opportunities will not change, but the costs of attaining those revenues can be expected to increase in some fashion. The analysis shows that March was the primary period in which it was markedly noticeable that some vessels took advantage of the opportunity to deliver on the B Platoon schedule. For that period in particular, the cost of eliminating the B Platoon option may be incurred as the result of fishing in poorer weather, thus increasing safety issues, or fishing harder to take advantage of opportunities in the groundfish fishery and other fisheries.

Management Lines for the RCA

Vessel costs and safety are affected by the placement of lines delineating the RCA closure. Costs may be affected by increases in transit distances and/or reductions in catch per unit effort. If catch per unit effort declines, effort-related costs would increase for vessels to bring in the same amount of catch. Revenues may decline if vessels are unable to take their full limits in the remaining open areas. In the current model the only reduction in revenue anticipated as a result of depth closures is that related to a reduction in the bycatch of certain species as a result of shifted catch location. Operational costs may also increase for vessels forced to fish in greater depths. Closed areas may also affect vessel safety if vessels are forced to transit greater distances to fishing grounds.

Impacts of RCAs on transit vary by region of the coast (Figures 4.5.2-3 through 4.5.2-5). Along the coast from Coos Bay, Oregon north, vessels must generally travel between 20 and 40 nautical miles out of port in order to get beyond the trawl RCA. From Moss Landing, California south, the travel distances to get outside the trawl RCA boundaries are generally between 10 and 20 nautical miles.

In general, under the *Council OY* alternative, the RCAs will be contracted and narrower in 2004 than they were in 2003. This is particularly true for the area south of Cape Mendocino where the trawl RCA shoreward boundary will vary from 75 to 100 fathoms and the outside boundary will be steady at 150 fathoms. In 2003 the inside boundary varied from 50 to 60 fathoms and the outside boundary varied from 200 to 250 fathoms. North of Cape Mendocino, in the early part of the year the inside boundary of the trawl RCA will be moved closer to shore as will the outside boundary, reducing the distance vessels must travel to reach deeper fishing grounds. Later in the year the outer boundary will be more comparable to the 2003 boundary while the inside boundary will be moved further out (specific boundaries for all alternatives are provided as part of the description of the alternatives in Chapter 2).

For the nontrawl fisheries, the boundaries north of Cape Mendocino would generally be similar to the 2003 fishery. However, the *Council OY* alternative includes a provision to allow the outside boundary of the nontrawl RCA to be moved out to 175 fathoms if new information from the observer program indicates that such a move is needed to preserve fishing opportunity while meeting conservation objectives for particular stocks. Such a change would have safety and cost impacts along the lines of those discussed in the previous paragraph. South of Cape Mendocino to 34º27' latitude north, the nontrawl RCA inside boundaries will generally move from 20 fathoms to 30 fathoms. South of 34º27' latitude north, the inside boundary would move from 20 fathoms to 60 fathoms. The outside boundaries would generally remain at 150 fathoms.

Whiting Fishery and Widow Constraints

Economic impacts were estimated using the Pacific whiting OYs and allocations specified in Table 4.5.2-5. The Council will specify its OY for whiting in 2004, prior to the start of the 2004 whiting fishery. While no OY has been chosen at this time, for purposes of economic modeling, the *No Action* alternative (status quo) is assumed. For Pacific whiting, the *No Action* alternative is identical to the *Medium OY* alternative.

For the whiting fishery an average of the 1998 through 2003 bycatch rates is used to develop estimates of bycatch. The 2003 information was added after the September Council meeting at the request of the Council. It is noted that 2003 bycatch rates for the shoreside sector are final estimates, but are incomplete for the at-sea sectors, which were still fishing as this EIS went to press. The 2003 at-sea sector bycatch rates were calculated by applying observed bycatch rates by sector through September 25, 2003 to the at-sea sector allocations. Bycatch rates in the 2003 fishery appear to be lower than previous years (Table 4.5.2-6), purportedly because of higher abundance of whiting, resulting in easier targeting on concentrations with lower co-occurrence of other species, as compared to the years immediately preceding 2003. While whiting stock abundance was also high in the late 1990s, fishers were not trying to avoid the overfished species that are currently the subject of bycatch problems. As bycatch of species such as widow have become a concern, fishers changed their fishing practices to reduce the probability of bycatch in whiting fisheries. It has been suggested that the recent increase in whiting abundance will allow further reduction in bycatch rates (Table 3.5.2-18). One explanation of the potential "high whiting abundance" effect in reducing widow impacts is, with high whiting abundance, there is less searching for whiting. Widow rockfish are more abundant off Oregon and southern Washington, and this is presumably where the highest bycatch might be expected to occur. When whiting are abundant, the at-sea fleet based out of Seattle, does not have to venture far south of northern Washington to get their whiting, and therefore would incur less of a widow impact.

Prior to the Council meeting, an analysis of bycatch rates was conducted based on 1998 through 2002 bycatch data. In those data (as in the updated information in Table 3.5.2-18), there was considerable variability in bycatch rates. This variability is likely to have policy implications. For 1998 through 2002, the smallest range of bycatch rates was for canary rockfish in the shoreside whiting fishery, for which the high end of the range was only 1.7 times the low end. The greatest range was for darkblotched rockfish in the shoreside whiting fishery, for which the high end of the range was over 2,000 times the low end. Bycatch rates are substantially influenced by the rare occurrence of a "disaster tow" (a tow composed largely of one or more species other than whiting). There is concern that for the 2004 fishery, a few disaster tows might easily use all of the widow rockfish impacts planned for a sector in the overfished species "scorecards" provided in Chapter 2. The two whiting fisheries occur at a different times of year, with the shoreside season opening first. Questions to consider include whether one whiting sector's projected impacts should be considered a cap on the sector, such that if the cap were reached the sector would be shut down, and whether one sector's harvest in excess of the cap should affect the fishing opportunity of other sectors. Anticipation of the possibility that unexpected harvests of overfished species might shut down a whiting sector could exacerbate the "race for fish" in the shoreside and mothership sectors. A race for fish would not be expected for the catcher-processor sector because those vessels fish together as part of a cooperative. A decision on these issues may be part of the Council action next spring, when it sets the whiting OY. If the whiting OY is reduced to anticipate widow impacts, tribal allocation issues will also arise.

Economic impacts of the alternatives have been modeled assuming full harvest of the whiting OY. However, bycatch issues for overfished species could constrain harvest below OY levels. Using the 1998 to 2002 average widow rockfish bycatch rates (estimates of widow rockfish take in non-whiting groundfish fisheries available prior to the September Council meeting) and whiting allocation formulas, the following were the estimated reductions in whiting OY projected to be necessary to stay within the widow rockfish OY (Note: no whiting OY reduction was projected under the *High OY* alternative, which was unconstrained by the higher widow OY (Table 2.2.4-1)).

(August 2003 Estimates)	*Low OY* alternative	*Medium OY* alternative
Specified OY	74,100	148,200
Reduction to Achieve Widow OY	-13,900	-28,000
Tribal	-2,433	-3,965
Commercial OY	-11,468	-24,035
Motherships	-2,752	-5,768
Catcher-Processors	-3,899	-8,172
Shoreside (excluding pollock EFP)	-5,816	-11,095

Impacts on Adjacent Fleets

In recent years, adjacent fleets have been impacted when vessels seek to make up lost fishing opportunity in the groundfish fishery by increasing revenue in other fisheries. Adjacent fisheries may also benefit over the short term if an expansion in the groundfish fishery absorbs effort that might otherwise be directed to the adjacent fisheries. The *Low OY* alternative would have contracted opportunity in the groundfish fishery relative to the 2003 fishery and the *High OY* alternative would have increased that opportunity. The *Medium OY* and *Council OY* alternatives are very similar to 2003 in terms of projected revenue and therefore are likely to have little short term effect on adjacent fisheries.

4.5.2.3 Cumulative Impacts

It is not possible to distinguish differences in cumulative impacts among alternatives. The following cumulative impacts would be present under all alternatives.

Exvessel Revenue

Total exvessel revenue from groundfish generally ran close to or over $100 million dollars through 1997 (adjusted for inflation to 2001 dollars, Table 3.5.1-4). In 1998, exvessel revenue declined to $75 million and declined to the $60 million level in 2001 (including tribal landings). Thus the increase projected for the *Council OY* alternative (from $52.9 million in 2003 to $54.6 million for 2004) leaves the fishery at levels far below the long-term average.

Trawl Buyback

Trip limits and hence vessel revenues may increase inseason to levels above those projected for the *Council OY* alternative if landings show a decline as a result of the trawl buyback program. The implementation of a buyback program will be accompanied by a per pound landings fee, increasing vessel costs. The fee rate has yet to be determined but will not exceed 5% of the value of the deliveries and will be less if NMFS determines that a lower fee is sufficient to payback money borrowed for the program within 30 years. While impacting fiscal viability of harvesting operations, from a national perspective, this fee covers a cost that would be accounted for as part of the government costs. It would therefore show up as a transfer payment, rather than an additional cost to be balanced against total benefits.

A referendum was held to establish whether permit holders in seven fee-paying fisheries involved in the buyback (groundfish, excluding catcher-processors; Dungeness crab fisheries in Washington, Oregon and California; and pink shrimp fisheries in Washington, Oregon and California) consent to the landing fees to fund the program. These fees would, over the next 30 years, repay a nearly $36 million buyback loan financing about 78% of the buyback's $45,752,471cost.

Since the referendum was successful, 92 vessels (all of which participate in the groundfish limited entry trawl fishery) will be permanently removed from all worldwide fishing, 240 permits will be permanently relinquished as well. The vessels that will be retired account for 34.98% of total groundfish trawl permits and from 1.29% to 40.26% of total permits in each of the six fee-share fisheries. These vessels also account for 46.04% of total gross groundfish trawl revenues (excluding whiting) and from 1.13% to 29.70% of similar revenues in each of the six other fee-share fisheries. All told, these vessels involve annual gross revenues of a little over $20 million. The effect of the buyback program on trip limits will depend on whether relatively inactive permits become more active as individuals leaving the retired vessels seek to continue to employ their specialized skills on other West Coast vessels.

Since the analysis was done before the results of the buyback program were known, two scenarios were analyzed to assess the possible effects of implementing a fleet buyback program in 2004. The *Medium OY* alternative was used as the base alternative and trawl fleet sizes were varied. The first scenario is based on an approximately 50% reduction in the number of trawl vessels and the second on an approximately 33% reduction in the number of trawl vessels. As an example of the potential effect of fleet reductions, under the 50% reduction scenario, north of Cape Mendocino the inside management line of the RCA boundary could be moved from 60 fathoms to 75 fathoms for March through June and trip limits from May through December approximately doubled for DTS species in the absence of usage of a small foot rope. An approximate doubling of limits for the same species and periods would occur in the south of Cape Mendocino as well. The 33% reduction scenario showed trip limit increases for DTS species of roughly 50%. The effect on average vessel revenues as compared to 2002 revenues were as follows:

	Medium OY	*Medium OY* with 50% Fleet Reduction	*Medium OY* with 33% Fleet Reduction
All Trawl Vessels			
Number of Vessels	207	106	141
Percent Change in Groundfish Revenue (compared to 2002)	27%	127%	71%
Non-whiting Trawl Vessels			
Number of Vessels	174	89	116
Percent Change in Groundfish Revenue (compared to 2002)	9%	56%	34%

VMS Implementation

Implementation of a new VMS system beginning in 2004 will impose additional costs on groundfish limited entry vessels. VMS allows shoreside personnel to remotely track vessel locations and determine vessel compliance with depth-based restrictions (see Section 4.4 for additional discussion). Depth-based restrictions are a fundamental aspect of the current groundfish management regime, necessary to reduce bycatch of overfished species. These depth restrictions have provided significantly greater fishing opportunity than might have been allowed under a system without depth-based restrictions. For example, the EIS for the 2003 annual specifications projected exvessel revenues of $45 million and $38.6 million for management alternatives with and without depth management, respectively. While depth management has allowed greater harvest, fathom contours and RCA boundaries can be complex in shape and, therefore, difficult to follow and enforce, particularly in deep water. Therefore, the Council recommended VMS measures be required in 2003 for groundfish fishery limited entry vessels. As a result of delays in implementation, VMS will not be required on trawl vessels until the start of the 2004 fishery.

VMS units are expected to cost around $800 per vessel, cost between $1.50 and $5.00 per day to operate, and require not more than four hours to install and about four hours per year of maintenance a year. VMS units may also have some safety benefits in helping to locate vessels in trouble at sea.

The Council has directed the VMSC to evaluate extension of VMS technology to aid in enforcement of other segments of the fishery. If these requirements are extended, other segments of the groundfish fleet may need to bear additional expenses in future years. It is unlikely the program would be extended beyond the limited entry fleet for the 2004 fishery, due to the time required to analyze the issues and adopt regulations.

As described in Section 2.2.5.2, the Council asked that NMFS implement, with the publication of the 2004 specifications and management measures, a requirement that limited entry vessels with fixed gear endorsements be prohibited from activities other than continuous transit when in a non-trawl conservation area. The need for an adequate VMS program that aides in maintaining the integrity of the more liberal depth-based management regime must be balanced with other fishery needs, such as vessel safety. Management regulations that restrict fishing seasons or areas can affect safety. Management measures may result in an increased likelihood of fishers operating in extreme weather or taking undue risks. Fishery participants have indicated that management measures resulting in the closures of nearshore areas can result in small or unsafe vessels operating farther offshore and in areas with harsher conditions, farther from ports where emergency assistance is deployed, or in areas with increased commercial vessel traffic. There is a safety concern with smaller vessels staying for extended periods in far, offshore fishing areas because it can be expected to result in longer exposure to harsh weather conditions, especially during winter months. This problem is compounded by the relatively small size (less than 60 feet) and slow speed of many vessels. Small vessels are not able to withstand rough seas as well as larger vessels. Fishery participants indicated that prohibiting fixed gear vessels from drifting within the nontrawl RCAs would require them to incur the added costs to return to port or move into deeper waters at night, while fishers sleep. Moving into deep waters while drifting was viewed as a safety concern by fishers. However, navigational rules promulgated by 33 U.S.C. Sections 1601-1608, which are intended to allow for a full appraisal of the navigational situation to avoid the risk of collision, require vessels to maintain a proper look-out by sight, as well as by hearing and all other available means appropriate to the circumstances and conditions.

Individual Quotas

The Council will be considering individual quotas for the trawl fishery. While such a program will not be implemented in 2004, substantial economic effects may be anticipated if the program is implemented in coming years. Among these would be a consolidation of most harvest among fewer vessels, more profitable harvesting businesses, increased flexibility in operation and safety, fewer but better paying jobs, reduced need for vessel support services in local communities, increased costs associated with the monitoring of catch and landings.

4.5.2.4 Summary

The following is a very general summary of the information discussed in the previous sections. This information is summarized from the vessel perspective. For example, elimination of the "B" platoon will result in cost savings for fishery enforcement but here it is indicated that there is the possibility of some cost increase for vessels that would have chosen the "B" platoon option.

		Alternatives				
	1998	*No Action* (Status Quo, 2003)	*Low OY*	*Medium OY*	*High OY*	*Council OY*
Commercial Groundfish Exvessel Revenue (millions of dollars, no inflation adjustment)						
- Whiting	$11.6	$15.3	$7.6	$15.3	$23.1	$15.3
- Trawl Nonwhiting GF	$34.5	$22.9	$21.2	$23.6	$24.0	$22.8
- Nontrawl	$16.7	$12.1	$8.7	$13.1	$14.2	$13.5
Other Compliance Costs						
-RCA			Generally smaller than 2003	Generally smaller than 2003	Generally smaller than 2003	Generally smaller than 2003
-"B" Platoon			Same as 2003	Option eliminated (some cost increase, simplified regs)	Same as 2003	Option eliminated (some cost increase, simplified regs)
-Impact on Adjacent Fleets			Possible short-Term increase in pressure	Similar to 2003	Possible short-Term increase in pressure	Similar to 2003
Safety			Negative	Neutral to positive	Positive	Neutral to positive
Cumulative						
VMS		Imposed on the trawl fleet in 2004. Capital and operation costs are associated with the requirement. May be extended to other portions fo the groundfish fleet in coming years.				
Buyback		Referendum occurring now. Industry costs of approximately $36 million. May result in higher trip limits after permits are retired. Possibly in mid-2004.				
ITQs		Under consideration in the long-term. May result in consolidation within the fleet and increased efficiency. There will be monitoring and enforcement costs, some of which will likely be born by industry.				

TABLE 4.5.2-1a. Reported 2002 West Coast fishery exvessel revenue for the commercial fishery and projections for status quo and the management alternatives (tribal fisheries included). (Page 1 of 1)

			Alternatives			
	2002	Projection for 2003	Low OY	Medium OY	High OY	Council OY
	Reported & Projected Exvessel Revenue ($ millions)					
All Council Managed Groundfish (Including Shoreside & At-Sea Whiting)	51.6	52.9	39.5	55.0	64.6	54.6
All Council Managed Groundfish Except Catch-Processor Whiting Deliveries	47.7	48.5	37.3	50.6	57.6	50.2
All Council Managed Groundfish Except At-sea Whiting Deliveries	42.5	42.7	34.4	44.7	49.4	44.3
All Council Managed Groundfish Except Whiting Deliveries	38.0	37.7	31.9	39.7	41.5	39.3
All West Coast Landings & At-Sea Deliveries (Including Shoreside & At-Sea Whiting)	225.0	226.3	212.8	228.4	237.9	228.0
All West Coast Landings & Deliveries Except Catch-Processor Whiting Deliveries	221.0	221.9	210.6	223.9	230.9	223.5
All West Coast Landings & Deliveries At-Sea Whiting Deliveries	215.8	216.1	207.7	218.1	222.8	217.7
All West Coast Landings & Deliveries Whiting Deliveries	211.3	211.0	205.2	213.0	214.8	212.6
	Change Relative to Projection for 2003 ($ millions)					
All Council Managed Groundfish (Including Shoreside & At-Sea Whiting)			-13.5	2.1	11.6	1.7
All Council Managed Groundfish Except Catch-Processor Whiting Deliveries			-11.2	2.0	9.1	1.7
All Council Managed Groundfish Except At-sea Whiting Deliveries			-8.3	2.0	6.7	1.6
All Council Managed Groundfish Except Whiting Deliveries			-5.8	2.0	3.8	1.6
All West Coast Landings & At-Sea Deliveries (Including Shoreside & At-Sea Whiting)			-13.5	2.1	11.6	1.7
All West Coast Landings & Deliveries Except Catch-Processor Whiting Deliveries			-11.2	2.0	9.1	1.7
All West Coast Landings & Deliveries At-Sea Whiting Deliveries			-8.3	2.0	6.7	1.6
All West Coast Landings & Deliveries Whiting Deliveries			-5.8	2.0	3.8	1.6
	Change Relative to Projection for 2003 (percent)					
All Council Managed Groundfish (including Shoreside & At-Sea Whiting)			-25%	5%	21%	3%
All Council Managed Groundfish Except Catch-Processor Whiting Deliveries			-23%	5%	18%	3%
All Council Managed Groundfish Except At-sea Whiting Deliveries			-20%	6%	15%	3%
All Council Managed Groundfish Except Whiting Deliveries			-15%	6%	10%	4%
All West Coast Landings & At-Sea Deliveries (including Shoreside & At-Sea Whiting)			-6%	1%	5%	1%
All West Coast Landings & Deliveries Except Catch-Processor Whiting Deliveries			-5%	1%	4%	1%
All West Coast Landings & Deliveries At-Sea Whiting Deliveries			-4%	1%	3%	1%
All West Coast Landings & Deliveries Whiting Deliveries			-3%	1%	2%	1%

TABLE 4.5.2-1b. Reported 2002 West Coast fishery exvessel revenue for the commercial fishery and projections for status quo and the management alternatives (tribal fisheries excluded). (Page 1 of 1)

	2002	Projection for 2003	Alternatives: Low OY	Medium OY	High OY	Council OY
	Reported & Projected Exvessel Revenue ($ millions)					
All Council Managed Groundfish (Including Shoreside & At-Sea Whiting)	47.2	47.5	36.0	49.3	58.1	48.9
All Council Managed Groundfish Except Catch-Processor Whiting Deliveries	43.3	43.1	33.8	44.8	51.1	44.4
All Council Managed Groundfish Except At-sea Whiting Deliveries	40.5	40.0	32.3	41.7	46.2	41.3
All Council Managed Groundfish Except Whiting Deliveries	35.9	35.0	29.8	36.6	38.2	36.2
All West Coast Landings & At-Sea Deliveries (Including Shoreside & At-Sea Whiting)	215.9	216.2	204.7	218.0	226.8	217.6
All West Coast Landings & Deliveries Except Catch-Processor Whiting Deliveries	212.0	211.8	202.5	213.5	219.8	213.1
All West Coast Landings & Deliveries At-Sea Whiting Deliveries	209.2	208.7	201.0	210.4	214.8	210.0
All West Coast Landings & Deliveries Whiting Deliveries	204.6	203.7	198.5	205.3	206.9	204.9
	Change Relative to Projection for 2003 ($ millions)					
All Council Managed Groundfish (Including Shoreside & At-Sea Whiting)			-11.5	1.7	10.6	1.4
All Council Managed Groundfish Except Catch-Processor Whiting Deliveries			-9.3	1.7	8.0	1.3
All Council Managed Groundfish Except At-sea Whiting Deliveries			-7.7	1.7	6.2	1.3
All Council Managed Groundfish Except Whiting Deliveries			-5.2	1.6	3.2	1.3
All West Coast Landings & At-Sea Deliveries (Including Shoreside & At-Sea Whiting)			-11.5	1.7	10.6	1.4
All West Coast Landings & Deliveries Except Catch-Processor Whiting Deliveries			-9.3	1.7	8.0	1.3
All West Coast Landings & Deliveries At-Sea Whiting Deliveries			-7.7	1.7	6.2	1.3
All West Coast Landings & Deliveries Whiting Deliveries			-5.2	1.6	3.2	1.3
	Change Relative to Projection for 2003 (percent)					
All Council Managed Groundfish (including Shoreside & At-Sea Whiting)			-24%	5%	21%	2%
All Council Managed Groundfish Except Catch-Processor Whiting Deliveries			-22%	5%	18%	3%
All Council Managed Groundfish Except At-sea Whiting Deliveries			-19%	5%	15%	3%
All Council Managed Groundfish Except Whiting Deliveries			-15%	5%	9%	3%
All West Coast Landings & At-Sea Deliveries (including Shoreside & At-Sea Whiting)			-5%	1%	5%	1%
All West Coast Landings & Deliveries Except Catch-Processor Whiting Deliveries			-4%	1%	4%	1%
All West Coast Landings & Deliveries At-Sea Whiting Deliveries			-4%	1%	3%	1%
All West Coast Landings & Deliveries Whiting Deliveries			-3%	1%	2%	1%

TABLE 4.5.2-2. Projected average exvessel groundfish revenue per vessel and total revenue for the sectors under each alternative by level of vessel dependence on groundfish (thousands of dollars, catcher-processors excluded). (Page 1 of 2)

Dependence on Groundfish	Number of Vessels	Alternatives: (Status Quo) 2003 Projection	Low OY	Medium OY	High OY	Council OY
Limited Entry Trawl						
>0% & <5%	6	1.1	0.9	1.1	1.1	1.0
>5% & <35%	27	81.8	68.5	81.1	87.8	78.3
>35% & <65%	46	126.1	104.6	129.7	146.3	124.2
>65% & <95%	66	164.5	131.4	166.7	194.2	161.3
>95% & <100%	74	164.6	132.7	170.2	201.7	168.5
Sector Average		141.8	114.9	145.0	168.3	141.3
Sector Total	219	31,056.7	25,163.9	31,763.4	36,848.2	30,950.6
Limited Entry Longline and Fishpot						
>0% & <5%	12	2.2	1.6	2.5	2.8	2.5
>5% & <35%	38	45.1	33.2	52.7	56.8	52.7
>35% & <65%	36	64.8	47.2	74.5	80.3	75.1
>65% & <95%	33	54.3	40.9	60.3	64.5	60.9
>95% & <100%	34	57.1	39.0	56.5	60.7	57.3
Sector Average		51.0	36.9	56.4	60.6	56.8
Sector Total	153	7,806.5	5,653.0	8,624.3	9,273.1	8,693.5
Open Access with >5% Revenue from Groundfish						
>5% & <35%	216	3.3	2.3	3.5	4.0	3.7
>35% & <65%	68	5.3	3.7	5.6	6.3	6.1
>65% & <95%	90	7.5	5.6	7.8	8.5	8.6
>95% & <100%	404	5.7	3.9	5.8	6.6	6.3
Sector Average		5.2	3.6	5.4	6.0	5.8
Sector Total	778	4,050.7	2,822.3	4,181.5	4,703.3	4,545.2
Open Access with <5% Revenue from Groundfish						
>0% & <5%	590	0.3	0.2	0.3	0.4	0.4
Sector Average		0.3	0.2	0.3	0.4	0.4
Sector Total	590	193.9	139.0	204.7	228.2	214.7
Fishery Average		24.8	19.4	25.7	29.3	25.5
Fishery Total	1740	43,107.8	33,778.2	44,773.9	51,052.8	44,403.9

TABLE 4.5.2-2. Projected average exvessel groundfish revenue per vessel and total revenue for the sectors under each alternative by level of vessel dependence on groundfish (thousands of dollars, catcher-processors excluded). (Page 2 of 2)

Dependence on Groundfish	Number of Vessels	Alternatives				
		(Status Quo) 2003 Projection	Low OY	Medium OY	High OY	Council OY
Change Relative to Status Quo						
		Limited Entry Trawl				
>0% & <5%			-0.2	-0.1	-0.0	-0.1
>5% & <35%			-13.2	-0.7	6.1	-3.4
>35% & <65%			-21.5	3.6	20.2	-1.9
>65% & <95%			-33.1	2.2	29.6	-3.2
>95% & <100%			-31.9	5.6	37.1	3.9
Sector Average			-26.9	3.2	26.4	-0.5
Sector Total			-5,892.9	706.6	5,791.4	-106.2
		Limited Entry Longline and Fishpot				
>0% & <5%			-0.6	0.4	0.6	0.3
>5% & <35%			-11.9	7.6	11.7	7.6
>35% & <65%			-17.6	9.7	15.5	10.3
>65% & <95%			-13.4	5.9	10.1	6.5
>95% & <100%			-18.1	-0.6	3.6	0.2
Sector Average			-14.1	5.3	9.6	5.8
Sector Total			-2,153.5	817.8	1,466.6	887.0
		Open Access with >5% Revenue from Groundfish				
>5% & <35%			-1.0	0.2	0.6	0.4
>35% & <65%			-1.6	0.3	1.0	0.8
>65% & <95%			-1.9	0.3	1.0	1.1
>95% & <100%			-1.8	0.1	0.9	0.6
Sector Average			-1.6	0.2	0.8	0.6
Sector Total			-1,228.3	130.8	652.6	494.5
		Open Access with <5% Revenue from Groundfish				
>0% & <5%			-0.1	0.0	0.1	0.0
Sector Average			-0.1	0.0	0.1	0.0
Sector Total			-54.9	10.8	34.4	20.8
Fishery Average			-5.4	1.0	4.6	0.7
Fishery Total			-9,329.6	1,666.4	7,945.1	1,296.1

TABLE 4.5.2-3. Projected average exvessel groundfish revenue per vessel and total revenue for the sectors under each alternative by average vessel revenue from all species (thousands of dollars, catcher-processors excluded). (Page 1 of 1)

Revenue Per Vessel (All Species)	Number of Vessels	Alternatives: (Status Quo) 2003 Projection	Low OY	Medium OY	High OY	Council OY
Limited Entry Trawl						
<$5,000	3	6.3	5.6	7.2	7.5	8.2
$5,000-$50,000	12	19.0	17.7	19.2	19.6	17.6
$50,000-$200,000	102	109.5	96.6	112.5	120.1	112.1
>$200,000	102	192.5	147.9	196.4	238.7	189.0
Sector Average	219	141.8	114.9	145.0	168.3	141.3
Limited Entry Longline and Fishpot						
<$5,000	4	0.7	0.5	0.7	0.9	0.9
$5,000-$50,000	46	27.7	19.0	28.0	30.3	28.7
$50,000-$200,000	82	52.2	38.4	57.7	61.8	58.1
>$200,000	21	107.2	77.5	124.0	133.9	124.1
Sector Average	153	51.0	36.9	56.4	60.6	56.8
Open Access with >5% Revenue from Groundfish						
<$5,000	353	0.7	0.4	0.7	0.8	0.7
$5,000-$50,000	360	6.9	4.8	7.2	8.1	7.8
$50,000-$200,000	64	19.1	13.7	20.0	22.3	21.7
>$200,000	1	103.9	54.6	86.5	93.6	86.8
Sector Average	778	5.2	3.6	5.4	6.0	5.8
Open Access with <5% Revenue from Groundfish						
<$5,000	58	0.0	0.0	0.0	0.0	0.0
$5,000-$50,000	276	0.1	0.1	0.1	0.1	0.1
$50,000-$200,000	207	0.5	0.3	0.5	0.6	0.6
>$200,000	49	1.2	0.9	1.3	1.4	1.3
Sector Average	590	0.3	0.2	0.3	0.4	0.4
Fishery Average	1740	24.8	19.4	25.7	29.3	25.5
Limited Entry Trawl						
<$5,000			-0.7	0.9	1.2	2.0
$5,000-$50,000			-1.3	0.2	0.5	-1.4
$50,000-$200,000			-12.9	3.0	10.6	2.6
>$200,000			-44.7	3.9	46.1	-3.5
Sector Average						
Limited Entry Longline and Fishpot						
<$5,000			-0.2	0.1	0.2	0.2
$5,000-$50,000			-8.7	0.3	2.6	0.9
$50,000-$200,000			-13.7	5.5	9.6	5.9
>$200,000			-29.7	16.8	26.7	16.9
Sector Average			-14.1	5.3	9.6	5.8
Open Access with >5% Revenue from Groundfish						
<$5,000			-0.3	-0.0	0.1	0.0
$5,000-$50,000			-2.1	0.3	1.2	0.9
$50,000-$200,000			-5.4	0.9	3.2	2.6
>$200,000			-49.3	-17.4	-10.3	-17.1
Sector Average			-1.6	0.2	0.8	0.6
Open Access with <5% Revenue from Groundfish						
<$5,000			-0.0	-0.0	0.0	0.0
$5,000-$50,000			-0.0	-0.0	0.0	0.0
$50,000-$200,000			-0.1	0.0	0.1	0.1
>$200,000			-0.3	0.1	0.2	0.1
Sector Average			-0.1	0.0	0.1	0.0
Fishery Average			-5.4	1.0	4.6	0.7

TABLE 4.5.2-4. Projected average exvessel groundfish revenue per vessel under each alternative by vessel length category (thousands of dollars, catcher-processors excluded). (Page 1 of 2)

		Alternatives				
Dependence on Groundfish	Number of Vessels	(Status Quo) 2003 Projection	Low OY	Medium OY	High OY	Council OY
Limited Entry Trawl						
<40'	4	21.5	26.7	27.2	27.2	27.6
40'-50'	27	60.8	60.1	64.3	65.2	62.0
50'-60'	61	116.0	105.7	118.7	121.2	116.3
60'-70'	52	143.0	125.8	145.4	153.5	141.0
70'-150'	75	197.6	139.3	201.5	261.4	196.5
Sector Average	219	141.8	114.9	145.0	168.3	141.3
Limited Entry Longline and Fishpot						
<40'	63	41.0	28.8	42.3	45.4	43.2
40'-50'	52	44.8	33.6	50.4	54.0	50.6
50'-60'	20	61.2	44.6	70.4	76.0	70.6
60'-70'	14	89.6	64.5	103.8	112.2	103.8
70'-150'	4	103.5	74.3	120.0	129.8	120.0
Sector Average	153	51.0	36.9	56.4	60.6	56.8
Open Access with >5% Revenue from Groundfish						
<40'	685	4.5	3.2	4.6	5.3	5.1
40'-50'	69	12.5	8.4	13.1	14.3	13.4
50'-60'	9	7.0	5.5	8.4	9.0	8.4
60'-70'	4	1.6	1.3	1.3	1.4	1.3
70'-150'	1	1.0	0.5	2.0	1.7	1.9
Unspecified	10	1.6	0.8	1.6	2.2	2.0
Sector Average	778	5.2	3.6	5.4	6.0	5.8
Open Access with <5% Revenue from Groundfish						
<40'	388	0.2	0.1	0.2	0.2	0.2
40'-50'	121	0.3	0.2	0.4	0.4	0.4
50'-60'	30	1.0	0.8	1.1	1.2	1.1
60'-70'	26	0.9	0.7	1.0	1.1	1.0
70'-150'	25	0.9	0.7	1.0	1.0	1.0
Sector Average	590	0.3	0.2	0.3	0.4	0.4
Fishery Average	1740	24.8	19.4	25.7	29.3	25.5

TABLE 4.5.2-4. Projected average exvessel groundfish revenue per vessel under each alternative by vessel length category (thousands of dollars, catcher-processors excluded). (Page 2 of 2)

Dependence on Groundfish	Number of Vessels	Alternatives (Status Quo) 2003 Projection	Low OY	Medium OY	High OY	Council OY
Change Relative to Status Quo						
Limited Entry Trawl						
<40'			5.2	5.6	5.7	6.1
40'-50'			-0.7	3.5	4.4	1.3
50'-60'			-10.3	2.7	5.2	0.4
60'-70'			-17.2	2.4	10.5	-2.0
70'-150'			-58.3	4.0	63.8	-1.1
Sector Average			-26.9	3.2	26.4	-0.5
Limited Entry Longline and Fishpot						
<40'			-12.2	1.3	4.4	2.2
40'-50'			-11.2	5.6	9.1	5.7
50'-60'			-16.6	9.2	14.7	9.3
60'-70'			-25.1	14.2	22.6	14.2
70'-150'			-29.2	16.5	26.4	16.5
Sector Average			-14.1	5.3	9.6	5.8
Open Access with >5% Revenue from Groundfish						
<40'			-1.4	0.1	0.7	0.6
40'-50'			-4.0	0.7	1.8	1.0
50'-60'			-1.5	1.3	1.9	1.4
60'-70'			-0.4	-0.3	-0.3	-0.3
70'-150'			-0.4	1.1	0.7	0.9
Unspecified			-0.8	0.0	0.6	0.4
Sector Average			-1.6	0.2	0.8	0.6
Open Access with <5% Revenue from Groundfish						
<40'			-0.1	-0.0	0.0	0.0
40'-50'			-0.1	0.0	0.1	0.0
50'-60'			-0.2	0.1	0.2	0.1
60'-70'			-0.2	0.1	0.2	0.1
70'-150'			-0.2	0.1	0.2	0.1
Sector Average			-0.1	0.0	0.1	0.0
Fishery Average			-5.4	1.0	4.6	0.7

TABLE 4.5.2-5. Alternative Pacific whiting allocations and set-asides analyzed for 2004 fisheries. (Page 1 of 1)

Sectors/Set-asides	EIS Alternatives				
	No Action	*Low OY*	*Med OY*	*High OY*	*Council OY*
Total	148,200	74,100	148,200	250,000	NA[a/]
Tribal	25,000	12,968	25,000	35,000	NA
Non-wht impact	2,000	2,000	2,000	2,000	2,000
Pollock EFP	1,000	1,000	1,000	1,000	1,000
Commercial OY	121,200	59,132	121,200	213,000	NA
Motherships	29,088	14,192	29,088	51,120	NA
Catcher-Processors	41,208	20,105	41,208	72,420	NA
Shoreside	49,904	23,836	49,904	88,460	NA

a/ NA=Council action on adopting allocation and set asides for Pacific whiting was deferred until March 2004.

TABLE 4.5.2-6. Estimated catch (mt) of groundfish species in the whiting fishery under the 2004 EIS alternatives. (Page 1 of 1)

Sector	2003 Ave. bycatch rate[a/]	1998-2003 bycatch rate[b/]	EIS Alternatives[b/] *No Action*[a/]	*Low OY*	*Med OY*	*High OY*
			Tribal			
Whiting			0	0	0	0
Yellowtail	0.1763%	1.0679%	0.00	0.00	266.98	373.78
Widow	0.0111%	0.0851%	2.78	11.04	21.28	29.79
Canary	0.0035%	0.0166%	0.86	2.16	4.16	5.82
Darkblotch	0.0001%	0.0001%	0.03	0.01	0.02	0.03
POP	0.0056%	0.0042%	1.41	0.55	1.06	1.48
Lingcod	0.0003%	0.0017%	0.07	0.22	0.42	0.59
			Motherships			
Whiting			0	0	0	0
Yellowtail	0.0022%	0.3385%	0.00	0.00	98.47	173.06
Widow	0.0026%	0.1544%	0.77	21.91	44.90	78.91
Canary	0.0003%	0.0021%	0.09	0.30	0.61	1.07
Darkblotch	0.0004%	0.0082%	0.12	1.16	2.38	4.19
POP	0.0004%	0.0062%	0.11	0.89	1.82	3.19
Lingcod	0.0004%	0.0006%	0.10	0.09	0.18	0.31
			Catcher-Processors			
Whiting			0	0	0	0
Yellowtail	0.0046%	0.2036%	0.00	0.00	83.92	147.48
Widow	0.0311%	0.1684%	12.80	33.87	69.41	121.99
Canary	0.0005%	0.0015%	0.19	0.30	0.62	1.10
Darkblotch	0.0112%	0.0104%	4.62	2.10	4.30	7.55
POP	0.0136%	0.0160%	5.60	3.22	6.61	11.61
Lingcod	0.0011%	0.0003%	0.45	0.07	0.14	0.25
			Shoreside			
Whiting				0	0	0
Yellowtail	0.0954%	0.2815%	48.60	0.00	140.48	249.01
Widow	0.0176%	0.1373%	8.97	32.72	68.50	121.43
Canary	0.0002%	0.0005%	0.11	0.12	0.25	0.45
Darkblotched	0.0005%	0.0013%	0.26	0.32	0.67	1.19
POP	0.0006%	0.0069%	0.30	1.65	3.45	6.11
Lingcod	0.0008%	0.0008%	0.40	0.18	0.38	0.67
Yelloweye	0.0000%	0.0000%	0.00	0.00	0.01	0.01

a/ Preliminary. Catch estimates for the at-sea sector based on observed catch rates through September 25, 2003 applied to at-sea sector whiting allocations. These data incomplete since all at-sea sectors still fishing after this date. Shoreside catches are actual estimates.

b/ Estimated catch by alternative calculated using the 1998-2003 average of annual bycatch rates observed by sector; except for No Action, where the calculated 2003 bycatch rates were used.

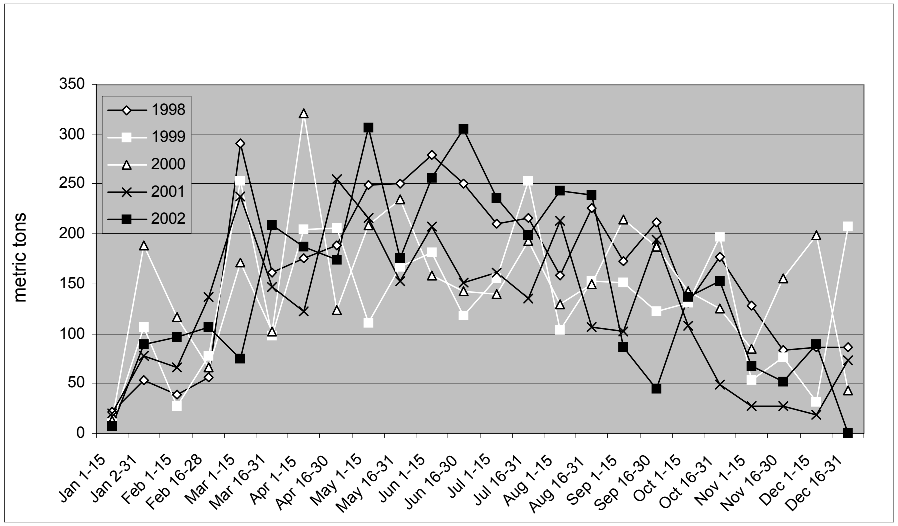

FIGURE 4.5.2-1. B Platoon landings, 1998-2002, half-month periods (Source PacFIN, run on August 25, 2003).

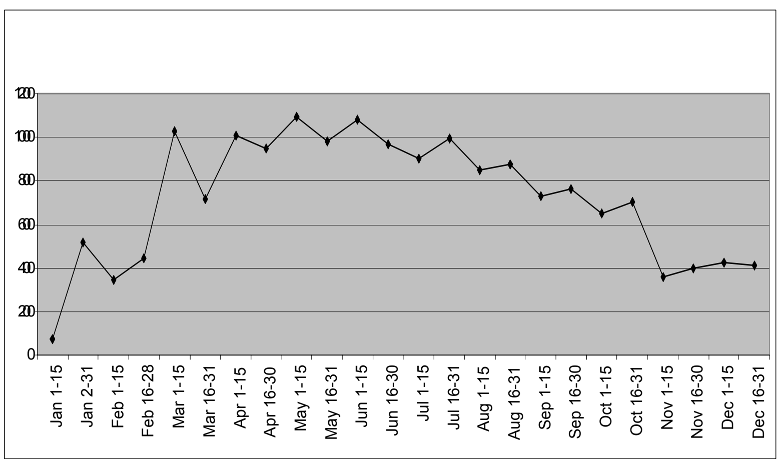

FIGURE 4.5.2-2. Aggregated "B" platoon landings by half-month period, 1998-2002 (Source PacFIN, run on August 25, 2003).

FIGURE 4.5.2-3. Distance from ports compared to the fall 2003 trawl RCA boundary, Oregon and Washington (distance rings are at 10, 20, and 40 nm).

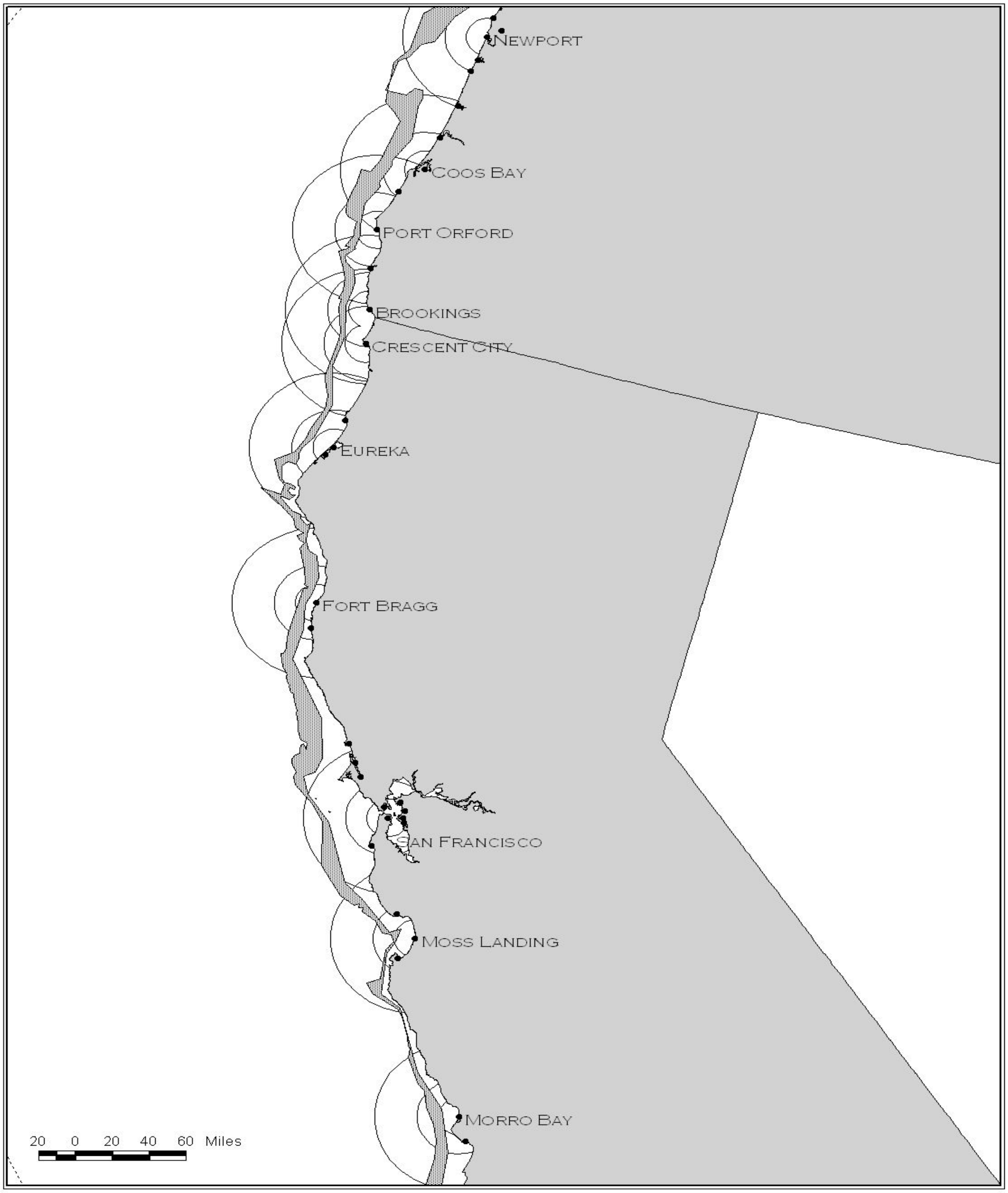

FIGURE 4.5.2-4. Distance from ports compared to the fall 2003 trawl RCA boundary, central California (distance rings are at 10, 20, and 40 nm).

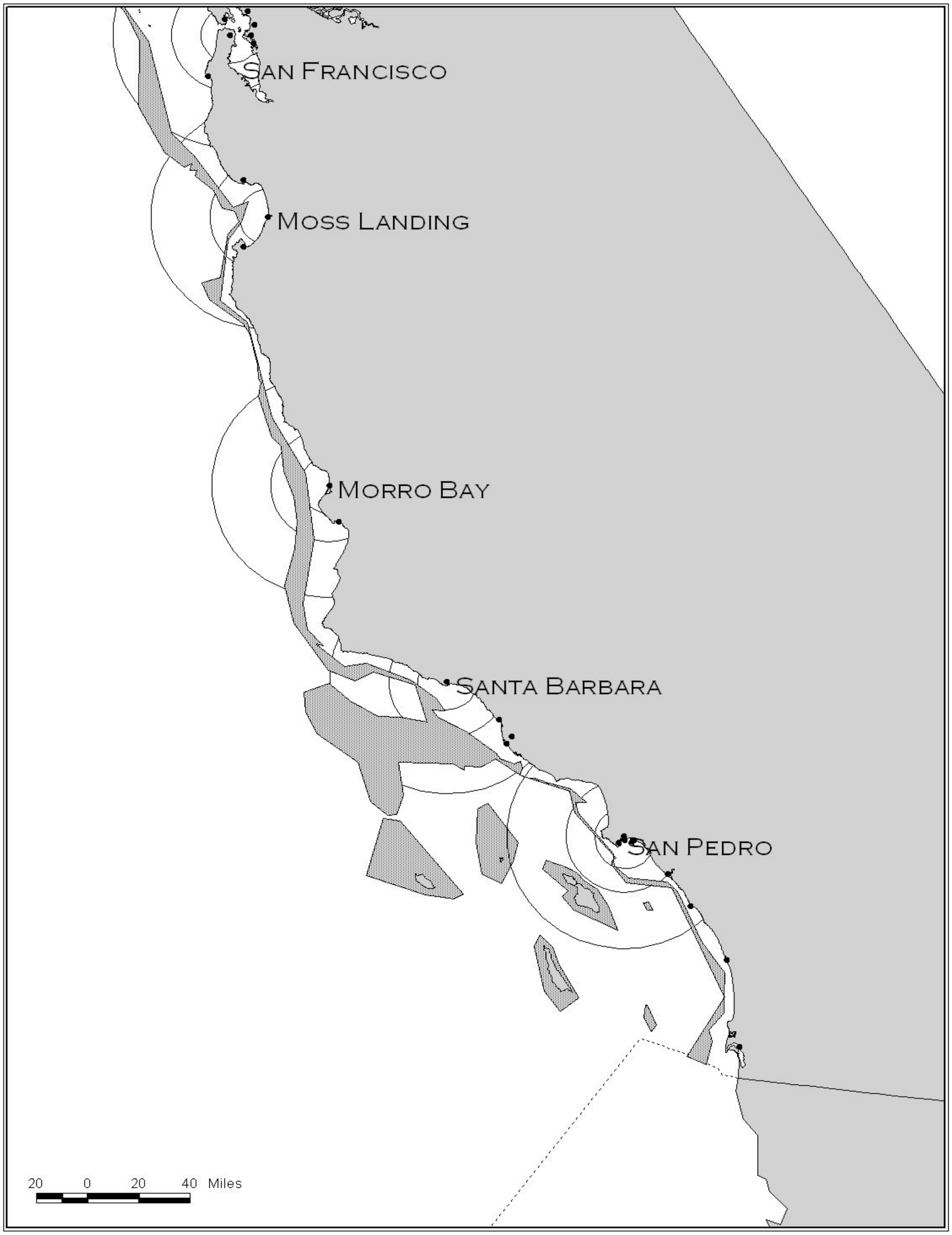

FIGURE 4.5.2-5. Distance from ports compared to the fall 2003 trawl RCA boundary, Southern California (distance rings are at 10, 20, and 40 nm).

4.5.3 Buyers and processors

This section examines potential impacts on buyers and processors of groundfish resources under the alternatives. Data for this analysis are from West Coast fish landing receipts (fish tickets). These record buyer license numbers, but do not distinguish buyers from processors. Therefore, the analysis is restricted to examining buyers and processors in aggregate. While some buyers have landing or processing facilities in each port where they buy, others do not. For the purposes of this analysis, a simplifying assumption has been made that each unique combination of buyer code and PacFIN port area represents a different buying unit. This assumption exaggerates the number of entities affected since a single firm operating in different ports is treated as several different buying units.

4.5.3.1 Criteria Used to Evaluate Impacts

Buyers and processors

Due to the lack of data on prices, costs and profitability of buyers and processors, much the same indicators as used for the harvesting sectors are used for comparing impacts on the buyer/processing sector. Specifically, as a proxy for profits, exvessel revenue is used as an indicator of activity level. From the buyers' perspective, exvessel revenue represents expenditures for a primary production input. Projected change in exvessel revenue under the alternatives is stratified by different categories to examine impacts by buyer/processors' relative size and level of involvement in or dependence on groundfish purchases.

In addition, indicators of flexibility are compared under the alternatives. Examples include the groundfish season structure, and whether or not a "B-platoon" of trawl vessels is allowed to operate under the alternative.

Markets

Substitutability of other products, or the same product from elsewhere, greatly affects regional seafood markets. Flatfish are generally lower value than rockfish and production is constrained by the market rather than by the resource itself. Rockfish are higher quality and valued in West Coast fresh markets. However, similar products from South America, Mexico, Canada or Alaska could potentially substitute for West Coast production. Whiting, which is turned into surimi, a generic fish product, competes with other sources of supply such as Alaska pollack.

The likelihood that the projected impacts on regional buyers and processors will affect the functioning of regional seafood markets is discussed below.

4.5.3.2 Direct and Indirect Impacts

Buyers and processors

Input purchases

Table 4.5.3-1 shows the projected change in fish buyers' purchases under the 2004 management alternatives with respect to the *No Action* alternative. The table groups buyers in two different ways: by dependence on groundfish (groundfish purchases as a percent of total fish purchases), and by size (level of total fish purchases). Table 4.5.3-2 shows the same information in terms of percent change in purchases by buyer category.

Compared with *No Action*, purchases by every buyer/processor category are lower under the *Low OY* alternative (Table 4.5.3-1). In percentage terms, these negative impacts are spread fairly evenly across buyers by dependence and involvement categories (Table 4.5.3-2).

Under the *Medium OY*, *High OY* and *Council OY* alternatives, purchases are projected to increase fairly evenly across groundfish dependence categories, but not across size categories. Under the *Medium OY* and *Council OY* alternatives, the tables show negative impacts for the 306 buyers with less than $100,000 in total purchases. Under *High OY*, the 203 buyers under $20,000 are negatively affected. Smaller buyers are probably more affected by changes in landings than larger buyers because smaller buyers are relatively less diversified in the range of species handled.

The projected change in exvessel revenue mirrors the change in the purchase of key inputs by seafood buyers and processors. Total purchases from vessels are projected to decline by about $9 million under the *Low OY* alternative, increase by $1.6 million under *Medium OY*, increase by $7.9 under *High OY* and increase by $1.3 million under *Council OY* alternative (Table 4.5.3-1).

Operating costs

Output is expected to change roughly in proportion to change in input. However, the effect on net revenues will depend on changes in cost associated with changed output and any changes in the market prices of raw materials or final product. Unfortunately, wholesale prices and processing/wholesaling costs are not available to assess the effects of harvest changes on gross or net revenue. In response to the uncertain availability of raw product, buyers and processors may seek to increase revenue through bidding or other means of increasing their share of available raw product (in groundfish or other fisheries); reducing costs or increasing the value of the products they sell.

Processors have advocated year-round fishing in order to help maintain consistent groundfish supplies, even if this necessitates low periodic vessel landing limits. If a processing plant shuts down because of inconsistent or insufficient raw materials, the semi-skilled labor may find other employment, making it difficult to re-hire them when fish are again available.

The B-platoon option for limited entry trawlers provides flexibility for harvestors and buyers to schedule deliveries of raw materials, thereby helping to make supplies more consistent. Removal of the B-platoon option is included in the *Medium OY* and *Council OY* alternatives for 2004. Removal of the B-platoon option under these two alternatives would potentially increase costs for buyers and processors by shifting costs that are currently borne by the public sector (i.e. managing and enforcing separate trip limits for the B-platoon) to the buyers, processors and harvesters themselves.

Markets

Because of the availability of substitutes for West Coast groundfish products in the regional food distribution chain, differential effects on regional seafood markets under the management alternatives are expected to be minor. Most supermarkets and restaurants do not rely on local supplies to stock their shelves or prepare menus. Locally caught products that are no longer available would be replaced with close substitutes for the local products that are obtained from elsewhere in the global supply chain. As such we do not anticipate an effect on the structure or functioning of regional markets for seafood products under any of the alternatives.

Since the regulations that would result under the management alternatives do not impose distortions, such as tarriffs, or impose other barriers on regional markets, no significant change in the competitive position of West Coast buyer/processors vis a vis foreign ones, or large buyer/processors versus smaller ones is expected under any of the alternatives.

4.5.3.3 Cumulative Impacts

As noted in section 3.5.3, prices for fish products have recently been on a general downward trend, in spite of increasing demand. This is in part due to competition between and substitutability of different products, for example wild-caught domestic salmon versus imported or cultured supplies. Most consumers do not differentiate or attach a price premium to wild fish caught in sustainable fisheries, making it difficult for fishers to receive higher prices. Aquaculture producers have recently turned their attention to whitefish, with aquaculture production of halibut becoming a reality, and intensive development of production techniques for cod and other ocean species under way (Loy 2002). Competition with a more consistent supply of aquacultured products produced at lower cost will continue to exert downward pressure on seafood prices.

4.5.3.4 Summary

Aggregate impacts on buyers and processors under the alternatives are shown in the table below.

Buyer/processor Impacts	Low OY	Medium OY	High OY	Council OY
Total raw material purchases (% change from No Action)	-21.6%	3.9%	18.4%	3.0%
Operating costs	unknown	unknown	unknown	unknown
Markets and balance of trade	no effect	no effect	no effect	no effect

TABLE 4.5.3-1. Value of purchases for buyers/processors grouped by dependence on groundfish and level of total purchases (excludes catcher-processors). (Page 1 of 1)

	Value of Purchases ($,000)						Change from No Action Alternative ($,000)			
	Number of buyers / procs.	No Action (2003 Projection)	Low OY	Medium OY	High OY	Council OY	Low OY	Medium OY	High OY	Council OY
Dependence on Groundfish					**Total Purchases by Group**					
>0% & <5%	174	726.3	575.9	759.0	879.7	751.0	-150.4	32.7	153.4	24.7
>5% & <35%	122	10,844.8	8,686.9	11,639.0	12,886.6	11,543.6	-2,157.9	794.2	2,041.8	698.9
>35% & <65%	52	23,973.1	19,758.2	24,722.0	26,843.0	24,364.1	-4,214.9	749.0	2,869.9	391.1
>65% & <95%	36	2,927.1	2,030.1	2,933.4	3,707.0	2,958.4	-897.0	6.3	779.9	31.3
>95% & <100%	63	4,636.6	2,727.1	4,720.5	6,736.5	4,786.7	-1,909.4	84.0	2,100.0	150.2
Total	447	43,107.8	33,778.2	44,773.9	51,052.8	44,403.9	-9,329.6	1,666.1	7,945.1	1,296.1
					Average Purchases Per Buyer/Processor By Group					
>0% & <5%		4.2	3.3	4.4	5.1	4.3	-0.9	0.2	0.9	0.1
>5% & <35%		88.9	71.2	95.4	105.6	94.6	-17.7	6.5	16.7	5.7
>35% & <65%		461.0	380.0	475.4	516.2	468.5	-81.1	14.4	55.2	7.5
>65% & <95%		81.3	56.4	81.5	103.0	82.2	-24.9	0.2	21.7	0.9
>95% & <100%		73.6	43.3	74.9	106.9	76.0	-30.3	1.3	33.3	2.4
All Buyers/Processors		96.4	75.6	100.2	114.2	99.3	-20.9	3.7	17.8	2.9
Level of Purchases (All Species)					**Total Purchases by Group**					
<$5,000	109	32.0	19.4	28.1	30.3	31.3	-12.7	-4.0	-1.8	-0.7
$5,000-$20,000	94	216.4	137.0	184.6	207.4	200.9	-79.4	-31.8	-9.0	-15.5
$20,000-$100,000	103	854.7	531.2	763.0	888.6	808.6	-323.5	-91.6	33.9	-46.1
$100,000-$300,000	58	2,083.6	1,554.5	2,132.0	2,396.0	2,182.5	-529.1	48.4	312.4	98.9
$300,000-$1,000,000	37	4,503.2	2,825.6	4,644.4	6,221.8	4,775.4	-1,677.7	141.1	1,718.6	272.2
>$1,000,000	46	35,417.9	28,710.6	37,021.9	41,308.8	36,405.3	-6,707.3	1,604.0	5,890.9	987.5
Total	447	43,107.8	33,778.2	44,773.9	51,052.8	44,403.9	-9,329.6	1,666.1	7,945.1	1,296.1
					Average Purchases Per Buyer/Processor By Group					
<$5,000		0.3	0.2	0.3	0.3	0.3	-0.1	-0.0	-0.0	-0.0
$5,000-$20,000		2.3	1.5	2.0	2.2	2.1	-0.8	-0.3	-0.1	-0.2
$20,000-$100,000		8.3	5.2	7.4	8.6	7.9	-3.1	-0.9	0.3	-0.4
$100,000-$300,000		35.9	26.8	36.8	41.3	37.6	-9.1	0.8	5.4	1.7
$300,000-$1,000,000		121.7	76.4	125.5	168.2	129.1	-45.3	3.8	46.4	7.4
>$1,000,000		770.0	624.1	804.8	898.0	791.4	-145.8	34.9	128.1	21.5
All Buyers/Processors		96.4	75.6	100.2	114.2	99.3	-20.9	3.7	17.8	2.9

TABLE 4.5.3-2. Percent change in value of purchases for buyers/processors grouped by dependence on groundfish and level of total purchases (excludes catcher-processors). (Page 1 of 1)

	Value of Purchases ($,000)						% Change from No Action Alternative			
	Number of buyers / procs.	No Action (2003 Projection)	Low OY	Medium OY	High OY	Council OY	Low OY	Medium OY	High OY	Council OY
Dependence on Groundfish					**Total Purchases by Group**					
>0% & <5%	174	726.3	575.9	759.0	879.7	751.0	-20.7%	4.5%	21.1%	3.4%
>5% & <35%	122	10,844.8	8,686.9	11,639.0	12,886.6	11,543.6	-19.9%	7.3%	18.8%	6.4%
>35% & <65%	52	23,973.1	19,758.2	24,722.0	26,843.0	24,364.1	-17.6%	3.1%	12.0%	1.6%
>65% & <95%	36	2,927.1	2,030.1	2,933.4	3,707.0	2,958.4	-30.6%	0.2%	26.6%	1.1%
>95% & <100%	63	4,636.6	2,727.1	4,720.5	6,736.5	4,786.7	-41.2%	1.8%	45.3%	3.2%
Total	447	43,107.8	33,778.2	44,773.9	51,052.8	44,403.9	-21.6%	3.9%	18.4%	3.0%
					Average Purchases Per Buyer/Processor By Group					
>0% & <5%		4.2	3.3	4.4	5.1	4.3	-21.4%	4.8%	21.4%	2.4%
>5% & <35%		88.9	71.2	95.4	105.6	94.6	-19.9%	7.3%	18.8%	6.4%
>35% & <65%		461.0	380.0	475.4	516.2	468.5	-17.6%	3.1%	12.0%	1.6%
>65% & <95%		81.3	56.4	81.5	103.0	82.2	-30.6%	0.2%	26.7%	1.1%
>95% & <100%		73.6	43.3	74.9	106.9	76.0	-41.2%	1.8%	45.2%	3.3%
All Buyers/Processors		96.4	75.6	100.2	114.2	99.3	-21.7%	3.8%	18.5%	3.0%
Level of Purchases (All Species)					**Total Purchases by Group**					
<$5,000	109	32.0	19.4	28.1	30.3	31.3	-39.7%	-12.5%	-5.6%	-2.2%
$5,000-$20,000	94	216.4	137.0	184.6	207.4	200.9	-36.7%	-14.7%	-4.2%	-7.2%
$20,000-$100,000	103	854.7	531.2	763.0	888.6	808.6	-37.8%	-10.7%	4.0%	-5.4%
$100,000-$300,000	58	2,083.6	1,554.5	2,132.0	2,396.0	2,182.5	-25.4%	2.3%	15.0%	4.7%
$300,000-$1,000,000	37	4,503.2	2,825.6	4,644.4	6,221.8	4,775.4	-37.3%	3.1%	38.2%	6.0%
>$1,000,000	46	35,417.9	28,710.6	37,021.9	41,308.8	36,405.3	-18.9%	4.5%	16.6%	2.8%
Total	447	43,107.8	33,778.2	44,773.9	51,052.8	44,403.9	-21.6%	3.9%	18.4%	3.0%
					Average Purchases Per Buyer/Processor By Group					
<$5,000		0.3	0.2	0.3	0.3	0.3	-33.3%	0.0%	0.0%	0.0%
$5,000-$20,000		2.3	1.5	2.0	2.2	2.1	-34.8%	-13.0%	-4.3%	-8.7%
$20,000-$100,000		8.3	5.2	7.4	8.6	7.9	-37.3%	-10.8%	3.6%	-4.8%
$100,000-$300,000		35.9	26.8	36.8	41.3	37.6	-25.3%	2.2%	15.0%	4.7%
$300,000-$1,000,000		121.7	76.4	125.5	168.2	129.1	-37.2%	3.1%	38.1%	6.1%
>$1,000,000		770.0	624.1	804.8	898.0	791.4	-18.9%	4.5%	16.6%	2.8%
All Buyers/Processors		96.4	75.6	100.2	114.2	99.3	-21.7%	3.8%	18.5%	3.0%

4.5.4 Recreational Fishery

The recreational fishing management alternatives being considered for 2004 retain the basic characteristics of the time and area closures introduced with the management regime in place during 2003, thereby continuing the challenge for recreational fishers of responding to complex regulations, and for fisheries managers of monitoring recreational catch and effort in order to limit mortality of overfished species.

While time/area closures may impose a loss on the individual angler forced to change from his or her optimal fishing plans, such closures are often intended to extend fishing opportunities over a longer period coastwide. Increased fishing opportunity allows for more angler trips and, depending on complementary regulations, a greater ocean catch. From a national or coastwide point of view, a loss to individual anglers in terms of quality of trips may be compensated by an increase in the total number of anglers able to participate in the ocean fishery.

With the exception of the state of Washington, there is no limit on the total number of charter vessels offering services. Even the limits in Washington are set at levels far above those required to meet current demand in the recreational fishery. Thus the effects on markets for guided or charter fishing activities under the alternatives will be driven by the same demand-related factors affecting the value of recreational experience overall: change in the quantity of available trips (season length) or the quality of the average trip taken (trip limits and time of the year).

Impacts on markets for recreational experience include both formal markets for guided or charter fishing experiences, and non-market measures of willingness-to-pay for recreational fishing experience. However there is insufficient data to measure the willingness to pay for recreational fishing experiences of varying quality. Thus while it is not possible to directly compare net economic value between the alternatives, it is possible to estimate projected catch and/or the number of recreational trips expected under the alternatives, and to use these measures to compare against baseline activity levels.

4.5.4.1 Criteria Used to Evaluate Impacts

The following criteria are used in this section to examine relative impacts to the West Coast recreational fishery under the 2004 managemnt alternatives.

Individual Fishers

Each recreational experience generates economic value for the individual angler. Taken together, these values comprise a component of the net economic value that the recreational fishery contributes to the national economy. Estimating net economic value involves summing the value of each trip, or alternatively, multiplying the number of trips by the average value per trip. However estimating these parameters is beyond the scope of this analysis. In this section, partial estimates of the change in total trips, and indicators of the direction and degree of change in the average value per trip are provided.

The net value of a recreational fishing trip is a function of expected catch (species, number and size), attractiveness of the location and distance traveled by the fisher. Restrictions can affect the quality of a trip by changing the relative species and size composition of the catch (decreasing trip quality). Reduced bag limits may also allow for an increased number of angler trips, thereby possibly making the angling experience available to a greater number of anglers, and increasing the marginal value of each fish. With greater bag limits, the marginal value of each additional fish caught per angler likely decreases. However, the cost of each additional unit of catch for an individual angler also declines.

While a loss of fishing opportunity may translate into a direct loss in trip-related expenditures received by fishing-related businesses, the resulting change in net economic value will be considerably less than the change in expenditure. Presumably the recreationalist would still spend a similar amount but in another place and/or on another activity, even though this alternative experience may be somewhat inferior than what the person originally had in mind. Substitution of one activity for another in time and/or place may still involve a similar level of expenditures, although not of the same kind or necessarily in the same place. In this case, while analysis of the impact on expenditures would translate the change in revenue of the recreational fishing-related businesses as a direct loss in economic activity or income, analysis of net economic value would treat only the difference in the intrinsic value between the two types of experience to the individual as a net change in value.

An ideal model would allow us to measure the effect on total recreational effort (quantity and location of trips) and marginal value per trip resulting from changes in different management variables. Unfortunately, the data to populate such a model are currently lacking because the specific surveys to collect the required data have not been done.

Change in recreational effort

Conceptually, effort may change in response to caps on total landings, changes in open seasons or depth closures (although if a cap is non-binding it may have no direct effect). In this section, we will estimate change in the number of angler trips in each state's recreational ocean fishery under each 2004 management alternative. In general, where trips cannot be estimated, change in total landings is used as a rough substitute for change in effort. Also considered are the proposed closure periods compared with the seasonal effort pattern observed in 2002, and the effect of shifts in the inshore closed area under the alternatives.

It should be noted that these estimates probably do not adequately project the effect of management changes on the distribution of effort, nor do they incorporate the impact of other changes on demand for recreational fishing experience. However this is the best abailable approach for evaluating impacts given the data limitations.

Change in quality (value) of trips

For determining net economic value, the perceived value of the recreational experience is the other main variable to be determined. Those anglers forced to change their desired fishing patterns will probably experience a decrease in economic value from the trip. Historically, managers have observed little change in recreational effort correlated with changes in bag limits. However downward adjustment of bag limits clearly does affect the quality of the recreational experience, and over time a reduced-quality experience would be expected to lead to reduced demand and lower levels of angler participation.

More trips vs higher quality trips

Greater restrictions (lower bag limits) on individual trips mean potentially more anglers may fish, but the individual experiences will be of a lower quality. More trips result in more expenditures benefitting charter vessels and communities. However, especially in the short term, these expenditures may represent dollars taken away from other places and other types of activities. Therefore there may be a redistribution of benefits among local businesses even if net national benefit is unchanged. Since OYs and management measures are being changed together, we are not able to isolate these effects in the analysis.

Safety

Safety of recreational fishing vessels is affected by the seasons and depth zones open to fishing under the alternatives.

Weather conditions during open seasons

Open seasons that encourage effort in times of the year when the potential for bad weather and storms is higher will negatively affect safety of recreational fishers.

Location of areas open for fishing

Limiting fisheries to inside 20 fm, as under the *No Action* alternative in Southern California, increases the potential for problems. This limit forces commercial, charter, and recreational fleets to fish in the same waters, increasing the risk of collisions, especially in bad weather. Recreational boaters tend to be less experienced and have less safety equipment than commercial skippers, and are often unfamiliar with bottom contours, wave dynamics, tides, and currents. This combination of increased vessel density, the inherent risks of navigating shallow waters, and relatively inexperienced skippers, increases the risks to recreational boaters.

Charter boat businesses

Demand for charter trips is affected by perceived quality of the experience. Factors affecting quality include bag limits and seasonal factors such as weather conditions during open seasons, and coincidental timing with recreational vacation periods.

4.5.4.2 Direct and Indirect Impacts

Modeling the Effects of Recreational Management Measures

This section describes the effects of different aspects of the alternative management measures, including season and depth restrictions, caps and size and retention limits. The discussion generally follows the methodologies used to estimate impacts for each management unit: Washington, Oregon and regions within California.

Washington

Season and depth restrictions under all the 2004 management alternatives for Washington recreational fishery are the same as they were in 2003, i.e. open year round (except for lingcod) with no depth restrictions unless the harvest guideline is attained, in which case the fishery is closed outside of 30 fm. The only significant change from *No Action* is a reduction in the canary rockfish daily bag sublimit from 1 fish to no retention. There is no differential impact between the alternatives. The change from a 25 fm management line in 2003 to a 30 fm line under the *Low OY*, *Medium OY*, *High OY* and *Council OY* alternatives for 2004 was made for administrative reasons and is not expected or intended to have a measurable effect on catch or effort.

Oregon

Modeling of expected 2004 Oregon recreational fishery impacts of selected groundfish species was based on recent year landings. For the ocean boat fishery, the data source was the ODFW Ocean Recreational Boat Survey (ORBS). For the shore and estuary fishery, the data source was MRFSS. Species analyzed include black, blue, brown, canary, china, copper, grass, quillback, widow, and yelloweye rockfish; as well as greenling, cabezon and lingcod. Base level landings for the ocean boat fishery were based on 2002 landings for overfished species (except lingcod) because most recent data reflects recent regulation changes most similar to those expected in 2004 (i.e., bag limits, effort shifts to avoid overfished species, etc.). For lingcod, the expected catch was based on 2002 landings with an assumed 16% increase as the bag limit was one fish and it is two fish under the proposed action. The 16% is based on bag length profiles from the late 1990s when the bag limit was two fish. For black and blue rockfish, the 2001-2002 average landings were used as landings during this period reflect the effect of recent increased salmon opportunity, which is anticipated again in 2004. During salmon openers anglers switch from groundfish to targeting salmon. For other species, the 2000-2002 average landings were used.

Base level landed weight for the shore and estuary fishery was based on the 2000-2002 average because offshore closures should not affect shore and estuary landings (numbers of fish); only annual weight was adjusted for bag and length changes. The expected average weight per fish was based on 2000-2002 average for each fishery (ocean boat vs. shore/estuary).

During offshore closures, an assumed 10% increase in effort would occur in open nearshore fisheries. Estimating the expected reduction in catch due to offshore closures was based on a 2001 observer study (105 observations). The following rates were applied to appropriate months closed under each option:

Species	Monthly reductions based on offshore closures:	
	outside 40 fm	outside 50 fm
Canary	44%	44%
Yelloweye	35%	32%
Widow	88%	88%
Lingcod	11%	11%

Additional reductions are expected from closing Stonewall Banks in the 40 fm closure under the proposed action. This is because most angler effort is from private boats and not charter boats, which were involved in the observer study. Stonewall Banks is one of the few Oregon areas between 40 fm and 50 fm that is fished for recreational groundfish. The 2000-2002 average weight for canary and yelloweye was applied to 2002 landings in the directed groundfish fishery on Stonewall Banks. It was assumed that 90% of this catch occurred during the June-September period.

Bag limit and minimum length changes were analyzed for greenling, cabezon, and lingcod. Minimum length changes considered for greenling assumed there would be no affect of an increased minimum length in the ocean boat fishery since greenling caught in this fishery are generally larger than 12 inches. Minimum length reductions in the shore and estuary fishery are based on MRFSS weight by length profiles (42% reduction at 12 inches; 61% at 11 inches; and 76% at 10 inches). The analysis of cabezon minimum length alternatives assumed a 10% catch reduction from no minimum length to 15 inches; and a 20% catch reduction from no minimum length to 16 inches in the ocean boat fishery. Shore and estuary fishery catch reductions of cabezon are based on MRFSS weight by length profiles (36% reduction at 16 inches; and 48% reduction at 15 inches). Bag limit and minimum size alternatives for lingcod in the ocean boat fishery assumed: 1) a 16% catch increase in the number of fish at 24 inches when the bag limit is increased to 2 fish; 2) a 29% reduction in catch due to increasing minimum length from 24 to 26 inches (based on length profiles); 3) and the effect of scaling factors for offshore closures. There was also an estimated 18.5% reduction in weight of lingcod in the ocean boat fishery based on landing length and weight profiles when going from a 24 to 26 inch minimum length. Thus lingcod average weight was adjusted to achieve the estimated total weight reduction. There was an estimated 30% reduction in weight of lingcod landed in the shore and estuary fishery based on weight by length profiles in going from a 24 to 26 inch minimum length. No adjustment was made for a 2 fish bag, as weight profiles are based on a period of 1 fish bag.

Discards of overfished groundfish species were also analyzed for proposed 2004 fisheries. Canary and yelloweye rockfish retention is not allowed in the Pacific halibut fishery under all alternatives. It was also assumed that lingcod would survive release during times when depth-based closures were in effect. Canary and yelloweye discard mortality was estimated using 2002 creel data (the first year canary and yelloweye rockfish retention was not allowed) and 2000-2002 average weight data. General depth-based closures under the alternatives assumed 2002 catch and 2000-2002 average weights with appropriate scalars for offshore closures (see above). A 5% discard mortality rate of canary and yelloweye rockfish was assumed during cabezon closures. Discard estimates are based on the number of fish released that would have been retained (includes scaling factors for offshore closures - see above). Discard rates were based on a 2001 observer study (12% of canary and 6% of yelloweye retained). A 100% mortality rate was assumed for yelloweye (all observed outside of 15 fathoms); and a 100% mortality was assumed for canary outside of 15 fm and 50% mortality inside of 15 fm. It is noted that 21% of canary catch during 2001 observations were inside 15 fm. The analysis assumed the canary B1 discard is 50% of average size (based on limited 2003 observation data available at this time); and the yelloweye B1 discard is 75% of average size (guess based on 2003 observation data for canary rockfish).

Tables 4.5.4-1 through 4.5.4-4 show the estimated distribution of recreational catch in Oregon by season for important species and species groups under the 2004 management alternatives.

The difference between the alternatives shown in these tables are chiefly the result of proposed changes in the seasonal depth management line to limit canary and yelloweye mortality. Under the *No Action* alternative, the fishery is closed outside 27 fm only if the canary or yelloweye harvest guidelines are attained. Under the *Low OY* alternative, the fishery is closed outside 40 fm year round. Under the *Medium OY* alternative, the fishery is closed outside 40 fm during the summer (between June and September). Under the *High OY* alternative, the fishery is closed outside 50 fm only during July.

California

The calculation of 2004 recreational impacts for the California fishery was performed using a combination of three separate analyses in order to view the estimated catch for a specific species or harvest group at a specific depth range and wave and within a specific region. The following describes the basics of each analysis and any specific points of import.

Each analysis was performed for the following species and species groups: 1) shallow nearshore rockfish (kelp, grass, black-and-yellow, China, and gopher rockfishes); 2) deeper nearshore rockfish (treefish, olive, brown, copper, quillback, calico, black, and blue rockfish); 3) California scorpionfish; 4) bocaccio; 5) canary rockfish; 6) widow rockfish; 7) yelloweye rockfish; 8) lingcod; and 9) cowcod. The three analyses were a depth stratum analysis, a regional analysis, and a catch by wave analysis.

The depth stratum analysis was performed using MRFSS Sample Data. A web page was created in RecFIN that reports estimated catch by depth stratum and latitude area filtered by species or species group. This website reported data for a latitude line south, so regions were created by subtracting the estimated catch from a southern latitude line analysis from a northern one. The depth strata analyzed were every 10 fathoms out to 100 fm and then everything outside of 100 fm was grouped together (i.e. 1-10 fm, 11-20 fm, 21-30 fm…, >100 fm). The regions analyzed were Cape Mendocino to Pt. San Pedro, Pt. San Pedro to Pt. Conception, and Pt. Conception to the U.S./Mexico border. The years used were 1999 and 2000 and both Commercial Passenger Fishing Vessel (CPFV) and private catch were included in the analysis. The percentage catch by wave was calculated by taking the MRFSS estimated catch (weight, A + B1) by wave for the years 1993-1999. This analysis used all recreational catch, not just CPFV and private boat catch.

This methodology used information from the MRFSS program plus information from CPFV logbooks, the central/northern California on-board CPFV study (1987-1998) and from the survey of non-salmon vessels by the CDFG's Ocean Salmon Project (1997-2000). Counties were used to define the north and central coast areas. The north coast included Del Norte and Humboldt counties. The central coast included all the remaining MRFSS northern California counties (all coastal and San Francisco Bay counties from Mendocino

County south through San Luis Obispo County. Landings for the north and central coast areas were calculated for each species by mode (shore, private/rental, party/charter) as follows:

- North coast landings for private boats were calculated using MRFSS sample data (number of fish, number of angler-days) from Del Norte and Humboldt counties combined. CPUEs were calculated for years with the "best" samples of landings for these two counties (1983-1985, 1994-2000). Using the proportion of effort observed by the Ocean Salmon Project for non-salmon vessels from the North Coast (about 6% of effort), we calculated the total number of fish (by species) for the North Coast (CPUE * 0.06 total estimated angler-days from MRFSS for northern California) and for the central coast (CPUE * 0.94 total estimated angler-days from MRFSS for northern California). These two estimates were then summed to give a total number of fish for northern California. Next, the percent contributions of the north coast and the central coast landings to the total northern California landings were calculated. The percentages for the north coast and central coast from 1983-1985 and 1994-2000 then were averaged. This average was then applied to the 1994-2002 MRFSS estimated catch (A+B1) from northern California to get the estimated catch in numbers of fish for the North and Central Coast for those years. Numbers were converted to weight using the MRFSS average sample weights from the north coast (Del Norte and Humboldt counties combined) and the central coast (remaining northern California counties combined).

- North coast landings for the two shore modes combined were calculated in a similar manner as that for the private boats except that a proxy for the proportion of effort for the North Coast area was calculated using the proportion of available access points * the proportion of population (North coast counties/all northern California coastal counties). We then calculated the total number of fish (by species) for the north coast (CPUE * 0.03 total angler-days for N CA) and for the central coast. The percentages for the north coast and central coast were averaged using the same years (1983-1985, 1994-2000). Numbers were converted to weight using the MRFSS average sample weights from each area.

- North coast landings for the party/charter mode used MRFSS sample data, CPFV logbook information, and CPFV observer data to calculate the percent landings for each rockfish species and data from the first two sources to calculate the percent landings for all other species.

    1. Rockfishes. Initally, species composition information for rockfish sampled in the central/northern California on-board CPFV study from 1988 and 1992-1995 for both the north coast and central coast was used. However, only one of these years had sufficient samples for the north coast, so species composition of the MRFSS sample data was examined. After much deliberation, it was decided to calculate the rockfish species composition based on the average of the MRFSS 1996 species composition from north coast samples and the CPFV observer 1993 species composition as these years were considered the best sampling years for each study. The total rockfish numbers from the logbooks for 1988 and 1992-1995, adjusted for compliance, were multiplied by the species composition as determined above to generate estimates of landings by species for the north coast. Central coast landings were then calculated using the species composition, logbook totals, and compliance rates for each of the sampled central coast ports.

    2. Other species. Total numbers of cabezon, lingcod, greenling, California sheephead, and monkeyface prickleback from the CPFV logbooks for 1988 and 1992-1993 were adjusted for compliance to generate estimates of landings by species for the north coast and central coast.

    3. All species. The landings (numbers) by species for the north and central coast were totaled. Next, the north coast and central coast percentages were calculated for 1988 and 1992-1995 and then averaged. These averages for each species were then applied to the 1994-2002 MRFSS estimated catch (A+B1) in numbers of fish from northern California to get the estimated catch for the north

and central coast for those years. Numbers were converted to weight using the average sample weights from the north coast and the central coast.

Counties also were used to define the two central coast areas. The north-central coast area included coastal and San Francisco Bay counties from Mendocino County south through San Mateo County; the south-central coast area included Santa Cruz County south through San Luis Obispo County. Landings for the two areas were calculated for each species using the same methodology as described above. However, more years of data were available for the central coast area, so average percentages were generated using more information. Also, these average percentages were multiplied times the central coast landings estimates generated using the methodology described above.

The analysis was done by species and then species were grouped into harvest groups where necessary. The base catch for bocaccio was increased by a factor of 2 due to the increased opportunity to encounter this species predicted by the most recent stock assessment (the 1999 year class effect). Cowcod, yelloweye, and canary rockfish impacts were calculated using an adjustment to the estimated catch within 20 fathoms due to the mortality rates predicted upon their capture and release. Canary rockfish impacts were also analyzed without these mortality estimates in order to view the impact of a one fish limit option. The depth-based discard mortality rates used were: 1) 1-10 fathoms = 10.5% mortality; and 2) 11-20 fathoms = 42.0% mortality.

The three analyses above were combined to give the total estimated catch for each specific species (or harvest group) by wave, depth stratum, and region (Tables 4.5.4-5 through 4.5.4-13). This analysis was run using years when the fishery was open for all (or almost all) of the year and open for all depths. Therefore, this analysis cannot predict the impact of fishing effort that would normally occur at certain depths shifting into other depths when depth restrictions are put in place. It simply gives the estimated catch of specific species or harvest groups assuming an unregulated season (in regards to depth and wave restrictions). It must be assumed that some amount of effort shift from a closed depth or region will shift into open areas and thus increase the catch in those areas by some factor.

California North of Cape Mendocino

Depth and season management in the recreational fishery for northern California (North of Cape Mendocino) under the *No Action* alternative is the same as Oregon (i.e. closed outside 27 fm if canary or yelloweye harvest guideline is attained). Under the remaining 2004 management alternatives, the nearshore management line changes to 30 fm (same for all coastwide fisheries), but in order to control catch of key species, the seasonal structure is different under each alternative. Under *Low OY* and *Medium OY* alternatives, the fishery is open only between March and December and inside of 30 fm. Under *High OY* and the proposed action under *Council OY*, the fishery is open all year inside 30 fm. The CDFG does not intend to match Oregon recreational regulations for the northern California recreational fishery north of Cape Mendocino in 2004.

California South of Cape Mendocino to Pt. Conception

Tables 4.5.4-5 through 4.5.4-13 show the estimated distribution of recreational catch of important groundfish species and species groups by depth, season, and region[30/] for management areas south of Cape Mendocino. These estimates were used to model expected catch under the 2004 management measures for areas south

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30/ While this section discusses measures considered for the entire area between Cape Mendocino and Pt. Conception, this area represents two new management regions bounded at 37°35'40" N latitude near Pt. San Pedro (see Section 2.1.4).

of Cape Mendocino. Differences in expected harvest between the alternatives were chiefly due to the changes in season and depth management lines.

Between Cape Mendocino and Point Conception, under the *No Action* alternative, the fishery is open only between July and December and inside 20 fm. Under *Low OY*, the fishery is open inside 20 fm between March and June, and inside 30 fm from July to December. Under *Medium OY*, the fishery is open inside 20 fm between January and April and again in November and December, and inside 30 fm from May to October. Under *High OY*, the fishery is open inside 30 fm only between March and December. Under *Council OY*, the fishery is open inside 30 fm in January and February and from September to December, and inside 20 fm in May and June.

California South of Pt. Conception

South of Point Conception, under the *No Action* alternative, the fishery is open only between July and December and inside 20 fm. Under *Low OY*, the fishery is open inside 80 fm in January and February and from May to December. Under *Medium OY*, the fishery is open year round inside 80 fm. Under *High OY*, the fishery is open year round with no depth restrictions. Under *Council OY*, the fishery is open inside 60 fm March through December.

Change in Total Catch and Effort

Table 4.5.4-14 shows the estimated distribution among West Coast states and subregions of ocean recreational groundfish catch under the 2004 management alternatives. Note that the *Council OY* alternative is the same as *Medium OY* for Washington, Oregon and Northern California, but not for Central and Southern California. There is no difference in expected recreational catch between the alternatives for Washington and Northern California. For Oregon, while *No Action* would allow the highest total catch, the difference between this alternative, *Council OY* (*Medium OY*) and *High OY* is much less than 1%. Total expected catch under the *Low OY* alternative for Oregon is 30 mt (6%) less than under *No Action*. Expected catch in Central and Southern California under *No Action* is much lower than under the other alternatives. In Central California, expected catch under *No Action* is just more than half what it would be under the next most conservative alternative, *Low OY*, and just less than half of the *Council OY* alternative. The difference in total catch between the *Council OY* and *High OY* alternatives is less than 3%. In Southern California, expected catch under *No Action* is only 45% of expected catch under the next most conservative alternative, *Council OY*. The main difference between the alternatives for Southern California is expected catch of Bocaccio, which varies between 6.1 mt under *No Action* to 122.7 mt under *High OY*.

Table 4.5.4-15 translates the catch estimates shown in the previous table into estimated recreational fishing effort under the different management alternatives. These estimates assume the same average catch per angler trip that was observed in 2002, and therefore vary between the alternatives in proportion to the difference in estimated total recreational groundfish catch shown in Table 4.5.4-15. Due to uncertainty in the actual relationship between harvest level and effort, the relative rankings of the impacts under the alternatives are probably more reliable indicators than the absolute levels of impacts shown in the table. As expected, there is no difference between the alternatives in estimated effort in Washington, and little difference for Oregon. The greatest variation occurs in Southern California, where estimated groundfish effort under the *High OY* alternative is nearly four times greater than under *No Action*. In the North and Central California region, estimated groundfish effort is just more than one and a half times greater under the *High OY* alternative than under the *No Action* alternative.

Change in quality of trips

In general, compared with the *No Action* alternative, the quality of recreational trips increases under all of the 2004 management alternatives. There is an expansion of fishing opportunities into areas and seasons that were closed in 2003. In California, bag limits for bocaccio are also increased from the *No Action* scenario. In Oregon and Washington, however, bag limits for canary rockfish are reduced under each alternative except *High OY.*

More trips vs higher qualitytrips

Because bag limits are not very different between the alternatives, there is probably also not much of a tradeoff between quantity versus quality of trips between the alternatives.

Adjacent fisheries

Compared with 2003 (*No Action*), opportunities for recreational groundfish fishing on the West Coast increase under all of the alternatives. This may have the effect of reducing pressure on other fisheries that may have absorbed effort that was displaced from the groundfish fishery during 2003 by management restrictions to protect overfished species. Examples of adjacent recreational fisheries that may be affected include: salmon and Pacific halibut.

Operational Safety

In Washington, the same season and depth restrictions are in place under each alternative. There is no difference between the management alternatives in terms of safety considerations for recreational fishers.

In Oregon, depth/area closures are considerably more restrictive under the 2004 alternatives than under the *No Action* alternative. However the depth line is set no shallower than 40 fm under any alternative, and the season is generally year round, so differential implications for boater safety are predicted to be minimal.

For Northern California, in contrast to the *No Action* alternative, where a 27 fm limit is imposed only if the canary or yelloweye harvest guidline is attained, under the other alternatives fishing is limited to inside 30 fm during open seasons. Pushing fishing closer to shore may negatively affect boater safety under these alternatives.

For California between Cape Mendocino and Point Conception, compared with *No Action*, restrictions on the seasons and depths available for fishing are relaxed somewhat under all the other alternatives. This is predicted to make all alternatives relatively safer than the *No Action* alternative. The safest alternative is predicted to be the *High OY* alternative, where the fishery is closed during January and February, but open inside 30 fm the remainder of the year.

For California south of Point Conception, compared with *No Action*, restrictions on the seasons and depths available for fishing are relaxed considerably under all the other alternatives. All alternatives are predicted to be relatively safer than the *No Action* alternative. The safest alternative is predicted to be the *High OY* alternative, where the season is open year-round without depth restrictions.

Demand for Charter Boat Services

Increased recreational fishing opportunities under the alternatives should translate into increased demand for charter fishing trips. Compared with 2003 (*No Action*), bag limits are generally no more restrictive under any of the other alternatives, and the configuration of seasons and areas open for fishing should enhance the quality of the recreational experience and encourage demand.

4.5.4.3 Cumulative Impacts

Periodic ocean and atmospheric phenomena that bring warm water closer to the West Coast north of Cape Mendocino can have a significant impact on recreational fisheries. During such periods, sport fishers get to experience fishing for species usually only found much further south, and local charter operators enjoy increased local demand for their services.

4.5.4.4 Summary

Aggregate impacts on recreational fisheries under the alternatives are shown in the table below.

Recreational Fishery Impacts	Indicator	No Action (est. 2003)	Low OY	Medium OY	High OY	Council OY
Estimated effort						
All Trips	(000 trips)[a/]	3,430	4,738	5,183	5,330	4,303
GF Trips	(000 trips)	986	2,294	2,740	2,886	1,860
Quality of trips	(-,0,+)	-	+	+	++	+
Effect on adjacent fisheries	(-,0,+)	-	-	-	-	-
Operational safety						
WA	(-,0,+)	0	0	0	0	0
OR	(-,0,+)	0	0	0	0	0
CA (North of 40-10)	(-,0,+)	0	-	-	-	-
CA (40-10 to 34-27)	(-,0,+)	-	+	+	+	+
CA (South of 34-27)	(-,0,+)	-	+	+	+	+
Demand for charters	(-,0,+)	-	+	+	++	+

a/ (-, 0, +)=Indicates decrease, no change, and increase respectively, with respect to conditions present in the 2002 recreational fishery.

TABLE 4.5.4-1. Estimated 2004 Oregon recreational fishery under No Action alternative. (Page 1 of 2)

	Minor Nearshore Rockfish													
	Yellowey e	Canary	Lingcod	Widow	Black	Blue	Brown	China	Copper	Grass	Quillback	Cabezon	Kelp Greenling	Rock Greenling
Scaling factors used for offshore closures with retention:														
Jan	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Feb	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mar	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Apr	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
May	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
June	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
July	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
August	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
September	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
October	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
November	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
December	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Estimated number of fish caught in 2004:														
Jan	499	72	161	14	1,886	467	20	19	17	0	21	51	65	0
Feb	21	157	640	31	4,770	1,433	0	70	53	0	90	146	164	0
Mar	38	369	1,215	108	16,045	3,542	1	100	84	1	143	278	327	0
Apr	82	660	2,183	112	23,342	2,772	2	193	147	1	124	523	525	0
May	195	1,175	3,526	158	36,421	3,150	1	368	360	2	393	885	811	3
June	261	885	2,793	392	44,581	3,538	272	519	351	3	525	1,135	1,159	15
July	180	1,154	2,960	606	46,552	4,278	25	568	427	4	533	1,218	1,130	14
August	582	3,033	5,040	1,217	55,464	10,993	1	820	599	2	1,019	1,418	1,574	21
September	161	958	1,917	342	20,510	4,108	1	328	241	1	320	542	736	4
October	106	572	1,059	226	8,387	3,201	0	131	61	2	84	255	294	2
November	15	118	292	19	3,854	629	4	48	32	0	45	42	41	2
December	23	137	341	30	4,126	572	3	49	37	0	43	113	124	2
total number of ocean fish =	1,673	9,290	22,129	3,255	265,936	38,681	332	3,213	2,407	14	3,339	6,604	6,948	64
2000-2002 avg wt (kg)	1.91	0.96	3.96	0.89	1.12	0.68	0.94	0.96	1.36	1.16	1.02	2.09	0.67	0.57

TABLE 4.5.4-1. Estimated 2004 Oregon recreational fishery under No Action alternative. (Page 2 of 2)

	Minor Nearshore Rockfish													
	Yelloweye	Canary	Lingcod	Widow	Black	Blue	Brown	China	Copper	Grass	Quillback	Cabezon	Kelp Greenling	Rock Greenling
Estimated landed weight in kg:														
Jan	952	69	639	12	2,112	318	19	19	24	0	21	107	43	0
Feb	40	151	2,536	27	5,342	974	0	68	72	0	91	304	110	0
Mar	73	354	4,809	96	17,970	2,408	1	96	114	1	146	582	219	0
Apr	157	634	8,645	100	26,143	1,885	2	185	200	1	126	1,092	352	0
May	372	1,128	13,965	141	40,791	2,142	1	354	490	2	401	1,849	543	2
June	499	850	11,061	349	49,931	2,406	256	498	477	3	536	2,371	776	9
July	344	1,108	11,723	539	52,138	2,909	24	545	581	4	543	2,545	757	8
August	1,112	2,912	19,959	1,083	62,119	7,475	1	788	814	2	1,039	2,963	1,054	12
September	308	920	7,593	304	22,971	2,793	1	315	327	1	326	1,132	493	2
October	202	549	4,194	201	9,393	2,177	0	126	83	2	86	534	197	1
November	29	113	1,158	17	4,316	427	4	46	43	0	46	88	28	1
December	44	132	1,351	27	4,621	389	3	47	50	0	44	235	83	1
total ocean boat kg =	4,130	8,918	87,632	2,897	297,848	26,303	312	3,085	3,274	16	3,406	12,423	4,655	36
inside and shore (kg) =	0	0	9,666	0	18,333	1,000	0	0	2,333	2,000	0	1,760	26,333	0
total kg =	3,195	8,918	97,298	2,897	316,181	27,303	312	3,085	5,607	2,016	3,406	14,182	30,988	36
discard mortality due to non-retention (halibut fishery)	579	223												
B1 discard mortality	144	479												
total kg impacts =	3,918	9,620												

Notes:
1. Data source: Oregon Recreational Ocean Boat Survey (ORBS) and MRFSS for shore and estuary.
2. Based on 2002 for overfished stocks; except expected 2003 lingcod; 2001-2002 avg for black rock and blue rock; 2000-2002 avg. for other species.
3. Average weight data is from 2000-2002 avg.
4. Inside and shore estimates are based on MRFSS using 2000-2002 avg.
5. Bycatch mortality is based on 2001 observer study for discard rate and 2003 study for avg size and includes impacts from halibut fishery.

TABLE 4.5.4-2. Estimated 2004 Oregon recreational fishery under High OY alternative. (Page 1 of 2)

					Minor Nearshore Rockfish									
	Yelloweye	Canary	Lingcod	Widow	Black	Blue	Brown	China	Copper	Grass	Quillback	Cabezon	Kelp Greenling	Rock Greenling
Scaling factors used for offshore closures with retention:														
Jan	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Feb	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mar	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Apr	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
May	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
June	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
July	0.75	0.62	1.03	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
August	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
September	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
October	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
November	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
December	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Estimated number of fish caught in 2004:														
Jan	9	72	161	14	1,886	467	20	19	17	0	21	51	65	0
Feb	21	157	640	31	4,770	1,433	0	70	53	0	90	146	164	0
Mar	38	369	1,215	108	16,045	3,542	1	100	84	1	143	278	327	0
Apr	82	660	2,183	112	23,342	2,772	2	193	147	1	124	523	525	0
May	195	1,175	3,526	158	36,421	3,150	1	368	360	2	393	885	811	3
June	261	885	2,793	392	44,581	3,538	272	519	351	3	525	1,135	1,159	15
July	135	711	2,635	80	51,207	4,706	28	625	470	4	586	1,339	1,243	15
August	582	3,033	5,040	1,217	55,464	10,993	1	820	599	2	1,019	1,418	1,574	21
September	161	958	1,917	342	20,510	4,108	1	328	241	1	320	542	736	4
October	106	572	1,059	226	8,387	3,201	0	131	61	2	84	255	294	2
November	15	118	292	19	3,854	629	4	48	32	0	45	42	41	2
December	23	137	341	30	4,126	572	3	49	37	0	43	113	124	2
total number of ocean fish =	1,628	8,847	21,804	2,729	270,591	39,108	334	3,270	2,450	14	3,393	6,726	7,061	65
2000-2002 avg wt (kg)	1.91	0.96	3.96	0.89	1.12	0.68	0.94	0.96	1.36	1.16	1.02	2.09	0.67	0.57

TABLE 4.5.4-2. Estimated 2004 Oregon recreational fishery under High OY alternative. (Page 2 of 2)

	Minor Nearshore Rockfish													
	Yelloweye	Canary	Lingcod	Widow	Black	Blue	Brown	China	Copper	Grass	Quillback	Cabezon	Kelp Greenling	Rock Greenling
Estimated landed weight in kg:														
Jan	17	69	639	12	2,112	318	19	19	24	0	21	107	43	0
Feb	40	151	2,536	27	5,342	974	0	68	72	0	91	304	110	0
Mar	73	354	4,809	96	17,970	2,408	1	96	114	1	146	582	219	0
Apr	157	634	8,645	100	26,143	1,885	2	185	200	1	126	1,092	352	0
May	372	1,128	13,965	141	40,791	2,142	1	354	490	2	401	1,849	543	2
June	499	850	11,061	349	49,931	2,406	256	498	477	3	536	2,371	776	9
July	257	682	10,433	71	57,352	3,200	26	600	639	5	598	2,799	833	9
August	1,112	2,912	19,959	1,083	62,119	7,475	1	788	814	2	1,039	2,963	1,054	12
September	308	920	7,593	304	22,971	2,793	1	315	327	1	326	1,132	493	2
October	202	549	4,194	201	9,393	2,177	0	126	83	2	86	534	197	1
November	29	113	1,158	17	4,316	427	4	46	43	0	46	88	28	1
December	44	132	1,351	27	4,621	389	3	47	50	0	44	235	83	1
total ocean boat kg =	3,109	8,493	86,343	2,429	303,062	26,594	314	3,139	3,332	17	3,460	12,652	4,731	37
inside and shore (kg) =	0	0	9,666	0	18,333	1,000	0	0	2,333	2,000	0	1,760	20,013	0
total kg =	3,109	8,493	96,009	2,429	321,395	27,594	314	3,139	5,665	2,017	3,460	14,411	24,744	37
discard mortality due to non-retention (halibut fishery)	579	223												
B1 discard mortality	140	456												
total kg impacts =	3,827	9,172												

Notes:
1. Data source: Oregon Recreational Ocean Boat Survey (ORBS) and MRFSS for shore and estuary.
2. Based on 2002 for overfished stocks; except expected 2003 lingcod; 2001-2002 avg for black rock and blue rock; 2000-2002 avg. for other species.
3. Average weight data is from 2000-2002 avg.
4. Inside and shore estimates are based on MRFSS using 2000-2002 avg.
5. Bycatch mortality is based on 2001 observer study for discard rate and 2003 study for avg size and includes impacts from halibut fishery.

TABLE 4.5.4-3. Estimated 2004 Oregon recreational fishery under Medium OY alternative (Page 1 of 2)

	Minor Nearshore Rockfish													
	Yelloweye	Canary	Lingcod	Widow	Black	Blue	Brown	China	Copper	Grass	Quillback	Cabezon	Kelp Greenling	Rock Greenling
Scaling factors used for offshore closures with retention:														
Jan	0.00	0.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.10
Feb	0.00	0.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.10
Mar	0.00	0.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.10
Apr	0.00	0.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.10
May	0.00	0.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.10
June	0.00	0.00	1.03	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
July	0.00	0.00	1.03	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
August	0.00	0.00	1.03	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
September	0.00	0.00	1.03	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
October	0.00	0.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.10
November	0.00	0.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.10
December	0.00	0.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.10
Estimated number of fish caught in 2004:														
Jan	0	0	161	14	1,886	467	20	19	17	0	21	51	71	0
Feb	0	0	640	31	4,770	1,433	0	70	53	0	90	146	180	0
Mar	0	0	1,215	108	16,045	3,542	1	100	84	1	143	278	360	0
Apr	0	0	2,183	112	23,342	2,772	2	193	147	1	124	523	578	0
May	0	0	3,526	158	36,421	3,150	1	368	360	2	393	885	892	4
June	0	0	2,486	52	49,039	3,892	300	571	386	3	578	1,248	1,275	17
July	0	0	2,635	80	51,207	4,706	28	625	470	4	586	1,339	1,243	15
August	0	0	4,486	161	61,010	12,092	1	902	659	2	1,121	1,559	1,731	23
September	0	0	1,707	45	22,560	4,519	1	361	265	1	352	596	810	4
October	0	0	1,059	226	8,387	3,201	0	131	61	2	84	255	323	3
November	0	0	292	19	3,854	629	4	48	32	0	45	42	45	2
December	0	0	341	30	4,126	572	3	49	37	0	43	113	136	2
total number of ocean fish =	0	0	20,731	1,036	282,646	40,972	362	3,437	2,569	15	3,579	7,036	7,643	70
2000-2002 avg wt (kg)	1.91	0.96	3.96	0.89	1.12	0.68	0.94	0.96	1.36	1.16	1.02	2.09	0.67	0.57

TABLE 4.5.4-3. Estimated 2004 Oregon recreational fishery under Medium OY alternative (Page 2 of 2)

	Minor Nearshore Rockfish													
	Yelloweye	Canary	Lingcod	Widow	Black	Blue	Brown	China	Copper	Grass	Quillback	Cabezon	Kelp Greenling	Rock Greenling
Estimated landed weight in kg:														
Jan	0	0	639	12	2,112	318	19	19	24	0	21	107	48	0
Feb	0	0	2,536	27	5,342	974	0	68	72	0	91	304	121	0
Mar	0	0	4,809	96	17,970	2,408	1	96	114	1	146	582	241	0
Apr	0	0	8,645	100	26,143	1,885	2	185	200	1	126	1,092	387	0
May	0	0	13,965	141	40,791	2,142	1	354	490	2	401	1,849	597	2
June	0	0	9,845	46	54,924	2,646	282	548	525	3	589	2,609	854	9
July	0	0	10,433	71	57,352	3,200	26	600	639	5	598	2,799	833	9
August	0	0	17,764	143	68,331	8,223	1	866	896	3	1,143	3,259	1,160	13
September	0	0	6,758	40	25,268	3,073	1	346	360	1	359	1,245	542	2
October	0	0	4,194	201	9,393	2,177	0	126	83	2	86	534	216	1
November	0	0	1,158	17	4,316	427	4	46	43	0	46	88	30	1
December	0	0	1,351	27	4,621	389	3	47	50	0	44	235	91	1
total ocean boat kg =	0	0	82,095	922	316,564	27,861	340	3,299	3,494	17	3,651	11,763	5,121	40
inside and shore (kg) =	0	0	9,666	0	18,333	1,000	0	0	2,333	2,000	0	1,320	16,063	0
total kg =	0	0	91,761	922	334,897	28,861	340	3,299	5,827	2,017	3,651	13,083	21,184	40
additional reduction from rockpile	402	422												
discard mortality due to non-retention (halibut fishery)	579	223												
discard mortality due to non-retention	2,543	5,708												
B1 discard mortality	114	342												
total kg impacts =	2,833	5,851												

Notes:
1. Data source: Oregon Recreational Ocean Boat Survey (ORBS) and MRFSS for shore and estuary.
2. Based on 2002 for overfished stocks; except expected 2003 lingcod; 2001-2002 avg for black rock and blue rock; 2000-2002 avg. for other species.
3. Average weight data is from 2000-2002 avg.
4. Inside and shore estimates are based on MRFSS using 2000-2002 avg.
5. Bycatch mortality is based on 2001 observer study for discard rate and 2003 study for avg size and includes impacts from halibut fishery.

TABLE 4.5.4-4. Estimated 2004 Oregon recreational fishery under Low OY alternative (Page 1 of 2)

					Minor Nearshore Rockfish									
	Yelloweye	Canary	Lingcod	Widow	Black	Blue	Brown	China	Copper	Grass	Quillback	Cabezon	Kelp Greenling	Rock Greenling
Scaling factors used for offshore closures with retention:														
Jan	0.00	0.00	0.73	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	0.00	1.10	1.10
Feb	0.00	0.00	0.73	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	0.00	1.10	1.10
Mar	0.00	0.00	0.73	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	0.00	1.10	1.10
Apr	0.00	0.00	0.73	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	0.00	1.10	1.10
May	0.00	0.00	0.73	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	0.00	1.10	1.10
June	0.00	0.00	0.73	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	0.00	1.10	1.10
July	0.00	0.00	0.73	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	0.00	1.10	1.10
August	0.00	0.00	0.73	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	0.00	1.10	1.10
September	0.00	0.00	0.73	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	0.00	1.10	1.10
October	0.00	0.00	0.73	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	0.00	1.10	1.10
November	0.00	0.00	0.73	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	0.00	1.10	1.10
December	0.00	0.00	0.73	0.13	1.10	1.10	1.10	1.10	1.10	1.10	1.10	0.00	1.10	1.10
Estimated number of fish caught in 2004:														
Jan	0	0	102	2	2,075	514	22	21	19	0	23	0	71	0
Feb	0	0	405	4	5,246	1,576	0	77	58	0	99	0	180	0
Mar	0	0	767	14	17,650	3,896	1	110	92	1	157	0	360	0
Apr	0	0	1,380	15	25,676	3,049	2	212	162	1	136	0	578	0
May	0	0	2,228	21	40,063	3,464	1	405	396	2	432	0	892	4
June	0	0	1,765	52	49,039	3,892	300	571	386	3	578	0	1,275	17
July	0	0	1,871	80	51,207	4,706	28	625	470	4	586	0	1,243	15
August	0	0	3,185	161	61,010	12,092	1	902	659	2	1,121	0	1,731	23
September	0	0	1,212	45	22,560	4,519	1	361	265	1	352	0	810	4
October	0	0	669	30	9,226	3,521	0	144	67	2	93	0	323	3
November	0	0	185	3	4,239	691	5	52	35	0	50	0	45	2
December	0	0	216	4	4,538	629	3	54	40	0	47	0	136	2
total number of ocean fish =	0	0	13,984	430	292,529	42,549	365	3,535	2,648	15	3,673	0	7,643	70
2000-2002 avg wt (kg)	1.91	0.96	3.96	0.89	1.12	0.68	0.94	0.96	1.36	1.16	1.02	2.09	0.67	0.57

TABLE 4.5.4-4. Estimated 2004 Oregon recreational fishery under Low OY alternative (Page 2 of 2)

	Minor Nearshore Rockfish													
	Yelloweye	Canary	Lingcod	Widow	Black	Blue	Brown	China	Copper	Grass	Quillback	Cabezon	Kelp Greenling	Rock Greenling
Estimated landed weight in kg:														
Jan	0	0	0	2	2,324	349	21	20	26	0	24	0	48	0
Feb	0	0	1,839	4	5,876	1,072	0	74	79	0	101	0	121	0
Mar	0	0	3,489	13	19,767	2,649	1	106	125	1	160	0	241	0
Apr	0	0	6,271	13	28,757	2,073	2	203	220	1	139	0	387	0
May	0	0	10,129	19	44,870	2,356	1	389	539	2	441	0	597	2
June	0	0	8,023	46	54,924	2,646	282	548	525	3	589	0	854	9
July	0	0	8,503	71	57,352	3,200	26	600	639	5	598	0	833	9
August	0	0	14,477	143	68,331	8,223	1	866	896	3	1,143	0	1,160	13
September	0	0	5,508	40	25,268	3,073	1	346	360	1	359	0	542	2
October	0	0	3,042	27	10,333	2,394	0	138	91	2	95	0	216	1
November	0	0	840	2	4,748	470	4	50	47	0	50	0	30	1
December	0	0	980	4	5,083	427	3	51	55	0	48	0	91	1
total ocean boat kg =	0	0	63,564	382	327,633	28,933	343	3,393	3,601	18	3,747	0	5,121	40
inside and shore (kg) =	0	0	6,766	0	18,333	1,000	0	0	2,333	2,000	0	0	11,060	0
total kg =	0	0	70,330	382	345,966	29,933	343	3,393	5,934	2,018	3,747	0	16,181	40
additional reduction from rockpile	447	468												
discard mortality due to non-retention (halibut fishery)	579	223												
discard mortality due to non-retention	2,377	4,811												
normal discard mortality	75	451												
total kg impacts =	2,584	5,016												

Notes:
1. Data source: Oregon Recreational Ocean Boat Survey (ORBS) and MRFSS for shore and estuary.
2. Based on 2002 for overfished stocks; except expected 2003 lingcod; 2001-2002 avg for black rock and blue rock; 2000-2002 avg. for other species.
3. Average weight data is from 2000-2002 avg.
4. Inside and shore estimates are based on MRFSS using 2000-2002 avg.
5. Bycatch mortality is based on 2001 observer study for discard rate and 2003 study for avg size and includes impacts from halibut fishery.

TABLE 4.5.4-5. Expected 2004 California recreational bocaccio catch (mt) south of Cape Mendocino by region, depth, and period. (Page 1 of 1)

Depth range (fm)	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	All Periods
U.S./Mexico Border to Point Conception							
1-10	0.20	0.12	0.04	0.02	0.07	0.06	0.52
11-20	0.71	0.43	0.15	0.08	0.23	0.21	1.81
21-30	4.94	3.04	1.02	0.55	1.64	1.46	12.66
31-40	10.19	6.26	2.10	1.14	3.38	3.02	26.09
41-50	17.25	10.60	3.56	1.93	5.72	5.11	44.17
51-60	4.94	3.04	1.02	0.55	1.64	1.46	12.66
61-70	0.91	0.56	0.19	0.10	0.30	0.27	2.32
71-80	2.12	1.30	0.44	0.24	0.70	0.63	5.42
81-90	5.35	3.28	1.10	0.60	1.77	1.58	13.69
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	1.31	0.81	0.27	0.15	0.44	0.39	3.36
All Depths	44.00	29.40	9.70	5.30	19.30	15.00	122.71
Point Conception to Point San Pedro							
1-10	0.22	0.14	0.12	0.12	0.22	0.04	0.86
11-20	0.11	0.07	0.06	0.06	0.11	0.02	0.43
21-30	0.77	0.51	0.40	0.40	0.76	0.15	2.99
31-40	0.44	0.29	0.23	0.23	0.43	0.09	1.71
41-50	2.75	1.80	1.44	1.44	2.71	0.54	10.69
51-60	8.80	5.77	4.62	4.62	8.66	1.73	34.20
61-70	1.76	1.15	0.92	0.92	1.73	0.35	6.84
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	14.86	9.74	7.79	7.79	14.61	2.92	57.72
Point San Pedro to Cape Mendocino							
1-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11-20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21-30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31-40	3.34	2.19	1.75	1.75	3.28	0.66	12.97
41-50	3.02	1.98	1.58	1.58	2.97	0.59	11.73
51-60	6.20	4.06	3.25	3.25	6.10	1.22	24.08
61-70	7.15	4.69	3.75	3.75	7.03	1.41	27.79
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	19.71	12.92	10.34	10.34	19.38	3.88	76.57

TABLE 4.5.4-6. Expected 2004 California recreational canary catch (mt) south of Cape Mendocino by region, depth, and period. (Page 1 of 1)

Depth range (fm)	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	All Periods
			U.S./Mexico Border to Point Conception				
1-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11-20	0.00	0.00	0.00	0.00	0.01	0.00	0.02
21-30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31-40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41-50	0.05	0.11	0.00	0.11	0.21	0.05	0.53
51-60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61-70	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.05	0.11	0.00	0.11	0.21	0.05	0.53
All Depths	0.10	0.20	0.00	0.20	0.40	0.20	1.08
			Point Conception to Point San Pedro				
1-10	0.00	0.00	0.00	0.00	0.00	0.00	0.02
11-20	0.04	0.08	0.09	0.11	0.11	0.05	0.46
21-30	0.56	1.14	1.36	1.59	1.59	0.72	6.95
31-40	0.04	0.08	0.09	0.11	0.11	0.05	0.47
41-50	0.13	0.26	0.31	0.36	0.36	0.16	1.58
51-60	0.57	1.16	1.39	1.62	1.62	0.74	7.11
61-70	0.51	1.03	1.24	1.44	1.44	0.66	6.32
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	2.30	3.20	4.30	4.90	5.30	2.80	22.93
			Point San Pedro to Cape Mendocino				
1-10	0.00	0.01	0.01	0.01	0.01	0.01	0.05
11-20	0.16	0.33	0.40	0.46	0.46	0.21	2.04
21-30	0.23	0.46	0.55	0.64	0.64	0.29	2.80
31-40	0.66	1.34	1.61	1.87	1.87	0.85	8.21
41-50	1.11	2.26	2.70	3.15	3.15	1.43	13.81
51-60	0.72	1.47	1.75	2.04	2.04	0.93	8.96
61-70	0.53	1.07	1.28	1.49	1.49	0.68	6.53
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	4.30	6.00	7.90	9.10	9.90	5.20	42.39

TABLE 4.5.4-7. Expected 2004 California recreational cowcod catch (mt) south of Cape Mendocino by region, depth, and period. (Page 1 of 1)

Depth range (fm)	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	All Periods
U.S./Mexico Border to Point Conception							
1-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11-20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21-30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31-40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41-50	0.15	0.22	0.07	0.04	0.17	0.31	0.95
51-60	0.10	0.15	0.05	0.02	0.11	0.21	0.64
61-70	0.10	0.15	0.05	0.02	0.11	0.21	0.64
71-80	0.05	0.07	0.02	0.01	0.06	0.10	0.32
81-90	0.20	0.29	0.10	0.05	0.22	0.42	1.27
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.05	0.07	0.02	0.01	0.06	0.10	0.32
All Depths	0.64	0.95	0.32	0.16	0.72	1.35	4.13
Point Conception to Point San Pedro							
1-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11-20	0.02	0.00	0.07	0.07	0.02	0.00	0.20
21-30	0.00	0.00	0.01	0.01	0.00	0.00	0.02
31-40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41-50	0.00	0.00	0.01	0.01	0.00	0.00	0.02
51-60	0.01	0.00	0.03	0.03	0.01	0.00	0.08
61-70	0.01	0.00	0.04	0.04	0.01	0.00	0.10
71-80	0.00	0.00	0.01	0.01	0.00	0.00	0.02
81-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	0.06	0.00	0.17	0.17	0.06	0.00	0.44
Point San Pedro to Cape Mendocino							
1-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11-20	0.03	0.00	0.09	0.09	0.03	0.00	0.24
21-30	0.00	0.00	0.01	0.01	0.00	0.00	0.02
31-40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41-50	0.00	0.00	0.01	0.01	0.00	0.00	0.02
51-60	0.01	0.00	0.04	0.04	0.01	0.00	0.10
61-70	0.02	0.00	0.05	0.05	0.02	0.00	0.12
71-80	0.00	0.00	0.01	0.01	0.00	0.00	0.02
81-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	0.07	0.00	0.20	0.20	0.07	0.00	0.54

TABLE 4.5.4-8. Expected 2004 California recreational deeper nearshore rockfish catch (mt) south of Cape Mendocino by region, depth, and period. (Page 1 of 1)

Depth range (fm)	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	All Periods
U.S./Mexico Border to Point Conception							
1-10	1.46	1.20	0.64	0.82	0.91	0.88	5.90
11-20	4.81	3.96	2.10	2.71	3.00	2.92	19.51
21-30	5.72	4.70	2.50	3.22	3.56	3.47	23.16
31-40	2.33	1.92	1.02	1.31	1.45	1.42	9.45
41-50	1.22	1.00	0.53	0.69	0.76	0.74	4.95
51-60	0.07	0.06	0.03	0.04	0.05	0.04	0.30
61-70	0.06	0.05	0.03	0.03	0.04	0.04	0.25
71-80	0.06	0.05	0.03	0.03	0.04	0.04	0.25
81-90	0.11	0.09	0.05	0.06	0.07	0.07	0.45
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.09	0.07	0.04	0.05	0.05	0.05	0.35
All Depths	15.94	13.10	6.97	8.97	9.92	9.68	64.58
Point Conception to Point San Pedro							
1-10	1.29	1.88	4.90	7.21	6.94	3.22	25.44
11-20	2.96	4.31	11.25	16.54	15.94	7.39	58.38
21-30	2.39	3.49	9.12	13.40	12.91	5.99	47.30
31-40	1.58	2.30	6.02	8.85	8.53	3.95	31.23
41-50	0.68	0.99	2.59	3.80	3.66	1.70	13.42
51-60	0.39	0.57	1.50	2.20	2.12	0.98	7.78
61-70	0.07	0.10	0.25	0.37	0.36	0.17	1.32
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	9.36	13.64	35.64	52.36	50.47	23.39	184.87
Point San Pedro to Cape Mendocino							
1-10	2.55	3.72	9.72	14.28	13.76	6.38	50.42
11-20	5.71	8.32	21.74	31.94	30.78	14.27	112.75
21-30	1.16	1.69	4.42	6.49	6.26	2.90	22.93
31-40	0.75	1.09	2.86	4.20	4.05	1.88	14.83
41-50	0.14	0.21	0.54	0.79	0.77	0.35	2.80
51-60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61-70	0.01	0.01	0.04	0.06	0.05	0.03	0.20
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81-90	0.00	0.00	0.01	0.02	0.02	0.01	0.06
91-100	0.02	0.02	0.06	0.09	0.09	0.04	0.31
100+	0.02	0.02	0.06	0.09	0.09	0.04	0.31
All Depths	10.36	15.10	39.45	57.96	55.86	25.89	204.61

Table 4.5.4-9. Expected 2004 California recreational lingcod catch (mt) south of Cape Mendocino by region, depth, and period. (Page 1 of 1)

Depth range (fm)	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	All Periods
U.S./Mexico Border to Point Conception							
1-10	0.18	0.07	0.09	0.08	0.12	0.34	0.88
11-20	0.69	0.28	0.37	0.30	0.48	1.34	3.46
21-30	1.26	0.50	0.67	0.55	0.88	2.44	6.31
31-40	0.64	0.26	0.34	0.28	0.45	1.24	3.21
41-50	0.51	0.20	0.27	0.22	0.35	0.98	2.53
51-60	0.09	0.04	0.05	0.04	0.06	0.17	0.44
61-70	0.03	0.01	0.02	0.01	0.02	0.06	0.16
71-80	0.03	0.01	0.02	0.01	0.02	0.06	0.16
81-90	0.04	0.02	0.02	0.02	0.03	0.08	0.20
91-100	0.02	0.01	0.01	0.01	0.01	0.03	0.08
100+	0.04	0.02	0.02	0.02	0.03	0.08	0.20
All Depths	3.53	1.41	1.88	1.53	2.47	6.82	17.64
Point Conception to Point San Pedro							
1-10	0.54	1.95	2.68	4.63	4.83	2.48	17.11
11-20	1.40	5.05	6.95	12.03	12.53	6.45	44.41
21-30	0.41	1.50	2.06	3.56	3.71	1.91	13.16
31-40	0.15	0.54	0.75	1.29	1.35	0.69	4.77
41-50	0.01	0.02	0.03	0.04	0.05	0.02	0.16
51-60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61-70	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91-100	0.01	0.04	0.05	0.09	0.09	0.05	0.33
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	2.52	9.09	12.52	21.65	22.55	11.61	79.95
Point San Pedro to Cape Mendocino							
1-10	0.99	3.57	4.91	8.49	8.85	4.56	31.36
11-20	0.94	3.38	4.65	8.05	8.39	4.32	29.73
21-30	0.40	1.45	2.00	3.46	3.60	1.86	12.77
31-40	0.18	0.66	0.91	1.57	1.64	0.84	5.81
41-50	0.75	2.70	3.72	6.43	6.70	3.45	23.75
51-60	0.35	1.25	1.72	2.97	3.10	1.59	10.97
61-70	0.46	1.68	2.31	3.99	4.16	2.14	14.74
71-80	0.00	0.01	0.01	0.02	0.02	0.01	0.08
81-90	0.01	0.04	0.05	0.09	0.09	0.05	0.33
91-100	0.01	0.02	0.03	0.04	0.05	0.02	0.16
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	4.09	14.75	20.31	35.13	36.60	18.84	129.71

TABLE 4.5.4-10. Expected 2004 California recreational shallow nearshore rockfish catch (mt) south of Cape Mendocino by region, depth, and period. (Page 1 of 1)

Depth range (fm)	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	All Periods
			U.S./Mexico Border to Point Conception				
1-10	0.36	0.44	0.49	0.30	0.33	0.27	2.19
11-20	0.62	0.77	0.86	0.53	0.57	0.48	3.83
21-30	0.48	0.60	0.67	0.41	0.45	0.37	2.98
31-40	0.09	0.11	0.12	0.08	0.08	0.07	0.55
41-50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
51-60	0.00	0.01	0.01	0.00	0.00	0.00	0.03
61-70	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81-90	0.01	0.01	0.01	0.01	0.01	0.01	0.06
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	1.57	1.93	2.17	1.32	1.44	1.20	9.63
			Point Conception to Point San Pedro				
1-10	0.29	0.69	1.63	2.18	3.02	1.06	8.88
11-20	0.66	1.56	3.70	4.93	6.85	2.40	20.11
21-30	0.48	1.13	2.66	3.55	4.94	1.73	14.49
31-40	0.07	0.17	0.41	0.54	0.75	0.26	2.21
41-50	0.04	0.08	0.20	0.26	0.37	0.13	1.08
51-60	0.01	0.02	0.06	0.08	0.10	0.04	0.31
61-70	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	1.55	3.66	8.65	11.54	16.04	5.63	47.07
			Point San Pedro to Cape Mendocino				
1-10	0.28	0.67	1.58	2.11	2.93	1.03	8.61
11-20	0.26	0.62	1.48	1.97	2.74	0.96	8.03
21-30	0.03	0.07	0.17	0.22	0.31	0.11	0.91
31-40	0.02	0.06	0.13	0.18	0.25	0.09	0.73
41-50	0.00	0.01	0.02	0.03	0.04	0.01	0.11
51-60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61-70	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81-90	0.01	0.02	0.04	0.05	0.07	0.03	0.22
91-100	0.00	0.01	0.03	0.04	0.05	0.02	0.15
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	0.62	1.46	3.45	4.59	6.39	2.24	18.74

TABLE 4.5.4-11. Expected 2004 California recreational widow rockfish catch (mt) south of Cape Mendocino by region, depth, and period. (Page 1 of 1)

Depth range (fm)	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	All Periods
			U.S./Mexico Border to Point Conception				
1-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11-20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21-30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31-40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41-50	0.00	0.07	0.00	0.00	0.03	0.00	0.10
51-60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
61-70	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	0.00	0.07	0.00	0.00	0.03	0.00	0.10
			Point Conception to Point San Pedro				
1-10	0.00	0.00	0.00	0.00	0.01	0.00	0.02
11-20	0.00	0.00	0.00	0.00	0.01	0.00	0.02
21-30	0.05	0.05	0.01	0.02	0.06	0.01	0.20
31-40	0.38	0.38	0.10	0.14	0.44	0.10	1.54
41-50	0.33	0.33	0.09	0.12	0.38	0.09	1.35
51-60	0.74	0.74	0.20	0.27	0.85	0.20	2.99
61-70	0.74	0.74	0.20	0.27	0.86	0.20	3.02
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.01
81-90	0.00	0.00	0.00	0.00	0.00	0.00	0.01
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	2.25	2.25	0.61	0.82	2.59	0.61	9.15
			Point San Pedro to Cape Mendocino				
1-10	0.00	0.00	0.00	0.00	0.00	0.00	0.02
11-20	0.00	0.00	0.00	0.00	0.00	0.00	0.02
21-30	0.04	0.04	0.01	0.02	0.05	0.01	0.18
31-40	0.34	0.34	0.09	0.12	0.39	0.09	1.38
41-50	0.30	0.30	0.08	0.11	0.34	0.08	1.21
51-60	0.66	0.66	0.18	0.24	0.76	0.18	2.68
61-70	0.67	0.67	0.18	0.24	0.77	0.18	2.71
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.01
81-90	0.00	0.00	0.00	0.00	0.00	0.00	0.01
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	2.02	2.02	0.55	0.73	2.32	0.55	8.19

TABLE 4.5.4-12. Expected 2004 California recreational yelloweye rockfish catch (mt) south of Cape Mendocino by region, depth, and period. (Page 1 of 1)

Depth range (fm)	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	All Periods
U.S./Mexico Border to Point Conception							
1-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11-20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21-30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31-40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41-50	0.00	0.00	0.00	0.07	0.13	0.00	0.20
51-60	0.00	0.00	0.00	0.13	0.26	0.00	0.39
61-70	0.00	0.00	0.00	0.07	0.13	0.00	0.20
71-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Depths	0.00	0.00	0.00	0.26	0.53	0.00	0.79
Point Conception to Point San Pedro							
1-10	0.00	0.00	0.00	0.00	0.01	0.00	0.02
11-20	0.01	0.01	0.01	0.02	0.03	0.01	0.09
21-30	0.01	0.00	0.00	0.01	0.01	0.01	0.05
31-40	0.01	0.00	0.00	0.01	0.01	0.01	0.05
41-50	0.07	0.04	0.04	0.09	0.12	0.06	0.40
51-60	0.09	0.05	0.05	0.12	0.17	0.08	0.57
61-70	0.11	0.06	0.06	0.15	0.21	0.09	0.68
71-80	0.01	0.00	0.00	0.01	0.01	0.00	0.03
81-90	0.01	0.00	0.00	0.01	0.01	0.00	0.03
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.01	0.00	0.00	0.01	0.01	0.00	0.03
All Depths	0.32	0.17	0.17	0.42	0.59	0.27	1.94
Point San Pedro to Cape Mendocino							
1-10	0.01	0.01	0.01	0.02	0.02	0.01	0.08
11-20	0.05	0.03	0.03	0.07	0.09	0.04	0.31
21-30	0.03	0.01	0.01	0.03	0.05	0.02	0.16
31-40	0.03	0.01	0.01	0.03	0.05	0.02	0.16
41-50	0.22	0.12	0.12	0.29	0.41	0.19	1.35
51-60	0.32	0.17	0.17	0.41	0.58	0.27	1.92
61-70	0.38	0.20	0.20	0.49	0.69	0.32	2.28
71-80	0.02	0.01	0.01	0.02	0.03	0.01	0.10
81-90	0.02	0.01	0.01	0.02	0.03	0.01	0.10
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.02	0.01	0.01	0.02	0.03	0.01	0.10
All Depths	1.08	0.58	0.58	1.41	1.99	0.91	6.56

TABLE 4.5.4-13. Expected 2004 California recreational California scorpionfish catch (mt) south of Cape Mendocino by region, depth, and period. (Page 1 of 1)

Depth range (fm)	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	All Periods
			U.S./Mexico Border to Point Conception				
1-10	3.12	3.07	1.86	1.44	4.22	4.47	18.17
11-20	5.96	5.87	3.55	2.76	8.07	8.55	34.76
21-30	5.43	5.35	3.24	2.52	7.35	7.79	31.68
31-40	2.98	2.93	1.77	1.38	4.03	4.27	17.36
41-50	1.33	1.31	0.79	0.62	1.80	1.91	7.75
51-60	0.77	0.76	0.46	0.36	1.04	1.10	4.49
61-70	0.02	0.02	0.01	0.01	0.03	0.03	0.14
71-80	0.02	0.02	0.01	0.01	0.02	0.02	0.09
81-90	0.02	0.02	0.01	0.01	0.02	0.02	0.09
91-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100+	0.01	0.01	0.00	0.00	0.01	0.01	0.05
All Depths	19.65	19.36	11.70	9.10	26.58	28.17	114.57
No retention Mortality a/	3.33	3.28	1.98	1.54	4.50	4.77	19.42

a/ No retention mortality calculated by summing the amount caught in wave from 0 - 60 fathoms and multiplying that by 17%.

TABLE 4.5.4-14. Estimated distribution of ocean recreational catch of important groundfish species under the 2004 management alternatives (mt). (Page 1 of 1)

		No Action	Low OY	Medium OY	High OY	Council OY
Washington	Canary	1.5	1.5	1.5	1.5	1.5
	Yelloweye	3.5	3.5	3.5	3.5	3.5
	Lingcod	35.0	35.0	35.0	35.0	35.0
	Total	40.0	40.0	40.0	40.0	40.0
Oregon	Canary	9.6	5.0	5.9	9.2	5.9
	Yelloweye	3.9	2.6	2.8	3.8	2.8
	Lingcod	97.3	70.3	91.8	96.0	91.8
	Widow	2.9	0.4	0.9	2.4	0.9
	Black rock	316.2	346.0	334.9	321.4	334.9
	Other nearshore rockfish	41.7	45.4	44.0	42.2	44.0
	Cabezon	14.2	0.5	13.1	14.4	13.1
	Greenling	31.0	16.2	21.2	24.8	21.2
	Total	516.8	486.4	514.6	514.2	514.6
California - North of 40°10'	Canary	0.5	0.5	0.5	0.5	0.5
	Yelloweye	0.1	0.1	0.1	0.1	0.1
	Lingcod	195.0	195.0	195.0	195.0	195.0
	Widow	1.0	1.0	1.0	1.0	1.0
	Total	196.6	196.6	196.6	196.6	196.6
California - 40°10'-34°27'	Canary	2.6	7.8	8.9	11.3	7.1
	Yelloweye	0.2	0.5	0.6	0.6	0.7
	Lingcod	17.9	136.9	141.0	143.9	138.3
	Widow	0.0	0.2	0.2	0.3	0.3
	Bocaccio	0.2	2.3	2.8	3.2	3.1
	Cowcod	0.0	0.4	0.5	0.4	0.5
	Shallow Nearshore rockfish	36.9	55.0	58.6	59.0	57.0
	Deeper Nearshore rockfish	193.4	282.4	299.6	301.2	298.7
	CA Scorpionfish	0.0	0.0	0.0	0.0	0.0
	Total	251.2	485.5	512.3	519.9	505.6
California - South of 34°27'	Canary	0.2	0.4	0.5	1.1	0.5
	Yelloweye	0.2	0.8	0.8	0.8	0.6
	Lingcod	2.1	15.8	17.2	17.6	13.5
	Widow	0.0	0.0	0.1	0.1	0.1
	Bocaccio	6.1	80.3	105.7	122.7	59.7
	Cowcod	0.0	2.0	2.5	4.1	1.3
	Shallow Nearshore rockfish	3.8	7.7	9.6	9.6	8.0
	Deeper Nearshore rockfish	21.0	50.8	63.8	64.6	47.7
	CA Scorpionfish	51.2	95.1	114.4	114.6	55.4
	Total	84.6	252.9	314.6	335.2	186.8

TABLE 4.5.4-15. Estimated recreational groundfish effort and total effort under the 2004 management alternatives. (thousand angler trips)[a/] (Page 1 of 1)

		No Action		Low OY		Medium OY		High OY		Council OY	
Area	Fishing Mode	Ground-fish Trips	Total Trips	Ground-fish Trips	Total Trips	Ground-fish Trips	Total Trips	Ground-fish Trips	Total Trips	Ground-fish Trips	Total Trips
Washington	Charter	9	201	9	201	9	201	9	201	9	201
	Private	10	407	10	407	10	407	10	407	10	407
	Total	20	608	20	608	20	608	20	608	20	608
Oregon	Charter	46	62	43	59	46	62	46	62	46	62
	Private	36	130	34	128	36	130	36	130	36	130
	Total	82	192	77	188	82	192	81	192	82	192
North and Central California b/	Charter	53	142	81	170	84	173	85	174	83	173
	Private	253	556	385	688	400	703	404	707	396	699
	Total	306	698	466	858	484	877	489	882	480	872
Southern California	Charter	189	438	564	813	702	951	748	997	417	666
	Private	391	1,494	1,168	2,271	1,453	2,556	1,548	2,651	862	1,965
	Total	579	1,931	1,732	3,084	2,154	3,506	2,296	3,648	1,279	2,631
California Total	Charter	242	580	645	983	786	1,124	833	1,171	500	838
	Private	643	2,049	1,553	2,959	1,853	3,259	1,952	3,358	1,259	2,665
	Total	885	2,629	2,198	3,942	2,638	4,383	2,785	4,529	1,758	3,503
West Coast Total	Charter	297	843	697	1,244	841	1,387	888	1,434	555	1,101
	Private	690	2,587	1,597	3,494	1,899	3,796	1,998	3,896	1,305	3,202
	Total	986	3,430	2,294	4,738	2,740	5,183	2,886	5,330	1,860	4,303

a/ Assuming average 2002 catch per angler trip, and no change in nongroundfish effort. Assumes change in angler trips is proportional to projected change in recreational catch.
b/ From Point Conception (34°27') to the Oregon border.

4.5.5 Tribal Fishery

Tribal allocations of sablefish and whiting are specified by negotiated agreements, with 10% of the north of 40°10' U.S. sablefish harvest guideline allocated to the tribes, and a whiting allocation consistent with the court-approved proposal in *United States v. Washington*, subproceeding 96-2. There are several groundfish species taken in tribal fisheries for which the tribes have no formal allocation. The tribes annually recommend trip limits for these species that accommodate modest tribal fisheries. Trip limits are usually intended to constrain direct and incidental catch and incidental mortality of overfished species taken in the tribal groundfish fisheries.

4.5.5.1 Criteria Used to Evaluate Impacts

The criteria used in this section to compare 2004 management alternatives for the tribal groundfish fisheries are total projected groundfish landings and resulting exvessel revenue, assuming average 2002 exvessel prices. Income impacts of tribal fisheries on their communities is described in Section 4.5.6.

4.5.5.2 Direct and Indirect Impacts

Table 4.5.5-1 displays projected tribal harvests under the management alternatives for the 2004 fishery, compared with historic harvests for 1998, 2002 and estimated 2003 harvests. Note that the proposed *Council OY* alternative is the same as *Medium OY*. The *Council OY* alternative would generally allow the continuation of harvest levels comparable to 2003. The 2003 harvest levels also represent the best estimate of impacts under the *No Action* alternative. In order to keep canary interactions within these targets, the Makah will be restricting midwater trawlers to fall and winter months only. Note that projected flatfish total harvest in 2003 and in 2004 under the alternatives is roughly double the level in 2002 given increased participation in that fishery. But the distribution of individual flatfish species harvests is uncertain, since harvest of some species will increase more than others.

Total harvest under the *Low OY* alternative is 46% lower than the total under the *Council OY* alternative. Total harvest under the *High OY* alternative is 19% higher than the *Council OY* total. In both cases most of the difference in total harvest is due to the difference in Pacific whiting OYs.

Exvessel value of the harvest levels is shown in Table 4.5.5-2. 2002 average prices were used to value estimated harvests in 2003 and in 2004 under the alternatives. Projected revenue under the *Low OY* alternative is 38% lower than under the *Council OY* alternative, and revenue under the *High OY* alternative is 12% greater than *Council OY* projected revenue. Note that the difference in revenue between the alternatives is considerably less than the difference in landings. This is because Pacific whiting, the source of most of the difference in harvest weight, fetches a relatively low exvessel price.

Table 4.5.5-3 shows estimated bycatch of yellowtail rockfish and overfished groundfish species under the three Pacific whiting OYs. The vast majority of bycatch in the tribal whiting fishery is yellowtail rockfish. Also note that widow rockfish is the most taken of the overfished rockfish species in the fishery.

Table 4.5.5-4 shows the distribution of estimated bycatch under the *Council OY* alternative for the non-whiting tribal groundfish fisheries.

Table 4.5.5-5 shows estimated landings and discard mortality under the tribal sablefish alternatives. Note that the *Council OY* alternative corresponds to the medium sablefish tribal OY option shown in the table.

4.5.5.3 Cumulative Impacts

As shown in Section 4.5.6, tribal groundfish are an important component of the Washington coastal economy.

The factors affecting these types of coastal, resource-dependent economies are discussed in Section 4.5.6.

4.5.5.4 Summary

Aggregate impacts on tribal fisheries under the alternatives are shown in the table below. Projected tribal landings and revenues under the *Council OY* alternative are relatively higher than in 1998 and 2002, and roughly the same as expected in 2003.

Triibal Groundfish Harvest	No Action (est. 2003)	Low OY	Medium OY	High OY	Council OY
landings (mt)	26,597	14,286	26,709	31,815	25,000
revenue ($,000) a/	5,661	3,745	6,024	6,775	6,024

a/ Assuming average 2002 exvessel prices.

TABLE 4.5.5-1. Projected groundfish landings by Tribal fleet under the 2004 alternatives, displayed against 1998, 2002 and estimated 2003 landings (mts). (Page 1 of 1)

Species	1998	2002	*No Action* 2003 est.	2004 Projections *Low OY*	*Med OY*	*High OY*	*Council OY*
Arrowtooth Flounder	0.12	3.24					
Dover Sole	2.05	16.08					
English Sole	0.84	40.26					
Petrale Sole	1.48	20.65					
Rex Sole		3.01					
Rock Sole	1.09	2.65					
Unsp. Flatfish	0.02	3.82					
Unsp. Sanddab		8.92					
Sand Sole		1.25					
Starry Flounder		0.14					
Butter Sole		0.27					
Flatfish Total	5.58	100.29	200.57	200.57	200.57	200.57	200.57
Canary Rockfish	0.40	6.03	7.13	5.56	7.13	7.79	7.13
Darkblotched Rockfish	0.00	1.40	0.40	0.36	0.40	0.42	0.40
Pacific Ocean Perch	0.00	0.24	0.24	0.12	0.24	0.29	0.24
Unsp. Rockfish	29.62						
Widow Rockfish	0.02	34.46	61.95	51.38	61.95	66.34	61.95
Yelloweye Rockfish		2.38	2.38	2.38	2.38	2.38	2.38
Yellowtail Rockfish	6.22	471.13	613.43	515.51	613.43	654.02	613.43
Unsp. Shelf Rockfish		0.01					
Unsp. Near-shore Rockfish		0.05					
Unsp. Slope Rockfish		1.87					
Rockfish Total	36.28	517.58	685.54	575.32	685.54	731.25	685.54
Spiny Dogfish		1.18	1.18	1.18	1.18	1.18	1.18
Lingcod	2.38	11.02	13.38	25.20	25.32	25.38	25.32
Pacific Cod	2.21	58.35	58.35	58.35	58.35	58.35	58.35
Sablefish	445.25	435.83	624.67	443.69	722.08	781.25	722.08
Unsp. Skate	0.92	8.46	8.46	8.46	8.46	8.46	8.46
Shortspine Thornyhead	3.68	4.62	4.63	4.92	7.90	8.72	7.90
Other Groundfish Total	454.44	519.46	710.67	541.80	823.29	883.34	823.29
Pacific Whiting	24,509.00	20,823.79	25,000.00	12,968.00	25,000.00	30,000.00	25,000.00
All Groundfish Species Total	25,005.30	21,961.12	26,596.79	14,285.70	26,709.41	31,815.17	26,709.41

TABLE 4.5.5-2. Projected groundfish revenue by Tribal fleet under the 2004 alternatives, displayed against 1998, 2002 and estimated 2003 revenue ($,000 exvessel). (Page 1 of 1)

			2004 Projections [a/]				
Species	1998	2002	*No Action* 2003 est.[a/]	*Low OY*	*Med OY*	*High OY*	*Council OY*
Arrowtooth Flounder	0.03	0.72					
Dover Sole	1.48	11.34					
English Sole	0.61	29.29					
Petrale Sole	3.25	46.51					
Rex Sole		2.32					
Rock Sole	0.79	2.03					
Unsp. Flatfish	0.01	2.77					
Unsp. Sanddab		5.11					
Sand Sole		2.08					
Starry Flounder		0.10					
Butter Sole		0.21					
Flatfish Total	6.17	102.47	204.94	204.94	204.94	204.94	204.94
Canary Rockfish	0.33	5.89	6.96	5.42	6.96	7.60	6.96
Darkblotched Rockfish	0.00	1.14	0.33	0.30	0.33	0.35	0.33
Pacific Ocean Perch	0.00	0.24	0.24	0.12	0.24	0.29	0.24
Unsp. Rockfish	26.58						
Widow Rockfish	0.02	36.43	65.50	54.32	65.50	70.14	65.50
Yelloweye Rockfish		2.33	2.33	2.33	2.33	2.33	2.33
Yellowtail Rockfish	4.68	489.53	637.38	535.64	637.38	679.56	637.38
Unsp. Shelf Rockfish		0.01					
Unsp. Near-shore Rockfish		14.43					
Unsp. Slope Rockfish		0.01					
Rockfish Total	39.37	550.00	712.73	598.13	712.73	760.26	712.73
Spiny Dogfish		0.41	0.41	0.41	0.41	0.41	0.41
Lingcod	3.01	18.18	21.55	40.59	40.79	40.88	40.79
Pacific Cod	1.92	63.96	63.96	63.96	63.96	63.96	63.96
Sablefish	1,280.23	1,512.60	2,167.96	1,539.85	2,506.03	2,711.38	2,506.03
Unsp. Skate	0.14	2.56	2.56	2.56	2.56	2.56	2.56
Shortspine Thornyhead	7.76	8.23	8.00	8.50	13.64	15.06	13.64
Other Groundfish Total	1,285.30	1,605.93	2,264.44	1,655.87	2,627.39	2,834.25	2,627.39
Pacific Whiting	2,699.23	2,065.12	2,479.28	1,286.05	2,479.28	2,975.14	2,479.28
All Groundfish Species Total	4,030.07	4,323.52	5,661.39	3,744.99	6,024.34	6,774.58	6,024.34

a/ Assumes 2002 average exvessel prices.

TABLE 4.5.5-3. Expected bycatch in the tribal whiting fishery under three OY options for 2004 (mts). (Page 1 of 1)

Bycatch Species [a/]	**LOW WHITING OY** U.S. = 74,100 mt Tribal = 12,968 mt	**MED WHITING OY** U.S. = 148,200 mt Tribal = 25,000 mt	**HIGH WHITING OY** U.S. = 222,300 mt Tribal = 30,000 mt
Yellowtail	104.99	202.91	243.50
Widow	11.34	21.91	26.30
Canary	1.68	3.25	3.91
Darkblotched	0.04	0.08	0.10
POP	0.12	0.24	0.29
Lingcod	0.14	0.26	0.32

a/ All bycatch numbers based on NMFS observer estimates from 2002 tribal fishery.

TABLE 4.5.5-4. Expected catch of important groundfish species under the 2004 Council OY tribal fishery management alternative. (Page 1 of 1)

Species	Longline		Midwater Trawl		Bottom Trawl		Troll		Total- All Gears	
	lbs	mt	lbs	mt	lbs	mt	lbs	mt	lbs	mt
Black [a/]	0	0	0	0	0	0	0	0	0	0
Lingcod	33,000	15.0	200	0.1	19,800	9.0	19,800	9.0	55,200	25.1
Canary	700	0.3	5,100	2.3	1,100	0.5	1,100	0.5	8,100	3.7
Yelloweye	5,100	2.3	50	0.02	0	0	0	0	5,250	2.4
Yellowtail	300	0.1	882,000	400.4	5,900	2.7	5,900	2.7	895,300	406.5
Widow	0	0	88,200	40.0	0	0	0	0	88,200	40.0
POP	0	0	0	0	0	0	0	0	0	0
Darkblotched	0	0	0	0	0	0	0	0	0	0
Shortspine Thornyhead [b/]	17,137	7.8	0	0	300	0.1	300	0.1	17,400	7.9

a/ Not including unspecified rockfish. About 15-25 mt landed on average in 1996-2001.
b/ Expected catch under sablefish Medium OY option.

TABLE 4.5.5-5. 2004 tribal sablefish allocations and discard estimates. (Page 1 of 1)

2004 Tribal OY (Low) = 464 mt				
dressed lb	639,334	**Trawl**	48,000	trawl landed dressed lbs.
Total lb	1,022,026		76,800	trawl landed round lbs.
			16,896	remaining trawl allowances + overage a/
			93,696	total trawl lbs.
1,022,026 - 93,696 =		**Longline**	928,330	total longline lbs. (total OY - trawl)
			27,850	longline discard mortality lbs. (3% of total longline)
			900,481	longline landed lbs.
900,481+ 76800 =		**Total**	977,281	total landed lbs. (trawl + longline)
			95.62%	landed / total OY
2004 Tribal OY (Medium) = 751 mt				
dressed lb	1,034,784	**Trawl**	48,000	trawl landed dressed lbs.
Total lb	1,654,185		76,800	trawl landed round lbs.
			16,896	remaining trawl allowances + overage a/
			93,696	total trawl lbs.
1,654,185 - 93,696 =		**Longline**	1,560,489	total longline lbs. (total OY - trawl)
			46,815	longline discard mortality lbs. (3% of total longline)
			1,513,674	longline landed lbs.
1,513,674 + 76,800 =		**Total**	1,590,474	total landed lbs. (trawl + longline)
			96.15%	landed / total OY
2004 Tribal OY (High) = 812 mt				
dressed lb	1,118,835	**Trawl**	48,000	trawl landed dressed lbs.
Total lb	1,788,546		76,800	trawl landed round lbs.
			16,896	remaining trawl allowances + overage a/
			93,696	total trawl lbs.
1,788,546 - 93,696 =		**Longline**	1,694,850	total longline lbs. (total OY - trawl)
			50,846	longline discard mortality lbs. (3% of total longline)
			1,644,005	longline landed lbs.
1,644,005 + 76,800 =		**Total**	1,720,805	total landed lbs. (trawl + longline)
			96.21%	landed / total OY

a/ Sablefish taken in the tribal bottom trawl fishery are subject to full retention. All overages are forfeited to the tribe.

4.5.6 Fishing Communities

In this section, fishing communities are defined in a broad sense as collections of ports and processing facilities that are grouped based on geographical proximity and similarity of available commercial fishery opportunities and the applicable management regime. The Pacific Fisheries Information Network (PacFIN) ports comprising each commercial fishery port area are described in Section 3.5.6. Due to data limitations and statistical uncertainty, recreational fisheries are differentiated at a broader, regional level: the state level for Washington and Oregon, and Northern (north of Point Conception) and Southern components for California recreational fisheries.

4.5.6.1 Criteria Used to Evaluate Impacts

Commercial fisheries impacts

Projected commercial landings under the alternatives are compared against recent historical landings to estimate change in landings by port area. Income multipliers generated by Fishery Economic Assessment Model (FEAM) (Jensen 1996) and differentiated by species, gear type and landing port are applied to the projected landings to estimate change in total personal income resulting from the estimated change in harvest under each alternative.

Recreational fisheries impacts

Annual recreational fishing effort under the alternatives is estimated by region and compared against recent data. Change in effort is assumed to be proportional to the change in estimated harvest shown in Section 4.5.4. Regional income multipliers derived from the recreational FEAM and estimated average trip expenditures for recreational fishers in the four regions derived from (Gentner 2001) are applied to the estimated change in effort to estimate the change in regional income resulting from the level of recreational fishing activity expected under each alternative.

4.5.6.2 Direct and indirect impacts

Direct impacts consist of the changes in commercial landings, exvessel revenue and recreational effort expected under the different alternatives. Income impacts go beyond direct impacts by measuring the total change in income received by participants in the local economy as a result of the direct effects. Income impacts (generated using FEAM) incorporate the indirect (change in suppliers and the distribution chain) and induced (change in spending by households) effects on the regional economies. (See Section 3.5.6.3 for further discussion of income impact estimating methodology).

Commercial landings income impacts

Table 4.5.6-1 shows the income in thousands of current U.S. dollars that would be generated from commercial fishery activities under the five management alternatives (*No Action, Low OY, Medium OY, High OY, and Council OY*). Table 4.5.6-2 displays these dollar impacts as the percentage change from the baseline *No Action* alternative for each income category and port area.

From Table 4.5.6-1, excluding the at-sea fisheries, coast wide total commercial fisheries income under the *No Action* alternative is $524 million,. Of this, $74 million was generated by groundfish fisheries, of which $57 million was attributable to limited entry trawl and $17 million contributed by other groundfish gear. Tribal groundfish fisheries added an additional $3 million to this total.

Under the lowest harvest (*Low OY*) alternative, total income falls to $507 million, a reduction of 3% compared with *No Action* (Table 4.5.6-2). Groundfish fisheries, including tribal, are harder hit under the *Low*

OY alternative, falling overall by 21%: 19% for limited entry trawl and 28% for other groundfish gear. Total commercial fisheries-related income does not increase for any port area. The hardest hit port areas in terms of percentage reduction (compared with *No Action*) are: Newport (-15%), and North Washington Coast, Eureka, Fort Bragg and Morro Bay (-9%). Income from limited entry trawl groundfish is shown increasing somewhat for port areas in Washington and San Francisco under the *Low OY* alternative.

Under the other 2004 management alternatives, total coast wide income increases, although not uniformly and not necessarily for each port area. For example, under the *Medium OY* alternative, total income coast wide increases by 1%, but falls somewhat for Fort Bragg, Morro Bay and San Diego, and doesn't increase for South and Central Washington, Monterey, Santa Barbara and Los Angeles.

Under the *High OY* alternative, overall fisheries-related income increases coast wide by 3%, and doesn't fall for any port area, although little or no overall increase is registered for North Washington Coast, Santa Barbara, Los Angeles and San Diego. Limited entry trawl groundfish income falls for several port areas, including Brookings, Crescent City, Fort Bragg, Morro Bay, Santa Barbara and Los Angeles.

Under the *Council OY* alternative, overall fisheries-related income increases by $2.5 million coast wide (<1%), and falls slightly for two port areas: Coos Bay and Fort Bragg. Income from limited entry trawl groundfish increases slightly coast wide, but falls in several port areas, including South and Central Washington, Newport, Coos Bay, Brookings, Crescent City, Eureka, Fort Bragg, Santa Barbara and Los Angeles.

Compared with the other alternatives, the *Council OY* alternative is no worse for any port area overall than the *Low OY* alternative, and significantly better than that alternative for each area's nontrawl groundfish sectors. Compared with *Medium OY* alternative, under *Council OY* limited entry trawl is slightly worse off overall, but better off in all port areas from San Francisco south.

Recreational fishing income impacts

Table 4.5.6-4 shows estimated income and employment impacts resulting from the proposed changes in recreational fisheries under the management alternatives. Due to uncertainty in the actual relationship between harvest level and effort, the relative rankings of the impacts under the alternatives are probably more reliable indicators than the absolute levels of impacts shown in the table. The table shows no expected change relative to the *No Action* alternative for Washington's recreational fishery under any of the other alternatives. For Oregon, slight negative income impact changes are shown under the *Medium OY*, *High OY* and *Council OY* alternatives, and a decline of 2.8% under the Low OY alternative. Income impacts in California are unambiguously positive compared with *No Action* under all of the alternatives. The greatest positive impacts are shown in Southern California (South of Point Conception), where an increase of over 100% is shown under the *High OY* alternative, and over 40% under *Council OY*. These changes reflect the significant proposed expansion of recreational season and area opportunities compared with the *No Action* scenario. Overall, for the entire West Coast, income impact increases by 44% under *Low OY*, 52% under *Medium OY*, 56% under *High OY* and 25% under *Council OY*.

Commercial landings employment impacts

Table 4.5.6-3 translates the total income impacts from commercial fishing in Table 4.5.6-1 into total employment impacts by dividing by an estimate of expected average annual wage in each port area. Under the *Low OY* alternative, the table shows total employment falling coast wide and for each port area compared with the *No Action* alternative. The worst affected is Newport (-14.9%). While coast wide employment rises under *Medium OY* alternative, several port areas experience declines, including Fort Bragg, Morro Bay, Santa Barbara, Los Angeles and San Diego. The greatest coast wide employment increase is shown under the *High OY* alternative. However two port areas experience employment declines under this alternative: Los Angeles and San Diego. Under *Council OY* alternative, coast wide employment rises by 0.5%, but falls somewhat for Coos Bay, Fort Bragg, Santa Barbara, Los Angeles and San Diego.

Recreational Fishing Employment Impacts

The right hand column of Table 4.5.6-4 shows estimated change in the number of jobs resulting from changes in recreational fishing under the management alternatives. These estimates are generated from the income impacts shown in the same table by dividing by an expected average annual wage for each area. Compared with the *No Action* alternative, the table shows no change for Washington, slight negative changes for Oregon, and significant positive changes for North/Central California and Southern California. Overall coast wide recreational employment impacts are estimated to increase by 3,300 jobs under *Low OY*, 3,900 jobs under *Medium OY*, 4,200 jobs under *High OY* and 1,900 jobs under the *Council OY* alternative. In all cases, Southern California accounts for at least 80% of the total increase.

4.5.6.3 Cumulative Impacts

Many coastal fishing communities are also historically dependent on wood products industry and tourism. Both industries have suffered in recent years for different reasons. Wood products employment has generally been falling since the 1980s as a result of technological change in the industry (automation) and harvest restrictions on public land to protect critical habitat of threatened and endangered species. Tourism has suffered more recently as a result of the slow national economy and the perceived terror-related travel risk. These effects may tend to exacerbate the negative income and employment impacts expected under the *Low OY* alternative.

4.5.6.4 Summary

Aggregate income and employment impacts on coastal communities under the alternatives resulting from commercial fishing and recreational fishing activities are shown in the table below.

Community Impacts	No Action (est. 2003)	Low OY	Medium OY	High OY	Council OY
Commercial fishing community impacts:					
income impact ($,000)	524,663	507,285	526,623	537,794	526,191
employment impact (jobs)	18,365	17,742	18,484	18,919	18,460
Recreational fishing community impacts:					
income impact ($,000)	214,926	309,808	327,643	337,154	270,272
employment impact (jobs)	8,321	11,656	12,281	12,612	10,289

TABLE 4.5.6-1. Estimated total income impacts from commercial fishing activities by port area under the 2004 management alternatives ($,000). a/ (Page 1 of 2)

	WASHINGTON				OREGON				
2004 Management Alternatives	Puget Sound	North WA Coast	South and Central WA Coast	WA TOTAL	Astoria-Tillamook	Newport	Coos Bay	Brookings	OR TOTAL
No Action Alternative									
All West Coast Ocean Fisheries, 0-200 mi. b/	11,330	9,010	74,844	95,185	63,936	35,034	22,416	6,408	127,794
Non-Tribal Groundfish	4,925	2,419	1,514	8,857	12,003	13,485	4,881	2,531	32,899
Limited Entry Trawl Groundfish	2,980	1,559	732	5,271	10,920	12,185	3,991	1,249	28,346
All Other Groundfish Gear	1,945	860	781	3,586	1,083	1,299	889	1,282	4,553
Tribal Groundfish	28	3,113	8	3,149	0	0	0	0	0
Low OY Alternative									
All West Coast Ocean Fisheries, 0-200 mi. b/	11,113	8,182	74,668	93,963	61,132	29,799	21,857	5,915	118,703
Non-Tribal Groundfish	4,715	2,238	1,341	8,294	9,200	8,250	4,322	2,038	23,808
Limited Entry Trawl Groundfish	3,274	1,609	777	5,660	8,400	7,311	3,682	1,017	20,410
All Other Groundfish Gear	1,441	629	564	2,634	799	939	640	1,020	3,398
Tribal Groundfish	20	2,465	6	2,491	0	0	0	0	0
Medium OY Alternative									
All West Coast Ocean Fisheries, 0-200 mi. b/	11,988	9,586	75,064	96,637	64,625	35,342	22,642	6,445	129,054
Non-Tribal Groundfish	5,578	2,647	1,732	9,958	12,692	13,792	5,107	2,568	34,159
Limited Entry Trawl Groundfish	3,348	1,656	828	5,832	11,456	12,289	4,077	1,169	28,991
All Other Groundfish Gear	2,230	991	905	4,126	1,236	1,503	1,030	1,399	5,168
Tribal Groundfish	32	3,460	10	3,502	0	0	0	0	0
High OY Alternative									
All Ocean Fisheries, 0-200 mi. b/	12,177	9,887	75,150	97,214	67,602	40,419	22,805	6,532	137,359
Non-Tribal Groundfish	5,764	2,737	1,818	10,319	15,669	18,869	5,270	2,655	42,463
Limited Entry Trawl Groundfish	3,365	1,669	840	5,873	14,333	17,244	4,156	1,199	36,933
All Other Groundfish Gear	2,399	1,068	978	4,446	1,336	1,625	1,114	1,456	5,530
Tribal Groundfish	35	3,672	10	3,716	0	0	0	0	0
Council OY Alternative									
All West Coast Ocean Fisheries, 0-200 mi. b/	11,779	9,510	74,942	96,232	64,381	35,139	22,279	6,540	128,339
Non-Tribal Groundfish	5,370	2,572	1,611	9,552	12,448	13,589	4,744	2,663	33,444
Limited Entry Trawl Groundfish	3,139	1,581	706	5,426	11,208	12,086	3,713	1,098	28,106
All Other Groundfish Gear	2,230	991	905	4,126	1,239	1,503	1,031	1,565	5,338
Tribal Groundfish	32	3,460	10	3,502	0	0	0	0	0

a/ Includes total income impacts (wages and salaries paid to producers, processors and suppliers, and the additional income generated when wages and salaries are spent).
Impact estimates based on PFMC Commercial FEAM (9/03).
b/ Excludes at-sea sector.

TABLE 4.5.6-1. Estimated total income impacts from commercial fishing activities by port area under the 2004 management alternatives ($,000). a/ (page 2 of 2)

	CALIFORNIA											
2004 Management Alternatives	Crescent City	Eureka	Fort Bragg	Bodega Bay	San Fran-cisco	Monterey	Morro Bay	Santa Barbara	Los Angele s	San Diego	CA TOTAL	W-O-C Total
No Action Alternative												
All West Coast Ocean Fisheries, 0-200 mi. b/	9,394	13,664	17,059	9,470	29,966	54,949	7,674	48,526	101,248	8,735	300,685	523,663
Non-Tribal Groundfish	2,895	6,299	8,504	629	3,645	4,938	2,877	1,071	1,579	319	32,756	74,513
Limited Entry Trawl Groundfish	2,454	5,534	7,171	517	2,507	2,791	2,244	51	47	2	23,319	56,936
All Other Groundfish Gear	441	765	1,332	111	1,138	2,147	633	1,020	1,532	317	9,326	17,465
Tribal Groundfish	0	0	0	0	0	0	0	0	0	0	0	3,149
Low OY Alternative												
All West Coast Ocean Fisheries, 0-200 mi. b/	9,212	12,439	15,464	9,410	29,569	54,093	7,019	48,191	100,619	8,604	294,619	507,285
Non-Tribal Groundfish	2,713	5,074	6,909	568	3,248	4,082	2,222	736	949	188	26,691	58,794
Limited Entry Trawl Groundfish	2,157	4,381	5,995	499	2,566	2,483	1,933	37	22	2	20,076	46,146
All Other Groundfish Gear	556	693	914	69	682	1,600	289	699	927	186	6,615	12,648
Tribal Groundfish	0	0	0	0	0	0	0	0	0	0	0	2,491
Medium OY Alternative												
All West Coast Ocean Fisheries, 0-200 mi. b/	9,531	13,836	16,875	9,551	30,275	55,199	7,546	48,428	101,006	8,685	300,932	526,623
Non-Tribal Groundfish	3,033	6,471	8,320	709	3,954	5,188	2,749	973	1,337	270	33,003	77,119
Limited Entry Trawl Groundfish	2,342	5,483	6,805	619	2,880	2,819	2,193	41	31	2	23,216	58,039
All Other Groundfish Gear	691	989	1,515	90	1,074	2,369	556	932	1,305	267	9,787	19,081
Tribal Groundfish	0	0	0	0	0	0	0	0	0	0	0	3,502
High OY Alternative												
All West Coast Ocean Fisheries, 0-200 mi. b/	9,600	14,838	17,172	9,570	30,429	55,404	7,822	48,565	101,113	8,708	303,222	537,794
Non-Tribal Groundfish	3,101	7,474	8,617	729	4,108	5,393	3,025	1,110	1,444	292	35,293	88,075
Limited Entry Trawl Groundfish	2,387	6,423	6,918	626	2,917	2,859	2,219	44	37	2	24,433	67,240
All Other Groundfish Gear	715	1,051	1,699	102	1,191	2,534	806	1,066	1,407	290	10,860	20,835
Tribal Groundfish	0	0	0	0	0	0	0	0	0	0	0	3,716
Council OY Alternative												
All West Coast Ocean Fisheries, 0-200 mi. b/	9,488	13,684	16,940	9,552	30,349	55,393	7,977	48,487	101,048	8,702	301,620	526,191
Non-Tribal Groundfish	2,990	6,319	8,385	710	4,028	5,383	3,181	1,032	1,378	286	33,692	76,688
Limited Entry Trawl Groundfish	2,278	5,308	6,791	604	2,900	2,955	2,556	42	35	3	23,473	57,005
All Other Groundfish Gear	712	1,011	1,594	106	1,128	2,428	624	990	1,343	283	10,219	19,683
Tribal Groundfish	0	0	0	0	0	0	0	0	0	0	0	3,502

a/ Includes total income impacts (wages and salaries paid to producers, processors and suppliers, and the additional income generated when wages and salaries are spent). Impact estimates based on PFMC Commercial FEAM (9/03).

b/ Excludes at-sea sector.

TABLE 4.5.6-2. Estimated % change (from 2003) in total fishery related-income by port area under 2004 groundfish management alternatives. a/ (page 1 of 2)

	WASHINGTON				OREGON				
2004 Management Alternatives	Puget Sound	North WA Coast	South and Central WA Coast	WA TOTAL	Astoria-Tillamook	Newport	Coos Bay	Brookings	OR TOTAL
No Action Alternative									
All West Coast Ocean Fisheries, 0-200 mi. b/	13,091	8,798	74,939	96,828	64,657	33,957	22,785	6,896	128,295
Non-Tribal Groundfish	6,694	2,910	1,612	11,216	12,724	12,407	5,250	3,019	33,400
Limited Entry Trawl Groundfish	4,420	2,063	875	7,358	11,657	11,169	4,405	1,285	28,516
All Other Groundfish Gear	2,274	847	736	3,858	1,068	1,238	845	1,734	4,885
Tribal Groundfish	19	2,409	6	2,434	0	0	0	0	0
Low OY Alternative									
All West Coast Ocean Fisheries, 0-200 mi. b/	-2%	-9%	0%	-1%	-4%	-15%	-2%	-8%	-7%
Non-Tribal Groundfish	-4%	-7%	-11%	-6%	-23%	-39%	-11%	-19%	-28%
Limited Entry Trawl Groundfish	10%	3%	6%	7%	-23%	-40%	-8%	-19%	-28%
All Other Groundfish Gear	-26%	-27%	-28%	-27%	-26%	-28%	-28%	-20%	-25%
Tribal Groundfish	-28%	-21%	-29%	-21%					
Medium OY Alternative									
All West Coast Ocean Fisheries, 0-200 mi. b/	6%	6%	0%	2%	1%	1%	1%	1%	1%
Non-Tribal Groundfish	13%	9%	14%	12%	6%	2%	5%	1%	4%
Limited Entry Trawl Groundfish	12%	6%	13%	11%	5%	1%	2%	-6%	2%
All Other Groundfish Gear	15%	15%	16%	15%	14%	16%	16%	9%	14%
Tribal Groundfish	15%	11%	15%	11%					
High OY Alternative									
All West Coast Ocean Fisheries, 0-200 mi. b/	7%	10%	0%	2%	6%	15%	2%	2%	7%
Non-Tribal Groundfish	17%	13%	20%	17%	31%	40%	8%	5%	29%
Limited Entry Trawl Groundfish	13%	7%	15%	11%	31%	42%	4%	-4%	30%
All Other Groundfish Gear	23%	24%	25%	24%	23%	25%	25%	14%	21%
Tribal Groundfish	24%	18%	25%	18%					
Council OY Alternative									
All West Coast Ocean Fisheries, 0-200 mi. b/	4%	6%	0%	1%	1%	0%	-1%	2%	0%
Non-Tribal Groundfish	9%	6%	6%	8%	4%	1%	-3%	5%	2%
Limited Entry Trawl Groundfish	5%	1%	-4%	3%	3%	-1%	-7%	-12%	-1%
All Other Groundfish Gear	15%	15%	16%	15%	14%	16%	16%	22%	17%
Tribal Groundfish	15%	11%	15%	11%					

a/ Includes total income impacts (wages and salaries paid to producers, processors and suppliers, and the additional income generated when wages and salaries are spent).
Impacts based on PFMC Commercial FEAM (9/03).
b/ Excludes at-sea sector.

TABLE 4.5.6-2. Estimated % change (from 2003) in total fishery related-income by port area under 2004 groundfish management alternatives. a/ (page 2 of 2)

2004 Management Alternatives	CALIFORNIA											
	Crescent City	Eureka	Fort Bragg	Bodega Bay	San Fran-cisco	Monterey	Morro Bay	Santa Barbara	Los Angeles	San Diego	CA Total	W-O-C Total
No Action Alternative												
All West Coast Ocean Fisheries, 0-200 mi. b/	*9,394*	*13,664*	*17,059*	*9,470*	*29,966*	*54,949*	*7,674*	*48,526*	*101,248*	*8,735*	*300,685*	*523,663*
Non-Tribal Groundfish	*2,895*	*6,299*	*8,504*	*629*	*3,645*	*4,938*	*2,877*	*1,071*	*1,579*	*319*	*32,756*	*74,513*
Limited Entry Trawl Groundfish	*2,454*	*5,534*	*7,171*	*517*	*2,507*	*2,791*	*2,244*	*51*	*47*	*2*	*23,319*	*56,936*
All Other Groundfish Gear	*441*	*765*	*1,332*	*111*	*1,138*	*2,147*	*633*	*1,020*	*1,532*	*317*	*9,326*	*17,465*
Tribal Groundfish	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*3,149*
Low OY Alternative												
All West Coast Ocean Fisheries, 0-200 mi. b/	-2%	-9%	-9%	-1%	-1%	-2%	-9%	-1%	-1%	-2%	-2%	-3%
Non-Tribal Groundfish	-6%	-19%	-19%	-10%	-11%	-17%	-23%	-31%	-40%	-41%	-19%	-21%
Limited Entry Trawl Groundfish	-12%	-21%	-16%	-4%	2%	-11%	-14%	-28%	-53%	3%	-14%	-19%
All Other Groundfish Gear	26%	-9%	-31%	-38%	-40%	-26%	-54%	-31%	-39%	-41%	-29%	-28%
Tribal Groundfish												-21%
Medium OY Alternative												
All West Coast Ocean Fisheries, 0-200 mi. b/	1%	1%	-1%	1%	1%	0%	-2%	0%	0%	-1%	0%	1%
Non-Tribal Groundfish	5%	3%	-2%	13%	8%	5%	-4%	-9%	-15%	-16%	1%	3%
Limited Entry Trawl Groundfish	-5%	-1%	-5%	20%	15%	1%	-2%	-19%	-34%	10%	0%	2%
All Other Groundfish Gear	57%	29%	14%	-19%	-6%	10%	-12%	-9%	-15%	-16%	5%	9%
Tribal Groundfish												11%
High OY Alternative												
All West Coast Ocean Fisheries, 0-200 mi. b/	2%	9%	1%	1%	2%	1%	2%	0%	0%	0%	1%	3%
Non-Tribal Groundfish	7%	19%	1%	16%	13%	9%	5%	4%	-9%	-9%	8%	18%
Limited Entry Trawl Groundfish	-3%	16%	-4%	21%	16%	2%	-1%	-13%	-21%	10%	5%	18%
All Other Groundfish Gear	62%	37%	28%	-8%	5%	18%	27%	5%	-8%	-9%	16%	19%
Tribal Groundfish												18%
Council OY Alternative												
All West Coast Ocean Fisheries, 0-200 mi. b/	1%	0%	-1%	1%	1%	1%	4%	0%	0%	0%	0%	0%
Non-Tribal Groundfish	3%	0%	-1%	13%	11%	9%	11%	-4%	-13%	-10%	3%	3%
Limited Entry Trawl Groundfish	-7%	-4%	-5%	17%	16%	6%	14%	-17%	-25%	53%	1%	0%
All Other Groundfish Gear	61%	32%	20%	-5%	-1%	13%	-1%	-3%	-12%	-11%	10%	13%
Tribal Groundfish												11%

a/ Includes total income impacts (wages and salaries paid to producers, processors and suppliers, and the additional income generated when wages and salaries are spent). Impacts based on PFMC Commercial FEAM (9/03).
b/ Excludes at-sea sector.

TABLE 4.5.6-3 Estimated employment impacts from commercial fishing by port area under the 2004 management alternatives. a/ b/ (Page 1 of 1)

	No Action Alternative	Low OY Alternative		Medium OY Alternative		High OY Alternative		Council OY Alternative	
Port Group Area	Estimated Employment	Employ-ment	Change from No Action	Employ-ment	Change from No Action	Employ-ment	Change from No Action	Employ-ment	Change from No Action
Puget Sound	398	391	-1.9%	422	5.8%	428	7.5%	414	4.0%
North WA Coast	377	342	-9.2%	401	6.4%	414	9.7%	398	5.5%
South and Central WA	3,364	3,356	-0.2%	3,373	0.3%	3,377	0.4%	3,368	0.1%
Astoria-Tillamook	2,534	2,423	-4.4%	2,561	1.1%	2,679	5.7%	2,552	0.7%
Newport	1,389	1,181	-14.9%	1,401	0.9%	1,602	15.4%	1,393	0.3%
Coos Bay	943	919	-2.5%	952	1.0%	959	1.7%	937	-0.6%
Brookings	252	232	-7.7%	253	0.6%	257	1.9%	257	2.1%
Crescent City	422	414	-1.9%	428	1.5%	431	2.2%	426	1.0%
Eureka	534	486	-9.0%	540	1.3%	579	8.6%	534	0.1%
Fort Bragg	665	603	-9.4%	658	-1.1%	669	0.7%	660	-0.7%
Bodega Bay	376	374	-0.6%	379	0.8%	380	1.1%	379	0.9%
San Francisco	893	881	-1.3%	902	1.0%	907	1.5%	905	1.3%
Monterey	1,724	1,697	-1.6%	1,731	0.5%	1,738	0.8%	1,737	0.8%
Morro Bay	266	243	-8.5%	262	-1.7%	271	1.9%	277	4.0%
Santa Barbara	1,459	1,449	-0.7%	1,456	-0.2%	1,460	0.1%	1,458	-0.1%
Los Angeles	2,539	2,524	-0.6%	2,533	-0.2%	2,536	-0.1%	2,534	-0.2%
San Diego	232	228	-1.5%	231	-0.6%	231	-0.3%	231	-0.4%
TOTAL	18,365	17,742	-3.4%	18,484	0.6%	18,919	3.0%	18,460	0.5%

a/ Includes total income impacts (wages and salaries paid to producers, processors and suppliers, and the additional income generated when wages and salaries are spent). Impacts based on PFMC FEAM (9/03).

b/ Excludes at-sea sector.

TABLE 4.5.6-4. Estimated personal income impacts related to trip expenditures in the ocean recreational fishery under the 2004 management alternatives. a/ (Page 1 of 1)

Area	2004 Management Alternatives:	Angler Trips (thousands) b/			Personal Income Associated with the Fishery ($,000)			Percent Change c/	Change in Income ($,000) c/	Number of Jobs	Change in Jobs c/
		Charter	Private	Total	Charter	Private	Total				
Washington Coast	*No Action*	201	407	608	36,949	13,337	50,286			2,260	
	Low OY	201	407	608	36,949	13,337	50,286	0.0	0	2,260	0
	Medium OY	201	407	608	36,949	13,337	50,286	0.0	0	2,260	0
	High OY	201	407	608	36,949	13,337	50,286	0.0	0	2,260	0
	Council OY	201	407	608	36,949	13,337	50,286	0.0	0	2,260	0
Oregon	*No Action*	62	130	192	9,063	5,021	14,084			632	
	Low OY	59	128	188	8,668	4,939	13,608	-3.4	-476	611	-21
	Medium OY	62	130	192	9,034	5,015	14,049	-0.2	-34	631	-2
	High OY	62	130	192	9,029	5,014	14,043	-0.3	-41	630	-2
	Council OY	62	130	192	9,034	5,015	14,049	-0.2	-34	631	-2
North/Central California	*No Action*	142	556	698	19,732	21,423	41,155			1,634	
	Low OY	170	703	873	23,586	27,099	50,685	21.7	+8,948	1,989	+355
	Medium OY	173	703	877	24,026	27,099	51,125	24.2	+9,970	2,030	+396
	High OY	174	707	882	24,151	27,264	51,415	24.9	+10,259	2,041	+407
	Council OY	173	699	872	23,917	26,954	50,871	23.6	+9,715	2,020	+386
Southern California	*No Action*	438	1,494	1,931	54,170	55,231	109,401			3,795	
	Low OY	813	2,556	3,369	100,645	94,507	195,153	68.8	+75,219	6,404	+2,609
	Medium OY	951	2,556	3,506	117,675	94,507	212,183	93.9	+102,782	7,360	+3,565
	High OY	997	2,651	3,648	123,377	98,033	221,410	102.4	+112,009	7,680	+3,885
	Council OY	666	1,965	2,631	82,385	72,681	155,066	41.7	+45,666	5,379	+1,584
California Total	*No Action*	580	2,049	2,629	73,903	76,653	150,556			5,429	
	Low OY	983	3,259	4,242	124,232	121,606	245,838	55.9	+84,167	8,393	+2,964
	Medium OY	1,124	3,259	4,383	141,702	121,606	263,308	74.9	+112,752	9,390	+3,961
	High OY	1,171	3,358	4,529	147,528	125,297	272,825	81.2	+122,269	9,721	+4,293
	Council OY	838	2,665	3,503	106,302	99,635	205,937	36.8	+55,381	7,399	+1,970
W-O-C Total	*No Action*	843	2,587	3,430	119,914	95,012	214,926			8,321	
	Low OY	1,244	3,796	5,040	169,849	139,959	309,808	38.9	+83,691	11,264	+2,943
	Medium OY	1,387	3,796	5,183	187,685	139,959	327,643	52.4	+112,718	12,281	+3,960
	High OY	1,434	3,896	5,330	193,505	143,648	337,154	56.9	+122,228	12,612	+4,291
	Council OY	1,101	3,202	4,303	152,285	117,988	270,272	25.8	+55,347	10,289	+1,968

a/ Includes total income impacts associated with ocean recreational fishing (wages and salaries paid to guides, charter operators and suppliers, and the additional income generated when those wages and salaries are spent). Impacts based on PFMC Recreational FEAM (9/03).
b/ Assumes change in angler trips is proportional to projected change in recreational catch.
c/ Change with respect to No Action alternative.

4.5.7 General Public

This section compares non-consumptive values between the alternatives. Non-consumers may derive benefits from use or non-use values provided by the resource. Examples of non-consumptive uses include wildlife viewing and the derivation of secondary benefits from ecosystem services. One or more of the following non-use benefits may result from preservation of fish stocks (1) existence value derived from knowing a fish population or ecosystem is protected without intent to harvest, observe, or otherwise derive direct benefits from the resource; (2) option value placed on knowing a fish population, habitat, or ecosystem has been protected and is available for use, regardless of whether the resources are actually used; and (3) bequethal value placed on knowing a fish population, habitat, or ecosystem is protected for the benefit of future generations. These values may be closely related and overlap with values the general public places on wildlife and natural parks. The following table shows the relationship between the different types of use and non-use, consumptive and non-consumptive values.

Relationship between Use/Non-use and Consumptive/Non-consumptive Activities		
	Consumptive	Non-Consumptive
Use	Recreational Fishing	Wildlife Viewing
Non-use	N/A	Existence Value, Options Value, Bequethal Value

The existence of coastal fishing communities in themselves may have intrinsic social value. For example, the Newport Beach dory fishing fleet, founded in 1891, is an historical landmark designated by the Newport Beach Historical Society. The city grants the dory fleet use of the public beach in return for the business and tourism this unique fishery generates.

4.5.7.1 Criteria Used to Evaluate Impacts

It is difficult to measure and aggregate individuals' non-use values for a given resource. For this discussion, the primary criterion used as a proxy for non-use values is unharvested biomass in the ocean. This is assumed to be inversely proportional to harvest levels under the alternatives.

4.5.7.2 Direct and Indirect Impacts

<u>Non-consumptive Users</u>

Increased fish stocks may indirectly enhance the value of wildlife viewing experience for non-consumptive users. Presumably alternatives based on lower harvest levels will enhance these benefits more than alternatives based on higher harvests. Alternatives ranked from lowest to highest total harvest levels are: *Low OY*, *Council OY*, *Low OY*, *High OY*.

<u>Non-users</u>

In the long run, increased stocks may enhance non-use values. Increases in existence value, options value or bequethal value for non-users may be proportional to the unharvested biomass. Alternatives ranked from highest to lowest unharvested total biomass are: *Low OY*, *Council OY*, *Low OY*, *High OY*.

4.6 *Summary of Environmental Management Issues*

4.6.1 Other Types of Impacts Identified in NEPA Regulations (40 CFR 1502.16)

Section 1502.16 in the NEPA regulations describes what the discussion of environmental consequences in an EIS should include. The previous sections of Chapter 4 have described direct, indirect, and cumulative impacts of the alternatives on different components of the human environment. Although these sections may have touched on a number of additional types of impacts specifically referenced at 40 CFR 1502.16, these other types of impacts are summarized below.

4.6.1.1 Short-term Uses Versus Long-term Productivity

Short-term uses generally affect the present quality of life for the public, in contrast to long-term productivity, which affects the quality of life for future generations, based on environmental sustainability. The proposed action indirectly affects the sustainability of marine resources by constraining fishing mortality to levels that are sustainable. This represents a tradeoff between short-term benefits, reflected in revenue generated from fishing in 2004, and long-term productivity of fish stocks, which determines the abundance of fish in the future, and thus future harvests. Managers must respond to changes in resource status, whether a result of harvests or other, environmental factors; this requires effective monitoring of total fishing mortality. A better understanding of the role of environmental and ecological factors play in affecting stock productivity would also enhance managers' ability to predict future stock response to current harvest levels.

Annual management is based on the framework in the FMP, which dictates how harvest control rules should be set in order to produce sustainable harvests over the long term. While each species' harvest in any one year affects long-term productivity, these harvests are part of an ongoing activity, fishing over many years, that cumulatively affect productivity. Although harvest specifications for many—particularly unassessed—species are the same across all alternatives, differences exist based on uncertainties in recent stock assessments and/or policy choices about the tradeoff between short- and long-term benefits. The alternatives represent a range of OYs, which broadly correlates with actual harvest of individual species. The *Low OY* and *No Action* alternatives contain lower OYs than the other alternatives (except for widow rockfish under *No Action*). Depending on actual harvests (and in particular widow rockfish under the *No Action* alternative), these alternatives favor long-term over short-term benefits. The *High OY* alternative favors short-term benefits while either assuming a greater degree of risk (in terms of interpreting uncertainty in stock assessment model results), which affects long-term benefits in terms of higher future yields. The *Medium OY* and *Council OY* alternatives represent an intermediate level of risk and tradeoff.

4.6.1.2 Irreversible and Irretrievable Resource Commitments

An irreversible commitment represents some permanent loss of an environmental attribute or service. The use of non-renewable resources is irreversible; unsustainable renewable resource use may be irreversible if future production is permanently reduced or, at the extreme, is extinguished.

The use of non-renewable energy resources, such as fossil fuel, represents a pervasive irreversible commitment associated with the proposed action, because fishing vessels are mechanically powered. The use of energy is discussed below in Section 4.6.1.4.

The proposed action, however, implemented under the alternatives, does not by itself represent an irreversible commitment; because harvest levels are specified and management measures set on an annual basis. Cumulatively, past, current, and future specifications could result in an irreversible commitment if a stock were to be extirpated or if population size is reduced to such a degree that even if harvesting stopped completely the stock would not recover. Theoretical work, for example, suggests that ecological factors can inhibit recovery of stocks that are reduced to very low biomass levels (MacCall 2002a; Walters and Kitchell 2001). Although several overfished stocks, such as cowcod, bocaccio, and canary rockfish, are at low biomasses relative to B_{MSY} (the biomass capable of supporting maximum sustainable yield), there can be considerable uncertainty about the likelihood of recovery. For example, the 2002 bocaccio stock assessment and rebuilding analysis (MacCall 2002b; MacCall and He 2002a), used as the basis for setting harvest specifications for 2003, concluded that the stock was unlikely to recover within the rebuilding framework time period (T_{MAX}) even if fishing mortality was reduced to zero. The 2003 stock assessment and rebuilding analysis (MacCall 2003b; MacCall and He 2002b) paint a quite different picture. Detection of a strong 1999 year class in more recent data sets, along with other factors, resulted in a substantial increase in the 2004 OY in comparison to 2003 (from under 20 mt in 2003 to 250 mt in 2004 under the *Council OY* alternative) for the rebuilding target previously chosen by the Council and based on a rebuilding probability (P_{MAX}) of 70%. Given this variability in assessment results, there is not enough information to determine a definite threshold below which population decline is irreversable.

A resource is irretrievably committed if its use is lost for time, but is not actually or practically lost permanently. The analysis of direct, indirect and cumulative impacts in sections 4.1-4.5 generally describe irretrievable resource commitments, and in the case of renewable resources these parallel the tradeoff between short-term use and long-term productivity. All of the alternatives would constrain fish harvests to a level related to the harvest specifications. The fish that are harvested represent an irretrievable resource commitment, as do the inputs in terms of capital and labor (including energy and resources) needed to harvest and market these fish. In addition, the difference between the current sustainable yield for a stock and the long-term maximum sustainable (recognizing this may be only a theoretical optimum) would represent an irretrievable resource commitment.

4.6.1.3 Possible Conflicts Between the Proposed Action and Other Plans and Policies For the Affected Area

The proposed action affects other fisheries managed under Council FMPs or by the states. The management measures under the proposed action have been developed in consultation with the states and keeping in mind other FMPs so as not to directly conflict with these plans and policies. Copies of this EIS have been submitted to Washington, Oregon, and California coastal zone management programs to ensure consistency with those plans (see Section 6.1.1).

4.6.1.4 Energy Requirement and Conservation Potential of the Alternatives

The alternatives directly and indirectly affect the use of energy, primarily in the form of fossil fuels used to power surveillance craft and fishing vessels. Energy used in at-sea and aerial monitoring and enforcement activities is a direct effect. Changes in the level of this type of monitoring is hard to predict for several reasons. First, the monitoring and enforcement may be combined with other activities not related to fisheries, such as the Coast Guard's homeland security obligations. Total time spent at sea is a function of overall agency budgets, with time allocated to different tasks, including fisheries enforcement and monitoring. The consequent level of fuel consumption is unlikely to differ no matter which alternative were chosen since enforcement agency budgets are not a function of the alternatives. Implementation of VMS, originally scheduled for mid-2003 but now expected to be implemented at the beginning of the 2004 fishing year (and applicable to all groundfish limited entry vessels), will reduce the need for at-sea surveillance and could therefore affect fuel consumption by surveillance vessels (although these vessels could be committed to other fuel-consuming tasks). The proposed action indirectly affects fishing activity, and thus, the consumption of fuel by fishing vessels. Fuel consumption may vary with changes in total revenue; revenue is projected to decline from the 2003 levels under the *Low OY* alternative, which may result in reduced fishing vessel fuel consumption. Revenue is projected to increase under the other action alternatives, implying a higher level of fishing vessel fuel consumption. However, the vessel buyback program for limited entry trawl vessels will retire a portion of the fleet. This should reduce overall fuel consumption as long as the remaining vessels can harvest fish more efficiently. Although closed area configurations vary somewhat from 2003, it is unlikely to substantially change vessel fishing patterns. In any case, resulting changes in fuel consumption cannot be predicted because there is insufficient information on the distribution of fishing effort.

4.6.1.5 Urban Quality, Historic and Cultural Resources, and the Design of the Built Environment

Section 3.5.6.7 discusses effects on the built environment, but impacts are not further described in Section 4.5.6 because there is insufficient information to differentiate among the alternatives in terms of these types of impacts. The indirect impact on the urban quality, historic resources, and the built environment will be minimal. Cumulative impacts could be greater. Fishing income has already fallen in many coastal communities, both because of declines in groundfish landings and in other fisheries such as salmon. Cumulative loss of income could lead to a fall in private investment that could curtail maintenance of buildings and other private infrastructure. Public investment, which includes shoreside amenities and marine-related infrastructure such as docks, boat basins, jetties, and navigable channels, is sensitive to changes in tax revenue. By itself, changes in fishing-related revenue may not have an overwhelming impact on local tax revenues, but external factors such as changes in the broader economy could act cumulatively. It is also possible that as private investment shrinks so that, for example, there are fewer fishing vessels using shoreside infrastructure, there will be less political motivation to devote public resources to these uses. In large urban centers, such as Seattle, San Francisco, and the Los Angeles area, the relative impact would be slight and probably not result in changes in urban quality substantially different from the baseline. For small communities, and especially those likely to be more hard hit by declining revenues, the effect on urban quality could be noticeable, especially over the long term (again, depending on external economic factors). These changes could also affect cultural and historic resources as fishing and fishing-dependent activities are supplanted or simply disappear, changing the character of a coastal community. Since the effects described above are speculative, it is not possible to compare the effects of the alternatives beyond projected changes in revenue No direct impacts of the proposed action on cultural historic resources protected under the National Historical Preservation Act are expected. Because indirect or cumulative impacts are too speculative, these impacts cannot be predicted. Income reductions are projected under the *Low OY* alternative, which could cumulatively affect the resources and characteristics discussed here, but these cumulative impacts are too speculative to predict.

4.6.2 Mitigation Measures Not Already Included in the Alternatives

The proposed action is itself mitigative. It seeks to constrain fishing mortality in order to prevent overfishing, rebuild overfished stocks and allow sustainable harvest of healthy fish stocks. No additional mitigation is proposed to be implemented with the proposed action. However, a number of related actions being carried out by the Council, NMFS, and state agencies will mitigate the effects of the proposed action.

<u>Improve commercial catch monitoring</u>: In 2003, observer data from limited entry trawl fisheries became available from the first year of the observer program and was used as a basis for adjusting bycatch estimates. A second year of data will become available in 2004, including observations from the limited entry fixed gear fleet. Use of these data could result in more accurate estimates of total fishing mortality.

<u>Improve recreational catch monitoring</u>: The Marine Recreational Fishery Statistics Survey (MRFSS) administered by NMFS has not been well-suited to fishery management. There is a long time lag between data gathering and publication of estimates. This survey relies on telephone and intercept survey instruments (Van Voorhees *et al.* 2001). Because of these methods, the resulting catch estimates are not believed to be sufficiently accurate for management purposes. As a result, this program is being revised to improve the accuracy and timeliness of catch data.

Establish a vessel and permit buyback program: Excess capacity is a widely-recognized problem for the West Coast groundfish trawl sector (Ad-Hoc Pacific Groundfish Fishery Strategic Plan Development Committee 2000). A vessel and permit buyback program, initiated with federal seed money in the form of loan guarantees, will be used to buy vessels and associated permits in the limited entry trawl fishery and retire them from fishing. (The program is structured to ensure a permanent reduction in capacity across sectors. In addition to retiring permits, vessels will be re-documented so they cannot be used in other fisheries.) Bids have been submitted by vessel/permit owners wishing to leave the fishery. The loan repayment for the buyback will be funded through a landing tax on the remaining fishery participants. A referendum for permit holders to approve the buyback program was held in November, and passed; 92 vessels will be retired before the beginning of 2004.

Implementation of a VMS program to improve monitoring and enforcement: Depth-based restrictions (GCAs) included in the alternatives will be better policed once a VMS program is implemented. A separate regulatory process has been underway throughout 2003 to establish a requirement for all limited entry vessels to carry VMS units. It is expected that these regulations will be in place by the beginning of the 2004 fishing year.

Cooperative research: Involving fishers in research can have a variety of benefits in addition to the research results. First, participating fishers may gain a better understanding of research and survey techniques, helping to reduce suspicion about the validity of scientific methods that ultimately determine to what degree management measures will constrain their catches. Second, and relevant to the current situation in the Pacific groundfish fishery, cooperative research can offer an alternative means of employment for some fishers. This reduces fishing effort, even if by a small amount. It also could relieve some economic hardship as management measures foreclose fishing opportunity.

Rationalize fisheries: Over the long term, management measures that better coordinate the deployment of capital and labor and the availability of inputs (sustainably harvestable fish) could be implemented. With support from the Council, groundfish fishery participants have begun exploring the feasibility of an individual fishing quota (IFQ) program. A "trawl individual quota" (TIQ) ad hoc committee has been established by the Council to explore development of such a program. IFQs do not address the need to accurately assess stocks and specify harvest limits. However, changing the incentive structure of fisheries could reduce bycatch and give fishery participants a realizable stake in long-term sustainability of stocks. IFQ programs generally require a high level of at-sea monitoring to prevent free riding or "quota busting." Economic benefits of IFQs could make expanded at-sea observer coverage more feasible. Total fishing mortality would be better monitored and there may be more information available on which to base stock assessments.

4.6.3 Adverse Effects that Cannot Be Avoided

The proposed action represents a tradeoff between different adverse effects, balancing short-term resource and socioeconomic impacts against long-term sustainability of groundfish resources. Thus, although a given adverse effect may avoided, it may be at the expense of incurring some other effect. All of the alternatives would likely incur the following adverse effects even if mitigation measures are implemented.

The risk or likelihood that certain fish stocks will not recover or decline further: Rebuilding analyses model the probability of stock recovery for a given harvest policy. The Council follows a risk-averse policy in that harvest policies have a greater than 50% probability of recovery within the maximum specified time period (T_{MAX}). But this means there is some likelihood, albeit less than 50%, of stocks not recovering. Furthermore, the current analysis does not take into account scenarios showing recovery to target biomass and subsequent decline due to recruitment variability. Other stocks, such as sablefish and dover sole, are considered in a precautionary zone because their stock size is estimated to be below B_{MSY} but they are not overfished. For both these stocks and overfished stocks there is a risk that because of model or estimation error harvest levels could be set at a level leading to further decline in stock size.

The risk that total fishing mortality could exceed the OY for one or more species: For species with low OYs inaccurate total catch data, or data that is not available to managers in time, could result in total catch exceeding OYs. This is especially true of so-called constraining stocks. The low OYs for these stocks require management measures that also prevent fishers from harvesting other, healthier stocks at higher, sustainable levels. Managers would not have the necessary information in time to close fisheries or impose other management measures to prevent such an overshoot. As noted above under mitigation, this is especially a problem with recreational catch information.

The risk that OY values will be met early in the year: Even with the restrictive management measures developed for the 2004 season, there is some chance the harvest specification for one or more species may be met before the end of the fishing year. The canary rockfish OY is so low relative to possible landings that fisheries may have to be closed, because, for example, a few errant trawls catch a large proportion of the OY. If a fishery is closed for a significant part of the year, firms may go out of business or may not be able to find the necessary skilled labor when they eventually reopen.

4.6.2 Rationale for Selecting the Preferred Alternative and Identifying the Environmentally Preferred Alternative

As discussed above, the range of OYs across the alternatives represent a tradeoff between short-term benefits derived from higher harvests (e.g., under the *High OY* alternative) and the risk (due to uncertainties in the specifications process and catch monitoring) that in-year harvests could delay or preclude higher sustainable harvests in future years. The preferred alternative (*Council OY* alternative) is based on the *Low OY* alternative. Both of these alternatives are intended to be precautionary while allowing sufficient harvest opportunity to mitigate the socioeconomic impacts of the reductions in OYs over the past few years. Where OYs differ among the action alternatives, the *Council OY* alternative is intermediate between the Low and *High OY* alternatives, except in the case of canary rockfish. The preferred alternative shows an increase of $12.5 million in projected revenue in comparison with 2003 (equivalent to the *No Action* alternative). At the same time, the OYs are consistent with the rebuilding targets for overfished species chosen by the Council. For both overfished and non-overfished stocks middle ground results from assessments were chosen as a basis for the OYs. The preferred alternative best addresses the purpose and need of the proposed action, which is to apply management measures to achieve fishing mortalities at or below OYs consistent with the groundfish FMP and the MSA. The Council OY alternative (the preferred alternative) achieves these objectives for the reasons just stated.

To develop its preferred alternative the Council modified four of the OYs in the *Medium OY* alternative and shaped the management measures to constrain total fishing mortality within the preferred set of OYs. The change in the Pacific whiting OY is a special case; the Council recommended deferring choosing a 2004 OY until March 2004 in order to use the best abailable science represented by a new stock assessment due in early 2004. Canary rockfish shows a one metric ton increase in the OY under the *Council OY* alternative, based on the estimated allocation of recreational and commercial catches, which affects the OY. There is no difference, however, between the *Council OY* alternative and the *Medium OY* alternative in terms of the target rebuilding year and rebuilding probability. The Council applied a precautionary reduction in the bocaccio OY (from 306 mt to 250 mt) in their preferred alternative. given the variability in recent stock assessment results and data uncertainty (see Section 2.1.1.2). Given projected total catch (161 mt under the *Medium OY* alternative and 136 mt under the *Council OY* alternative), this is unlikely to have much practical effect. If the actual total catch of bocaccio is substantially higher than projected, then this reduction could obligate the Council to modify management measures inseason; however, this is unlikely. The darkblotched rockfish OY was reduced so that it was equal to the ABC. For technical reasons (see Section 2.1.1.4), the

OY exceeds the ABC under the *Medium OY* and *High OY* alternatives; allowing a total catch above the ABC could be construed as overfishing.

Managing total catch of canary rockfish has been a key consideration shaping management measures. Because of the low OY for this species and its relatively wide latitudinal distribution, management across a range of fisheries had to be tailored to minimize bycatch. The lower OY coming out of the most recent widow rockfish stock assessment was also a concern, although estimated total catch of this species in 2003, at 251 mt, is within the preferred alternative OY. In contrast, the new, more optimistic bocaccio stock assessment allowed some slight relaxation in restrictions in the area south of Point Conception.

In comparison to management in 2003 (the *No Action* alternative) the same key management measures are used—rockfish conservation areas and cumulative trip limits for commercial fishing and bag limits, seasons, and closed areas for recreational fishing. Generally, changes in management measures for the limited entry trawl sector continue a trend of providing incentives—in terms of gear-related differential trip limits—and dis-incentives—primarily the configuration of RCAs. This structure encourages vessels capable of doing so to fish in deep water where overfished species bycatch is estimated to be lower. Fixed gear and open access management measures show modest adjustments in response to changes in the OY.

Differences in recreational management measures between the *Medium OY* and *Council OY* alternatives mainly reflect more cautious management of nearshore species in California waters south of Cape Mendocino. Washington measures do not differ between the alternatives. Oregon and Northern California (to Cape Mendocino) recreational management measures are harmonized, with the main difference in comparison to *No Action* being a change in the closure line that could be implemented inseason, depending on the level of canary or yelloweye rockfish catches. Other differences between the *Council OY* and *Medium OY* are changes in bag limits and sub-limits to address changes in the OY for overfished species.

NEPA regulations, at 40 CFR 1505.2(b), state that the record of decision (ROD) will identify an alternative or alternatives considered "environmentally preferable." In order to inform the public and facilitate preparation of the ROD, the rationale for identifying the *Low OY* alternative as the environmentally preferable alternative is summarized here. Guidance, in the form of *Forty Most Asked Questions Concerning CEQ's NEPA Regulations*, states that the environmentally preferable alternative is "the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources" (Question 6.A). The *Low OY* alternative represents the environmentally preferable alternative because it is the most risk averse and because it is estimated to have the least effect on biological resources in terms of impacts to habitat and ecosystem, total fishing mortality, and harm to protected species. However, in comparison to the preferred alternative the *Low OY* alternative could have a greater adverse impact, especially cumulatively, on West Coast fishing communities substantially engaged in or dependent on groundfish fisheries. The *Low OY* alternative is estimated to result in a decline in revenue and community income. Combined with substantial declines over the past five years, this could affect the character and viability of these communities. Furthermore, NEPA describes national policy in terms of the human environment, which includes the relationship of people with the natural and physical environment (40 CFR 1508.14). Fishing, whether commercial or recreational, is a direct expression of this relationship.

The Council did not choose the *Low OY* alternative (identified as the environmentally preferred alternative) as its preferred alternative because of the substantial adverse impacts to fishing communities predicted for this alternative. NEPA regulations and guidance indicate that agencies have discretion in choosing a preferred alternative different from the environmentally preferred alternative "based on relevant factors including economic and technical considerations and agency statutory missions" (40 CFR 1505.2(b)). In addition to the adverse economic impacts just summarized, the MSA emphasizes a balance between resource conservation and impacts to fishing communities. Thus, National Standard 1 identifies optimum yield as an objective of conservation and management measures and National Standard 9 states that conservation and management measures shall, to the extent practicable, minimize adverse impacts on fishing communities.

5.0 CONSISTENCY WITH THE GROUNDFISH FMP AND MANGNUSON-STEVENS ACT NATIONAL STANDARDS

5.1 Consistency with the Groundfish FMP

The groundfish FMP goals and objectives are listed below. The way in which the 2003 management measures address each objective is briefly described in italics below the relevant statement.

Management Goals.

Goal 1 - Conservation. Prevent overfishing by managing for appropriate harvest levels and prevent any net loss of the habitat of living marine resources.

Goal 2 - Economics. Maximize the value of the groundfish resource as a whole.

Goal 3 - Utilization. Achieve the maximum biological yield of the overall groundfish fishery, promote year-round availability of quality seafood to the consumer, and promote recreational fishing opportunities.

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

Conservation.

Objective 1. Maintain an information flow on the status of the fishery and the fishery resource which allows for informed management decisions as the fishery occurs.

The Council OY alternative (preferred alternative) employs the same data sources that have been used in past years to monitor groundfish fisheries. In addition, data from the first year of the NMFS observer program (August 2001 to August 2002) became available in early 2003 and were used for inseason management. In particular, more accurate data to determine bycatch rates for overfished species have been derived from these data and applied to develop management measures for 2004. A vessel monitoring system, will be implemented for the 2004 fishing year, providing real-time location information for participating vessels. These information sources would also apply to all of the other alternatives evaluated in this EIS.

Objective 2. Adopt harvest specifications and management measures consistent with resource stewardship responsibilities for each groundfish species or species group.

The Council OY alternative (preferred alternative) adopts harvest specifications and management measures that support rebuilding of overfished and precautionary stocks and sustainable harvest of healthy stocks. The other action alternatives fall within the management framework, but represent different tradeoffs between overfishing risk and socioeconomic impacts.

Objective 3. For species or species groups which are below the level necessary to produce MSY, consider rebuilding the stock to the MSY level and, if necessary, develop a plan to rebuild the stock.

All of the action alternatives, including the Council OY alternative (preferred alternative), set risk averse harvest levels for overfished species (in that the probability of rebuilding within the specified time frame is greater than 50%).

> Objective 4. Where conservation problems have been identified for nongroundfish species, and the best scientific information shows 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.

None of the alternatives include new measures intended to control the impacts of groundfish fishing on nongroundfish stocks.

> Objective 5. Describe and identify 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.

The use of groundfish conservation areas (GCAs) under all alternatives will reduce EFH impacts by eliminating most fishing-related impacts in those areas. However, redistribution of effort into open areas could intensify fishing effort in some areas; resulting habitat impacts cannot be predicted at this time. In addition to the GCAs, bottom trawlers are required to use small footropes showewared of GCAs , lessening impacts in rocky habitat, a preferred habitat for some overfished groundfish species. If a vessel fishes with small footrope gear seaward of the GCAs at any time in a cumulative limit period it is subject to smaller landing limits for DTS species for the entire period, further discouraging the use of this gear.

Economics.

> Objective 6. Attempt to achieve the greatest possible net economic benefit to the nation from the managed fisheries.

Calculating net costs and benefits in 2003 (including the imputed value of non-market costs and benefits) and the present value of all future net benefits would be the best way to measure net benefit. Although the analysis estimates changes in income associated with the alternatives, there is no directly comparable measure of the conservation benefits of the alternatives (such as net present value of future harvests), so it is not possible to determine if the Council OY alternative (preferred alternative) or any of the other alternatives, achieves the greatest possible net economic benefit. Furthermore, future best use of resources (in terms of economic return), which would predicate future allocation decisions, cannot be predicted. However, the action alternatives fall within the management framework intended to achieve maximum sustained yield over the long term. This gives greater latitude for future decision making to achieve maximum economic net benefit. Although net present value of future benefits cannot be measured, the Council OY alternative results in an increase in revenues from 2003 that is slightly greater than the Medium OY alternative and substantially higher than the Low OY alternative.

> 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.

All of the alternatives have management measures intended to allow commercial fisheries year-round, bearing in mind that individual fisheries, such as the directed fixed gear sablefish fishery, are seasonally constrained. Given low harvest specifications for some overfished species, however, actual harvests may result in early attainment of a particular specification, necessitating the closure of particular fisheries.

Objective 8. Gear restrictions to minimize the necessity for other management measures will be used whenever practicable.

No new gear restrictions are proposed for directed groundfish fisheries. Under the action alternatives gear restrictions and/or modifications are proposed for a range of nongroundfish fisheries in order to minimize bycatch of overfished species. A portion of the OY for certain species is allocated to vessels fishing under exempted fishing permits (EFPs). Some of these EFPs are being used as a means to test new gear configurations that reduce bycatch of overfished species.

Utilization.

Objective 9. Develop management measures and policies that foster and encourage full utilization (harvesting and processing) of the Pacific Coast groundfish resources by domestic fisheries.

There has been no foreign fishing on the West Coast for more than a decade, so all of the alternatives meet this objective.

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

As in past years, management measures in all of the alternatives use species groups related to particular fisheries or gear to structure trip limits.

Objective 11. Strive to reduce the economic incentives and regulatory measures that lead to wastage of fish. Also, develop management measures that minimize bycatch to the extent practicable and, to the extent that bycatch cannot be avoided, minimize the mortality of such bycatch. In addition, promote and support monitoring programs to improve estimates of total fishing-related mortality and bycatch, as well as those to improve other information necessary to determine the extent to which it is practicable to reduce bycatch and bycatch mortality.

GCAs are meant to reduce bycatch of overfished species by prohibiting fishing that generates significant bycatch in areas where these species are most abundant. (GCAs are included in all the action alternatives.) In addition, trip limits under all the alternatives are set through model projections that include estimated bycatch, based on data derived from the NMFS groundfish observer program. This provides the best estimates of total fishing-related mortality and bycatch currently available.

Objective 12. Provide for foreign participation in the fishery, consistent with the other goals to take that portion of the OY not utilized by domestic fisheries while minimizing conflict with domestic fisheries.

This objective is no longer relevant, since all stocks are fully utilized by domestic fishers.

Social Factors.

Objective 13. When conservation actions are necessary to protect a stock or stock assemblage, attempt to develop management measures that will affect users equitably.

The Council process facilitates input from resource user groups, state and federal agencies, and the general public. This promotes the formulation of equitable management measures.

Objective 14. Minimize gear conflicts among resource users.

Although redistribution of fishing effort because of GCA closures could increase crowding in nearshore areas, this has not emerged as an issue voiced during scoping for this EIS or through other public comment opportunities during Council meetings.

> 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.

Management measures proposed for 2004 do not differ substantially in kind from those used in 2003. GCAs were in use for all of 2003 and this base of experience has allowed managers to propose configurations that vary less over the course of the year, simplifying their application.

> Objective 16. Avoid unnecessary adverse impacts on small entities.

Relative to the 2003 fishery, small commercial seafood entities will experience some increase in revenue under the Council OY alternative and substantial increases are expected in the recreational fishery. The High OY alternative could have provided greater benefits to small entities but at a greater level of risk to achievement of stock rebuilding and recovery over the long term. The Low OY alternative would have provided even more precautionary harvest levels with respect to averting risk to stock rebuilding and recovery objectives, but would have imposed substantially greater adverse impact on small entities in the commercial seafood industry.

> 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.

The impacts of all the alternatives on communities are evaluated in Section 4.5.6. Given the harvest opportunity increases projected for the Council OY alternative, benefits for communities relative to the No Action alternative and the Low OY alternative are expected to be substantial.

> Objective 18. Promote the safety of human life at sea.

If smaller vessels traditionally fishing in the areas now part of GCAs or shoreward elect to fish seaward of the GCAs weather-related safety issues could arise. However, this did not come up as an issue during public scoping meetings or other public comment opportunities even though GCAs were in place during 2003.

5.2 Consistency with Magnuson-Stevens Act National Standards

An FMP or plan amendment and any pursuant regulations must be consistent with ten national standards contained in the Magnuson-Stevens Act (§301). These are:

National Standard 1 states that conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

The action alternatives, including the Council OY alternative (preferred alternative), all include OY values that reflect harvest rates below the overfishing threshold and include precautionary reductions to rebuild overfished stocks and other stocks that, while not overfished, are at a biomass below the level necessary to produce MSY. The No Action alternative establishes OYs lower than the Council OY alternative, except for widow rockfish, which had a new stock assessment in 2003 revising downward OY levels. Based on the stock assessment model used to determine the Council OY, the No Action widow rockfish OY would have rebuilding probability of less than 50%, indicating a significant impact on that stock if the full OY were caught.

National Standard 2 states that conservation and management measures shall be based on the best scientific information available.

OY values in the action alternatives, including the Council-OY alternative, are based on the most recent stock assessments, developed through the peer-review STAR process. This represents the best available science. The No Action alternative OY values are based on stock assessments conducted before the 2003, the year to which the No Action alternative management measures apply. Given that more recent stock assessments are available, that alternative does not use the best available science.

National Standard 3 states that, to the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

Some groundfish stocks are managed as individual units with specific trip limits. However, given the multi-species nature of many groundfish fisheries, other stocks are grouped in stock complexes and managed accordingly. This generally applies to non-target species for which no individual stock assessments have been performed. Until recently many species were not reported individually in groundfish fisheries and nongroundfish fisheries may not report incidental groundfish catches at the species level. This limits the amount of time-series data available for stock assessments on which individual stocks could be managed. However, whenever possible individual stocks are assessed; for example, black rockfish is a newly assessed species for which a species-specific OY was established for 2004. Stocks are managed throughout the range of that stock (as opposed to the species), although issues do arise in the case of stocks straddling international borders. For this reason allocation of the harvestable surplus of Pacific whiting between the U.S. and Canada is subject to a negotiated agreement.

National Standard 4 states that conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishers, such allocation shall be (A) fair and equitable to all such fishers; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges. The proposed measures will not discriminate between residents of different states.

Management measures are developed through the Council process, which facilitates substantial participation by state representatives. Generally, state proposals are brought forward when alternatives are crafted and integrated to the degree practicable. Decisions about catch allocation between different sectors or gear groups are also part of this participatory process, and emphasis is placed on equitable division while ensuring conservation goals. None of the management measures in the alternatives would allocate specific shares or privileges to one individual or corporation.

National Standard 5 states that conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

Management measures in the groundfish fishery are not designed specifically for the purpose of efficient utilization. However, lower OY levels and other restrictions are likely to result in further fleet capacity reduction as fishing becomes economically unviable for more vessels. There is broad consensus that capacity reduction in some sectors is needed to rationalize fisheries. A capacity reduction program for the limited entry groundfish trawl fleet is currently in progress. This vessel buyback has retired 92 vessels while compensating owners of retired vessels.

National Standard 6 states that conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources and catches.

Management measures reflect differences in catch, and in particular bycatch of overfished species, among different fisheries. Because of the low harvest specifications for overfished species, management measures are proposed for nongroundfish fisheries to minimize bycatch of these species. Each alternative was evaluated in terms of the probable bycatch of overfished species, based on the proposed management measures. (See Tables 2.2.2-1, 2.2.2-1, 2.2.3-1, 2.2.4-1, and 2.2.5-1.) This allows comparison between the proposed OY and a judgement of whether management measures will constrain fisheries sufficiently.

National Standard 7 states that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

The alternatives do not explicitly address this standard. Generally, by coordinating management, monitoring, and enforcement activities between the three West Coast states duplication, and thus cost, is minimized. Necessary monitoring and enforcement programs, such as the use of fishery observers and implementation of a vessel monitoring system, increase management costs. But these efforts are necessary to effective management.

National Standard 8 states that conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

This document evaluates the effects of the alternatives on fishing communities (see Section 4.5.6) and these effects were taken into account in choosing the Council-OY alternative. The preferred alternative represents the Council's judgement of the best tradeoff between the need to conserve and rebuild fish stocks and the economic impacts of the necessary management measures. Generally, this tradeoff is resolved by structuring management measures to allow communities to access healthy, harvestable stocks while minimizing catch of overfished stocks.

National Standard 9 states that conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

Minimizing bycatch, of all species and overfished species in particular, is an important component of the alternatives. GCAs are meant to keep fishing away from areas where overfished species are most abundant, and therefore reduce bycatch. Trip limits are structured to discourage directed and incidental catch of these species, but where bycatch is unavoidable to allow some minimal retention. Integration of observer data into the management process allows more accurate estimates of bycatch rates, and thus total catch estimates.

National Standard 10 states that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

GCAs could affect safety if more vessels elect to fish seaward of the closed areas and are more exposed to bad weather conditions. However, this was not raised as an issue during public scoping meetings. Implementation of a vessel monitoring system capable of sending distress calls could mitigate this safety issue.

6.0 CROSS-CUTTING MANDATES

In addition to being prepared in accordance with the requirements of the Magnuson-Stevens Act and NEPA, this document also addresses requirements of other applicable federal laws and EOs. These laws and orders are described here and their applicability to this action assessed.

6.1 Other Federal Laws

6.1.1 Coastal Zone Management Act

Section 307(c)(1) of the federal Coastal Zone Management Act (CZMA) of 1972 requires all federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. The *Council OY alternative* (preferred alternative) would be implemented in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of Washington, Oregon, and California. This determination has been submitted to the responsible state agencies for review under Section 307(c)(1) of the CZMA. The relationship of the groundfish FMP with the CZMA is discussed in Section 11.7.3 of the groundfish FMP. The groundfish FMP has been found to be consistent with the Washington, Oregon, and California coastal zone management programs. The recommended action is consistent and within the scope of the actions contemplated under the framework FMP.

Under the CZMA, each state develops its own coastal zone management program which is then submitted for federal approval. This has resulted in programs which vary widely from one state to the next. Groundfish harvest specifications and management measures for rebuilding plans adopted under Amendment 16-2 establish strategies for rebuilding four overfished groundfish stocks and are not expected to affect any state's coastal management program.

6.1.2 Endangered Species Act

NMFS issued Biological Opinions (BOs) under the ESA on August 10, 1990, November 26, 1991, August 28, 1992, September 27, 1993, May 14, 1996, and December 15, 1999 pertaining to the effects of the groundfish fishery on chinook salmon (Puget Sound, Snake River spring/summer, Snake River fall, upper Columbia River spring, lower Columbia River, upper Willamette River, Sacramento River winter, Central Valley spring, California coastal), coho salmon (Central California coastal, southern Oregon/northern California coastal), chum salmon (Hood Canal summer, Columbia River), sockeye salmon (Snake River, Ozette Lake), and steelhead (upper, middle and lower Columbia River, Snake River Basin, upper Willamette River, central California coast, California Central Valley, south-central California, northern California, southern California). During the 2000 Pacific whiting season, the whiting fisheries exceeded the chinook bycatch amount specified in the Pacific whiting fishery BO (December 15, 1999) incidental take statement estimate of 11,000 fish, by approximately 500 fish. In the 2001 whiting season, however, the whiting fishery's chinook bycatch was about 7,000 fish, which approximates the long-term average. After reviewing data from, and management of, the 2000 and 2001 whiting fisheries (including industry bycatch minimization measures), the status of the affected listed chinook, environmental baseline information, and the incidental take statement from the 1999 whiting BO, NMFS determined in a letter dated April 25, 2002 that a re-initiation of the 1999 whiting BO was not required. NMFS has concluded that implementation of the FMP for the Pacific Coast groundfish fishery is not expected to jeopardize the continued existence of any endangered or threatened species under the jurisdiction of NMFS, or result in the destruction or adverse modification of critical habitat. The proposed action is within the scope of these consultations.

6.1.3 Marine Mammal Protection Act

The MMPA of 1972 is the principle federal legislation that guides marine mammal species protection and conservation policy in the United States. Under the MMPA, NMFS is responsible for the management and conservation of 153 stocks of whales, dolphins, porpoise, as well as seals, sea lions, and fur seals; while the U.S. Fish and Wildlife Service is responsible for walrus, sea otters, and the West Indian manatee.

Off the West Coast, the Steller sea lion (*Eumetopias jubatus*) Eastern stock, Guadalupe fur seal (*Arctocephalus townsendi*), and Southern sea otter (*Enhydra lutris*) California stock are listed as threatened under the ESA and the sperm whale (*Physeter macrocephalus*) Washington, Oregon, and California stock, humpback whale (*Megaptera novaeangliae*) Washington, Oregon, and California - Mexico Stock, blue whale (*Balaenoptera musculus*) Eastern north Pacific stock, and Fin whale (*Balaenoptera physalus*) Washington, Oregon, and California stock are listed as depleted under the MMPA. Any species listed as endangered or threatened under the ESA is automatically considered depleted under the MMPA.

The West Coast groundfish fisheries are considered a Category III fishery, indicating a remote likelihood of or no known serious injuries or mortalities to marine mammals, in the annual list of fisheries published in the *Federal Register*. Based on its Category III status, the incidental take of marine mammals in the West Coast groundfish fisheries does not significantly impact marine mammal stocks. As discussed in Section 4.3, groundfish harvest specifications and management measures may indirectly affect the intensity, duration, and location of groundfish fisheries. Based on best professional judgement, the effects of the *Council OY* alternative (preferred alternative) will not differ significantly from the baseline and will not have significant impacts on marine mammals.

6.1.4 Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 was designed to end the commercial trade of migratory birds and their feathers that, by the early years of the 20th century, had diminished populations of many native bird species. The Act states that it is unlawful to take, kill, or possess migratory birds and their parts (including eggs, nests, and feathers) and is a shared agreement between the United States, Canada, Japan, Mexico, and Russia to protect a common migratory bird resource. The Migratory Bird Treaty Act prohibits the directed take of seabirds, but the incidental take of seabirds does occur. As discussed in Section 4.3, the proposed action is unlikely to affect the incidental take of seabirds protected by the Migratory Bird Treaty Act.

6.1.5 Paperwork Reduction Act

The proposed action, as implemented by any of the alternatives considered in this EIS, does not include any new collection-of-information requirements subject to the Paperwork Reduction Act.

6.1.6 Regulatory Flexibility Act

The purpose of the RFA is to relieve small businesses, small organizations, and small governmental entities of burdensome regulations and record-keeping requirements. Major goals of the RFA are; (1) to increase agency awareness and understanding of the impact of their regulations on small business, (2) to require agencies communicate and explain their findings to the public, and (3) to encourage agencies to use flexibility and to provide regulatory relief to small entities. The RFA emphasizes predicting impacts on small entities as a group distinct from other entities and the consideration of alternatives that may minimize the impacts while still achieving the stated objective of the action. An IRFA is conducted unless it is determined that an action will not have a "significant economic impact on a substantial number of small entities." The RFA requires that an IRFA include elements that are similar to those required by EO 12866 and NEPA. Therefore, the IRFA has been combined with the RIR and NEPA analyses.

Section 6.3 (below) summarizes the analytical conclusions specific to the RFA and EO 12866.

6.2 Executive Orders

6.2.1 EO 12866 (Regulatory Impact Review)

EO 12866, Regulatory Planning and Review, was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. The EO covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. Section 1 of the EO deals with the regulatory philosophy and principles that are to guide agency development of regulations. It stresses that in deciding whether and how to regulate, agencies should assess all of the costs and benefits across all regulatory alternatives. Based on this analysis, NMFS should choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach.

The RIR and IRFA determinations are part of the combined summary analysis in Section 6.3 of this document.

6.2.2 EO 12898 Environmental Justice

EO 12898 obligates federal agencies to identify and address "disproportionately high adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States" as part of any overall environmental impact analysis associated with an action. NOAA guidance, NAO 216-6, at §7.02, states that "consideration of EO 12898 should be specifically included in the NEPA documentation for decision-making purposes." Agencies should also encourage public participation—especially by affected communities—during scoping, as part of a broader strategy to address environmental justice issues.

The environmental justice analysis must first identify minority and low-income groups that live in the project area and may be affected by the action. Typically, census data are used to document the occurrence and distribution of these groups. Agencies should be cognizant of distinct cultural, social, economic, or occupational factors that could amplify the adverse effects of the proposed action. (For example, if a particular kind of fish is an important dietary component, fishery management actions affecting the availability, or price of that fish, could have a disproportionate effect.) In the case of Indian tribes, pertinent treaty or other special rights should be considered. Once communities have been identified and characterized, and potential adverse impacts of the alternatives are identified, the analysis must determine whether these impacts are disproportionate. Because of the context in which environmental justice is developed, health effects are usually considered, and three factors may be used in an evaluation: whether the effects are deemed significant, as the term is employed by NEPA; whether the rate or risk of exposure to the effect appreciably exceeds the rate for the general population or some other comparison group; and whether the group in question may be affected by cumulative or multiple sources of exposure. If disproportionately high adverse effects are identified, mitigation measures should be proposed. Community input into appropriate mitigation is encouraged.

Council staff are currently developing a methodology to characterize the demographics of coastal communities affected by Council and NMFS actions, such as this FMP amendment, using data from the 2000 U.S. Census. Although it will be useful in future environmental impact assessments, especially to address environmental justice concerns, this work is not sufficiently complete for use in this EIS. Once complete, this demographic characterization will only partially address the ability to identify low income and minority populations affected by Council and NMFS actions. A presumption of the EO is that a proposed action will affect members of a geographically discrete population in more-or-less similar fashion (taking into account specific cultural practices related to resource use and public health). However, Council and NMFS actions mainly affect a sub-population—those who participate in fishing and allied occupations (such as processing plant workers). The question then becomes one of identifying disproportionate impacts to the low income and minority segment of this sub-population in comparison to the whole sub-population of fishery participants affected by the proposed action. (If the data were available, this could be the "reference community" used to determine if impacts to the low income and minority segment are disproportionate.) The information needed to characterize this sub-population is not reasonably available. Thus, even if differential impacts to different coastal communities are identified, and low income and minority coastal communities distinguished, it is difficult to determine if the low income and minority segment of fishery participants is disproportionately affected in comparison to the whole population. (This "whole population" of fishery participants is typically not distinguishable within the geographic population characterized by census data.)

This EIS discloses that the intensity of impacts from the proposed action will vary among geographic regions and fishery sectors, as discussed in Section 4.5. Coastal communities are generally affected by the proposed action, in contrast to other communities in Washington, Oregon, and California, which are largely unaffected by the proposed action. However, in considering disproportionate effects, it is reasonable to consider the relative effects within the total affected area, rather than the whole three-state region. Tables 4.5.6-1 and 4.5.6-2 present estimates of fishery-related income impacts by port groups. (Port groups are statistical areas used in categorizing groundfish landings and cumulate data from constituent ports.) Table 4.5.6-2 is a useful basis for identifying disproportionate effects, since it presents these impacts in terms of the percent change from estimated income in 2003 (the *No Action* alternative). The *Low OY* alternative is projected to result in a decline in groundfish-related income (the non-tribal groundfish row in the table) in all communities. The *Medium OY*, *High OY*, and *Council OY* alternatives show increases in groundfish-related income in most communities. Focusing on the preferred alternative (the *Council OY* alternative), the following port groups show a decline in groundfish-related income: Coos Bay, Oregon, 3% ($33,000); Santa Barbara, California, 4% ($39,000); Los Angeles, California, 13% ($201,000); and San Diego, California, 10% ($33,000). Based on the percent decline and absolute magnitude of the change, the adverse impact to Los Angeles could be disproportionate. However, this region has a very large population, so the per capita effect is likely to be more modest than in Coos Bay, for example, which has a population of 15,443 (or 62,779 for Coos County, which more accurately reflects the regional scale of the income impact estimate). This information suggests the proposed action could have disproportionate impacts to particular fishery sectors in particular locales. However, as noted above, there is no reasonably available information that can be used to determine if the participants in the fisheries in particular locales are predominantly low income or minority. For example, Los Angeles has large segments of its population that would qualify as low income and/or minority, but the demographic characteristics of the population in this area directly affected by the action (fishers and those in allied industries such as fish processing) are unknown.

Treaty tribes in Washington State are an identifiable minority population affected by the proposed action. (Section 3.4.6.2 describes participation by treaty tribes in West Coast groundfish fisheries.) As part of the development of annual management measures, target species allocations are agreed upon for tribal fisheries, and the resulting bycatch of overfished species is estimated. Tribal governments develop separate management measures for the fisheries they prosecute, which are then approved by the Council as part of the annual management process. A representative of tribes with federally recognized fishing rights is an obligatory member of the Pacific Council (MSA §302(a)(1)(F)), and a staff biologist from the tribes serves on the GMT, which advises the Council on groundfish fishery management measures. This participation in the management process helps prevent disproportionate impacts to treaty tribes subject to the proposed action. When harvest specifications and management measures are implemented are considered and adopted, the tribal representative on the Council has the opportunity to ensure that management measures having a disproportionate impact on treaty tribes are modified or mitigated. Projections of personal income impacts resulting from 2004 management measures (Table 4.5.6-2) show an 11% increase in personal income from tribal groundfish fisheries in comparison to a prediction of no change in personal income for all fisheries coastwide. (It should be recognized that there may be Native Americans who participate in groundfish fisheries outside of those established by treaty. Currently, impacts to this population, as with impacts to minority and low income populations, generally, cannot be distinguished using reasonably available information.)

Participation in decisions about the proposed action by communities that could experience disproportionately high and adverse impacts is another important principle of the EO. The Council offers a range of opportunities for participation by those affected by its actions and disseminates information to affected communities about its proposals and their effects through several channels. In addition to Council membership, which includes representatives from the fishing industries affected by Council action, the GAP, a Council advisory body, draws membership from fishing communities affected by the proposed action. While no special provisions are made for membership to include representatives from low income and minority populations, concerns about disproportionate effects to minority and low income populations could be voiced through this body, or to the Council directly. Although Council meetings are not held in isolated coastal communities for logistical reasons, they are held in different places up and down the West Coast to increase accessability. In addition, fishery management agencies in Oregon and California sponsored public hearings in coastal communities to gain input on the proposed action. The comments were made available to the Council in advance of their decision to choose a preferred alternative.

The Council disseminates information about issues and actions through several media. Although not specifically targeted at low income and minority populations, these materials are intended for consumption by affected populations. Materials include a newsletter, describing business conducted at Council meetings, notices for meetings of all Council bodies, and fact sheets intended for the general reader. The Council maintains a postal and electronic mailing list to disseminate this information. The Council also maintains a website (www.pcouncil.org) providing information about the Council, its meetings, and decisions taken. Most of the documents produced by the Council, including NEPA documents, can be downloaded from the website.

6.2.3 EO 13132 (Federalism)

EO 13132, which revoked EO 12612, an earlier federalism EO, enumerates eight "fundamental federalism principles." The first of these principles states "Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people." In this spirit, the EO directs agencies to consider the implications of policies that may limit the scope of or preempt states' legal authority. Preemptive action having such "federalism implications" is subject to a consultation process with the states; such actions should not create unfunded mandates for the states; and any final rule published must be accompanied by a "federalism summary impact statement."

The Council process offers many opportunities for states (through their agencies, Council appointees, consultations, and meetings) to participate in the formulation of management measures. This process encourages states to institute complementary measures to manage fisheries under their jurisdiction that may affect federally-managed stocks.

The proposed action does not have federalism implications subject to EO 13132.

6.2.4 EO 13175 (Consultation and Coordination With Indian Tribal Government)

EO 13175 is intended to ensure regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

The Secretary recognizes the sovereign status and co-manager role of Indian tribes over shared federal and tribal fishery resources. At Section 302(b)(5), the Magnuson-Stevens Act reserves a seat on the Council for a representative of an Indian tribe with federally-recognized fishing rights from California, Oregon, Washington, or Idaho.

The U.S. government formally recognizes the four Washington coastal tribes (Makah, Quileute, Hoh, and Quinault) have treaty rights to fish for groundfish. In general terms, the quantification of those rights is 50% of the harvestable surplus of groundfish available in the tribes' U and A fishing areas (described at 50 CFR 660.324). Each of the treaty tribes has the discretion to administer their fisheries and to establish their own policies to achieve program objectives.

Accordingly, tribal allocations and regulations for the 2004 groundfish fishery have been developed in consultation with the affected tribe(s) and, insofar as possible, with tribal consensus.

For more information on tribal treaty rights and consultations through the Council process, see Section 3.4.6.2.

6.2.5 EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds)

EO 13186 supplements the MBTA (above) by requiring federal agencies to work with the U.S. Fish and Wildlife Service to develop memoranda of agreement to conserve migratory birds. NMFS is scheduled to implement its memorandum of understanding by January 2003. The protocols developed by this consultation will guide agency regulatory actions and policy decisions in order to address this conservation goal. The EO also directs agencies to evaluate the effects of their actions on migratory birds in environmental documents prepared pursuant to the NEPA.

Section 4.3 evaluates impacts to seabirds and concludes that the proposed action will not significantly impact seabirds.

6.3 Regulatory Impact Review and Regulatory Flexibility Analysis

In order to comply with EO 12866 and the RFA, this document also serves as an RIR and an IRFA. A summary of these analyses is presented below.

6.3.1 EO 12866 (Regulatory Impact Review)

EO 12866, Regulatory Planning and Review, was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. The EO covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. Section 1 of the Order deals with the regulatory philosophy and principles that are to guide agency development of regulations. It stresses that in deciding whether and how to regulate, agencies should assess all of the costs and benefits across all regulatory alternatives. Based on this analysis, NMFS should choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach.

The regulatory principles in EO 12866 emphasize careful identification of the problem to be addressed. The agency is to identify and assess alternatives to direct regulation, including economic incentives such as user fees or marketable permits, to encourage the desired behavior. Each agency is to assess both the costs and the benefits of the intended regulation and, recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only after reasoned determination the benefits of the intended regulation justify the costs. In reaching its decision agency must use the best reasonably obtainable information, including scientific, technical and economic data, about the need for and consequences of the intended regulation.

NMFS requires the preparation of an RIR for all regulatory actions of public interest, including the specification of annual management measures. The RIR provides a comprehensive review of the changes in net economic benefits to society associated with proposed regulatory actions. The analysis also provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problems. The purpose of the analysis is to ensure the regulatory agency systematically and comprehensively considers all available alternatives, so the public welfare can be enhanced in the most efficient and cost-effective way. The RIR addresses many of the items in the regulatory philosophy and principles of EO 12866.

The RIR analysis and an environmental analyses required by NEPA have many common elements and they have been combined in this document. The following table shows where the elements of an RIR, as required by EO 12866, are located.

Required RIR Elements	Corresponding Sections
Description of management objectives	Sections 1.2 & 1.3
Description of the fishery[31/]	Sections 1.2 & 3.0
Statement of the problem	Section 1.2.2
Description of each alternative considered in the analysis	Section 2.2
An economic analysis of the expected effects of each selected alternative relative to the *No Action* alternative	Sections 2.4 and 4.5

The RIR is designed to determine whether the proposed actions could be considered "significant regulatory actions" according to EO 12866. The following table identifies EO 12866 test requirements used to assess whether or not an action would be a "significant regulatory action" and identifies the expected outcomes of the proposed management alternatives. For the purposes of the EO, none of the alternatives appear to meet the significance criteria. A regulatory program is "economically significant" if it is likely to result in the effects described in item 1 in the table:

Summary of EO 12866 Test Requirements
(Changes Indicated Are Relative to the 2003 Baseline (*No Action* Alternative))

EO 12866 Test of "Significant Regulatory Actions"	*No Action* Alternative (2003 baseline)	*Low OY Alt*	*Medium OY Alt*	*High OY Alt*	*Council OY Alt*
1) Have a annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities	Status Quo	2004 Potential Changes: Exvessel Rev -$11.5 mil; Com Harvest Income Impacts -$6.2 mi (excluding whiting); Rec Fishery Income Impacts $95 mil.	2004 Potential Changes: Exvessel Rev +$3.3 mil; Com Harvest Income Impacts + $4.8 mil (excluding whiting); Rec Fishery Income Impacts +$112 mil.	2004 Potential Changes: Exvessel Rev - +$12.5 mil; Com Harvest Income Impacts +$6.9 mil (excluding whiting); Rec Fishery Income Impacts +$122 mil.	2004 Potential Changes: Exvessel Rev - +$2.8 mil; Com Harvest Income Impacts +$4.0 mil (excluding whiting); Rec Fishery Income Impacts +$55 mil.
		Overall Long Term Risk to Productivity (All Long Term Risk Levels Are Within Magnuson-Stevens Act Gudelines)			
	Status Quo	Lower Risk	Similar Risk	Higher Risk	Similar Risk
2) Create a serious inconsistency or otherwise interfere with action taken or planned by another agency	None Identified	None Identified	None Identified	None Identified	None Identified
3) Materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of recipients thereof	None Identified	None Identified	None Identified	None Identified	None Identified

31/ In addition to the information in this document, basic economic information is provided annually in the Council's Stock Assessment and Fishery Evaluation document.

Summary of EO 12866 Test Requirements
(Changes Indicated Are Relative to the 2003 Baseline (*No Action* Alternative))

EO 12866 Test of "Significant Regulatory Actions"	*No Action* Alternative (2003 baseline)	*Low OY Alt*	*Medium OY Alt*	*High OY Alt*	*Council OY Alt*
4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this EO	None Identified	None Identified	None Identified	None Identified	None Identified

Note: Exvessel revenues include tribal, nontribal, and all whiting deliveries (at-sea and shoreside). Community income impact estimates exclude at-sea whiting deliveries.

6.3.2 Impacts on Small Entities (Regulatory Flexibility Act, RFA)

The RFA requires government agencies to assess the effects that regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those effects. The RIR is also designed to determine whether the proposed rule has a "significant economic impact on a substantial number of small entities"[32/] under the RFA.

A fish-harvesting business is considered a "small" business by the Small Business Administration if it has annual receipts not in excess of $3.5 million. For related fish-processing businesses, a small business is one that employs 500 or fewer persons. For wholesale businesses, a small business is one that employs not more than 100 people. For marinas and charter/party boats, a small business is one with annual receipts not in excess of $5 million.

The data available for this analysis is based on data sets that have vessel and buyer/processor identifiers. The commercial data is from the PacFIN data system, and the recreational data was provided by the states. The vessel and processor counts are based on unique vessel and buyer/processor identifiers. However, it is known that in many cases a single firm may own more than one vessel or buyer/processing facility, and more than one profit center. Therefore, the counts should be considered upper bound estimates. Additionally, businesses owning vessels and/or buyer/processors may have revenue from fisheries in other geographic areas, such as Alaska, or from nonfishing activities. Therefore, there is some possibility that when all operations of a firm are aggregated, some of the small entities identified here are larger than indicated.

Most of the vessels, processors and related businesses engaged in the West Coast groundfish fishery would be classified as small businesses under these definitions.

<u>Overview for Seafood Fishery</u>: - For purposes of evaluating impacts, the analysis segregates the commercial groundfish fleet into subgroups based on involvement and dependence on the groundfish fishery, gear type, and possession of a limited entry permit. A slight increase in harvest under the *Council OY* alternative is expected to increase exvessel revenue by 3% as compared to status quo (revenue includes tribal, nontribal, and all whiting deliveries, at-sea and shoreside). From the buyer/processor perspective this represents an increase in raw product available. Under the *Low OY* alternative, a 25% decrease in exvessel revenue would be expected and under the high OY a 22% increase, as compared to status quo. Individual groups may experience greater or lesser reductions or increases (Section 4.5.2).

32/ The Small Business Administration defines a small business in commercial fishing "as a fish harvesting or hatchery business that is independently owned and operated and not dominant in its field of operation" with "annual receipts not in excess of $3,500,000."

Seafood Harvesters - The *Council OY* alternative includes an end to the "B" platoon portion of the trawl fleet. The monitoring and enforcement effort required for the RCA was substantially greater with the "B" platoon fleet in place than without. The costs and complexities of concern were associated with depth lines that changed for different vessels at different times depending on the platoon in which they participated. In 2003, 29 trawl vessels participated in the "B" platoon fleet (see Section 4.5.2 for additional discussion). Elimination of this fleet will also affect product flow for processors, primarily in March when vessels most regularly exercised the opportunities afforded by participation in the "B" platoon fleet (see Section 4.5.2 for additional discussion).

In 2002, landings from West Coast ocean areas were made by 3,529 vessels. Of these 1,740 made landings of groundfish. Of the vessels making landings, 372 held groundfish limited entry permits and an additional 404 participated in the open access groundfish fishery and derived more than 5% of total revenue from groundfish. The Council chose an OY level which mitigated the severe economic impact of the non-preferred *Low OY* alternative, but not to the detriment of the long term health of the resources involved. Section 4.5.2 identifies relative impacts on different groups of vessels. In general there does not appear to be a significant disproportionately of affected on any particular group.

Buyers/Processors - In 2001, of 732 buyers/processors on the coast, 732 bought at least some groundfish. There were 447 groundfish buyers/processors in the 2002 base data set that was used to construct the projections for 2003 and the management alternatives (Section 4.5.3). Of these, 46 purchased product in with an exvessel value in excess of $1,000,000. Exprocessor values are not available. Larger processors are predicted to buy more product in 2004 and smaller processors less, as compared to 2003.

Recreational Fishery Substantially less information is available on the recreational fishing industry than on the commercial fishery. In 2001 it is estimated that there were 753 recreational charter vessels on the West Coast, 106 in Washington, 232 in Oregon and 415 in California. Limited information on the vessels in the fishery and lack of detailed information on effort prevents segregation of the fleet into smaller units for analysis. The best index available of economic effect on the recreational fishing industry of the alternatives is changes in projected personal income associated with the fishery. The text table in this section contains a summary of changes in personal income impacts by option. This year canary rockfish constraints played a major role in determining the recreational regulations. There is significant recreational catch of canary rockfish, primarily in Northern California and Oregon. The bulk of canary rockfish were taken by charter vessels in all years shown, except for 2002. Lingcod is landed coastwide and is another of the rebuilding species important to the recreational fishery.

	Number of Charter Vessels (2001)	*Low OY* Alternative	*Medium OY* Alternative	*High OY* Alternative	*Council-preferred* Alternative
Overall Change		Percent Change in Personal Income Impacts in the Recreational Fishery (2003 Baseline is $215 Million)			
Recreational Fishery Impacts	753	46%	52%	57%	26%

The following table references the location of the RFA-required elements (see Section 6.1.6):

Required IRFA Elements	Corresponding Sections
A description of the reasons why action by the agency is being considered.	Section 1.2 and 1.3
A succinct statement of the objectives of, and the legal basis for, the proposed rule.	Section 1.3
A description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply (including a profile of the industry divided into industry segments, if appropriate).	Sections 4.5
A description of the projected reporting, record keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record.	Section 6.1.5
An identification to the extent practicable, of all relevant federal rules that may duplicate, overlap, or conflict with the proposed rule.	No Subject Rules Identified
A description of any significant alternatives to the proposed rule that accomplish the stated objectives that would minimize any significant economic impact of the proposed rule on small entities.	No Other Alternatives Identified

No federal rules have been identified that duplicate, overlap, or conflict with the preferred alterative. Public comment is hereby solicited identifying such rules. No alternatives, other than those considered here, have been identified that would reduce the impact of the preferred alternative on small entities. The Council process for developing a preferred alternative is conducted in an open forum with industry advisory groups that assist the Council in developing options that meet regulatory objectives, and conservation goals in particular, with the least possible impact on fishing business, most of which are small entities.

7.0 LIST OF PREPARERS

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Mr. John DeVore	Groundfish Staff Officer	Contributing author, Chapter 2, Sections 4.2, 4.4
Ms. Jennifer Gilden	Information and Communications Specialist	Contributing author, Section 3.9
Mr. Jim Seger	Staff Economist	Contributing author, Sections 3.4, 4.4-4.6
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Groundfish Management Team

The Groundfish Management Team worked with the Council to develop the details of the alternatives and provided catch and bycatch projections. State and tribal representatives put forward proposals for allocations and management measures. Additional contributions are noted below, as appropriate.

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Mr. Robert Hannah	Oregon Department Of Fish and Wildlife	Pink shrimp fishery bycatch analysis
Mr. Jim Ianelli	NMFS, Alaska Fisheries Science Center	Pacific ocean perch stock assessment
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Mr. John Wallace	NMFS, Northwest Fisheries Science Center	Sustainability analysis

8.0 AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THIS STATEMENT WERE SENT

The Council makes both the DEIS and FEIS available on its website, so anyone with computer access may download an electronic copy. Electronic copies on CD-ROM and paper copies are made available upon request. The Council distributes a notice of availability for the DEIS and FEIS through its electronic mailing list, which include state and federal agencies, tribes, and individuals. Copies of the FEIS are sent to anyone who comments on the DEIS. In addition, NMFS distributes copies of the DEIS to the following agencies:

Department of Interior
Department of State
U.S. Coast Guard, Commander Pacific Area
Marine Mammal Commission
Pacific States Marine Fisheries Commission
Washington Coastal Zone Management Program, Shoreline Environmental Assistance, Department of Ecology, Washington State
Ocean-Coastal Management Program, Department of Land Conservation and Development, State of Oregon
California Coastal Commission

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10.0 RESPONSE TO COMMENTS

The 45-day public comment period on the 2004 groundfish harvest specifications DEIS closed on December 8, 2003 (68 FR 60983). NMFS received a comment letter from the United States Environmental Protection Agency (USEPA) Region 10 in accordance with their responsibility to review and rate EISs pursuant to NEPA and Section 309 of the Clean Air Act. USEPA gave the DEIS a rating of EC-2 (Environmental Concerns- Insufficient Information) and attached detailed comments. NMFS also received written comments from the Natural Resources Defense Council (NRDC) and The Ocean Conservancy.

The detailed USEPA comments are reproduced below in their entirety, with responses following each comment. The letters from NRDC and The Ocean Conservancy have been summarized to identify specific comments, with responses following each comment. Their letters are reproduced in their entirety at the end of this chapter.

10.1 EPA Comments

Impacts on Habitat

The Magnuson-Stevens Act obligates the Fisheries Councils and National Marine Fisheries Service (NMFS) to identify and characterize essential fish habitat that is necessary to allow for groundfish production to support long-term sustainable fisheries for groundfish and for groundfish contributions to a healthy ecosystem. Bottom trawling gear is known to modify seafloor habitats by altering benthic habitat complexity and by removing or damaging infauna and sessile organisms. Other fisheries related changes in the physical environment include changes in water quality associated with vessel traffic and fish processing discards. The EIS summarizes the more than 400 essential fish habitat areas for all the life history stages of West Coast groundfish species and references an online appendix which describes in detail the essential fish habitat for these species. However, the EIS states that currently there is insufficient information to fully evaluate the effects of the proposed action on essential fish habitat. The NMFS is preparing an EIS to comprehensively evaluate groundfish habitat and the effects of groundfish fishing on that habitat. The Essential Fish Habitat EIS effort is gathering information and developing a predictive risk assessment model to quantitatively evaluate alternatives to minimize fishing effects on essential fish habitat.

The EIS (Section 4.1) provides a summary of the currently available information on groundfish fishery impacts on essential fish habitat and provides a qualitative evaluation of the impacts under each of the alternatives. The EIS concludes that the Low Optimum Yield alternative would have the least amount of habitat impacts because it will result in the least fishing effort. The No Action, Medium and Council Preferred Optimum Yield alternatives would have similar habitat impacts because the fishing efforts are very similar under each of these alternatives. The High Optimum Yield alternative would result in the greatest potential habitat impacts because it provides for the highest trip limits which may result in the highest intensity of fishing effort. However, these conclusions are contradictory to the conclusions presented in Table 2.3.0-1 which states that direct, indirect and cumulative habitat impacts for all the action alternatives are indistinguishable from the No Action alternative.

While sufficient information may not be available to perform a quantitative analysis of the impacts the groundfish fishery would have on essential fish habitat under each of the proposed alternatives, it is clear that the magnitude of the impacts is directly related to the intensity of fishing efforts. The EIS should assure that the conclusions reached in Section 4.1 are accurately reflected in the rest of the document and that the Low Optimum Yield alternative would result in the least amount of potential habitat impacts.

In addition, we recommend that this EIS contain provisions for amendment or modification to incorporate any protection measures that are identified in the Essential Fish Habitat EIS and other pertinent NEPA analyses. We also recommend that the EIS discuss which parameters utilized for estimating optimum yield may be impacted by protection measures identified in the Essential Fish Habitat EIS and the potential effects essential fish habitat protection measures may have on the optimum yield estimates presented. We also recommend that the EIS contain a schedule for generation of the Essential Fish Habitat EIS.

Response:

Table 2.3.0-1 has been revised to better characterize the impacts of the alternatives on EFH described in Section 4.1.4.

In response to the comment that the EIS should contain provisions for amendment or modification to incorporate any protection measures that are identified in the EFH EIS, first it should be noted that the EFH EIS will not be completed until 2006, while the proposed action only applies to measures that will be in place for 2004. (Section 4.1.1 in this EIS describes the schedule for completion of the EFH EIS.) In addition, the measures for 2004 are implemented through federal regulations, based on the current framework for periodic management described in the FMP. The EFH EIS could result in FMP amendments modifying this framework to address fishing-related habitat impacts and/or new regulations. Therefore, there is no need for provisions within this EIS to address subsequent and superceding actions resulting from the EFH EIS.

In response to the comment on the effect of habitat protection measures identified in the EFH EIS on parameters used for estimating optimum yield, again, the EFH EIS will not be completed until 2006. Therefore, such measures have not yet been identified and are outside the scope and timing for action considered in this EIS. Once identified and incorporated into the management framework, which will occur in 2006, such measures could affect the determination of OYs for subsequent management cycles.

Bycatch of Overfished Species

A vessel monitoring system (VMS) allows shoreside personnel to remotely track vessel locations and determine vessel compliance with depth-based restrictions. Depth-based restrictions are a fundamental aspect of the current groundfish management regime, necessary to reduce bycatch of overfished species. Tight control of bycatch is essential to the conservation and rebuilding of overfished stocks. Therefore, enforcement of the depth restrictions is critical for meeting these goals. The EIS discusses the financial and technical constraints to implementing the VMS program. While we recognize the constraints to implementing the VMS program, EPA is concerned that a lack of enforcement on depth restrictions could jeopardize NMFS' and Pacific Fishery Management Council's ability to constrain fishing to sustainable levels. If funding or authority for implementing VMS is not feasible, then the EIS should discuss other means available to ensure harvest and bycatch of these species is limited to proposed levels. The EIS should discuss in detail what the VMS program entails (e.g., number of vessels participating, amount of funding, geographic area of use) and in the absence of the VMS program, how NMFS and PFMC will monitor and enforce depth restrictions and area closures in 2004 through other management measures.

The EIS states that significant uncertainties in the data utilized for determining optimum yields include data on bycatch amounts across all fisheries. NMFS implemented an observer program for groundfish fisheries in 2001 and data from that program was first available in early 2003 and the observer data allowed for much more accurate bycatch estimates. Effective bycatch accounting and control mechanisms are critical for staying within target catch optimum yields and the first element in limiting bycatch is accurately measuring bycatcb rates by time, area, depth, gear type and fishing strategy and the best available means of obtaining bycatch rate infomtation is through the observer program. The EIS should evaluate and discuss the benefits of significantly increasing the observer coverage program for the Pacific Coast groundfish fishery. Increasing observer coverage would vastly increase the accuracy of bycatch rate data, thus providing more accurate optimum yield estimates and better management of fish stocks.

Response:

Section 4.4.2.1 (Fishery Management) has been edited to further discuss bycatch accountability and the availability of new data from the West Coast Groundfish Observer Program.

Section 3.4.5 (Fishery Management and Enforcement) and Section 4.4.3.1 (VMS Expansion) have been edited to reflect the current status of implementation of the VMS program and potential expansion. A complete analysis of the alternatives considered for this program can be found in the following Environmental Assessment:

NMFS (National Marine Fisheries Service). 2003. Environmental assessment/regulatory impact review/initial regulatory flexibility analysis for a program to monitor time-area closures in the Pacific coast groundfish fishery. National Marine Fisheries Service, Seattle, Washington, July 2003. (Available online at: http://www.nwr.noaa.gov/1sustfsh/groundfish/VMS/VMS_EA_Final.pdf).

Environmental Justice

Section 6.2.2 states that the proposed action could disproportionately impact low income and people of color communities. If low income or people of color communities will be impacted by the proposed project, the EIS should disclose what efforts were taken to meet environmental justice requirements consistent with Executive Order (EO) 12898 (Federal Actions to Address Environmental Justice in Minority and Low-Income Populations). In addition to the efforts taken to identify low income and people of color communities, this should include the following.

- A comprehensive accounting of all impacts on low income and people of color, including (but not limited to) cumulative and indirect impacts, exposure pathways unique to the impacted communities, historic exposures, and impacts to cultural, historic and protected resources. In addition, the EIS needs to demonstrate that the impacts to low income and people of color communities will be disproportionately higher than those on non-low income and non-people of color communities. For such a determination, the EIS must identify a reference community, provide a justification for utilizing this reference community, and include a discussion of the methodology for selecting the reference community.

- The EIS must demonstrate that communities bearing disproportionately high and adverse effects have had meaningful input into the decisions being made about the project. The EIS needs to describe what was done to inform the communities about the project and the potential impacts it will have on their communities (notices, mailings, fact sheets, briefings, presentations) exhibits, tours, news releases, translations, newsletters, reports, community interviews, surveys, canvassing, telephone hotlines, question and answer sessions, stakeholder meetings, and on scene information), what input was received from the communities, and how that input was utilized in the decisions that were made regarding the project.

Response:

Section 6.2.2 (EO 12898 Environmental Justice) has been edited and expanded to address these comments.

Consultation with Native American Tribes

The Consultation and Coordination with Indian Tribal Government section of the EIS states that tribal allocations and regulations for the 2004 groundfish fishery have been developed in consultation with the affected tribes and insofar as possible, with tribal consensus. However, the EIS does not provide any specifics regarding these consultations. The EIS needs to document that treaty rights and privileges are adequately addressed. As the proposed project will have impacts on Tribes, the EIS should be developed in consultation with all affected tribal governments, consistent with Executive Order (EO) 13175 (Consultation and Coordination with Indian Tribal Governments). EO 13175 states that the U.S. government will continue "to work with Indian tribes on a government-to-government basis to address issues concerning Indian tribal self-government, trust resources, and Indian tribal treaty and other rights." Documentation of these consultations should be included in the EIS.

Response:

Section 3.4.6.2 of the EIS describes Indian Tribes' fishing rights applicable to Pacific Coast groundfish. It also describes the specific procedures that have been developed for allocating a share of the groundfish harvest to Washington Coastal Tribes, which have treaty rights to groundfish. A cross reference has been inserted into Section 6.2.4 (EO 13175 Consultation and Coordination With Indian Tribal Government) to direct the reader to the expanded discussion in Section 3.4.6.2.

10.2 Public Comments

NRDC Comments

1. Missing Data

The DEIS omits critical data necessary to understand and evaluate the proposed specifications. For example, the document omits nearly all data on the actual landings and bycatch experienced in the Pacific groundfish fishery in 2002 and 2003. If NMFS does not have full-year data for 2003, it must include and analyze the partial-year data it does have. Another example of missing data in the draft EIS is Table 4.2-1-1 which fails (a) to present the fishing mortality rate, the target rebuilding year, and rebuilding probability for the preferred harvest alternative for canary rockfish and (b) to explain that different OY alternatives would result in different target rebuilding years fo darkblotched rockfish, lingcod and POP.

Response:

Table 2.2.1-1 presents the most up-to-date estimates of total mortality of the overfished species by fishery in 2003. Inseason catch estimates, including discard estimates (modeled estimates in the limited entry trawl and recreational sectors and assumed rates of discard in the limited entry fixed gear and open access sectors), through the end of August were applied in Table 2.2.1-1. These are the estimated fishery impacts under the *No Action* alternative and, as such, are considered to be the best data to use in comparing impacts of the alternatives. The 2002 catch data was used to analyze alternative harvest specifications and management measures in this EIS; and 2002 catch estimates are presented for various fisheries including the recreational, whiting trawl, and tribal sectors. The 2002 commercial catch data that was not explicitly presented in this EIS is available on the Pacific Fisheries Information Network (PacFIN). This reference is cited in the EIS.

Critical data were not missing in Table 4.2.1-1 in the DEIS; however, the table structure and format may have led commenters to this conclusion. Therefore, Table 4.2.1-1 was reformatted to more clearly depict these data.

2. Effect of increasing OYs for overfished species

The DEIS fails to present an adequate analysis of the consequences to overfished species and the ecosystem of increasing OYs for five overfished groundfish species. The document fails to explain how much more quickly darkblotched rockfish and POP would be expected to be rebuilt if NMFS did not increase the fishing harvest rate for these species.

Response:

All rebuilding plans and rebuilding analyses used by the Council to effect rebuilding of overfished groundfish species show annual increases in OYs. This is because the Council, on the advice of its scientific advisors on the SSC, uses a constant harvest rate strategy to achieve rebuilding objectives. As stock biomass increases, the OY would also increase given a constant harvest rate. This strategy is considered more precautionary than a constant harvest strategy since harvest remains proportional to the exploitable biomass, allowing harvest increases and decreases as biomass varies. Otherwise, with a constant harvest strategy, overharvest could occur if biomass decreased. All rebuilding analyses and rebuilding plans for West Coast groundfish have adopted the constant harvest rate strategy where OYs vary based on annual projections of biomass. The use of OY projections to determine alternative harvest levels is described in sections 1.4.3.1 and 4.2.1 in the EIS.

Four overfished groundfish species' (canary rockfish, darkblotched rockfish, lingcod, and Pacific ocean perch) rebuilding plans were adopted by the Council under FMP Amendment 16-2. New assessments and rebuilding analyses for darkblotched rockfish and Pacific ocean perch were adopted this year. It is anticipated that many population dynamics parameters will change with a new stock assessment and rebuilding analysis, which influences estimates of precautionary harvest rates predicted to achieve rebuilding objectives. Amendment 16-1 to the groundfish FMP adopted the process and standards for incorporating species' rebuilding plans into the FMP and federal regulations. The adopted standard is to specify the target rebuilding year and harvest control rule (i.e., harvest rate) used to rebuild the stock. The NEPA process to set annual or biennial groundfish specifications and management measures (i.e., the decision process outlined in this EIS) is the adopted process for changing the harvest control rule when there is a new understanding of a stock's status and potential productivity. The NRDC commented that this EIS presented an inadequate analysis of the effect of increasing the harvest rate for these two species. The Environmental Assessment for Amendment 16-1 thoroughly analyzed rebuilding standards and the process to change the harvest rate when a new assessment and rebuilding analysis is adopted for management. Additionally, in section 4.2.1.2 of the EIS, a comparison of rebuilding probabilities under each alternative is made. This is the metric used to gauge rebuilding risks of alternative OYs. The new assessments for darkblotched rockfish and Pacific ocean perch, both of which are more optimistic than previous assessments, indicate the potential productivity of these stocks is greater than previously thought. It is noted in section 4.2.1.2 of the EIS that the effect of increasing harvest rate for these two species while not changing the target rebuilding year is higher OYs coupled with an increased probability of rebuilding within the maximum allowable timeframe (i.e., P_{MAX} increases for both of these stocks). Table 4.2.1-1 was slightly modified to more clearly illustrate the comparative difference of OYs and strategic rebuilding parameters across alternatives.

3. Analysis of the Pacific whiting harvest

The DEIS fails to discuss adequately what the consequences might be of delaying the choice of an OY for Pacific whiting until March 2004 and fails to explain in what subsequent EIS these issues will be discussed.

Response:

Section 2.1.1.7 (Pacific Whiting) describes the positive consequence of adopting an interim OY range of ±50% of the status quo (2003) harvest level for Pacific whiting until a new stock assessment is completed. This range is adequately broad to encompass the range of outcomes from the new assessment and rebuilding analysis anticipated early next year and provides the basis for the socioeconomic analyses of the alternatives in Section 4.5 (Socioeconomic Impacts). Biological impacts of these harvest alternatives cannot be fully analyzed until a new assessment and rebuilding analysis are reviewed in January and February 2004 and adopted in March 2004. The selection of an OY at that time will be subject to a separate NEPA analysis, taking advantage of new information, which will represent the best scientific information available.

4. Enforcement

The DEIS fails to include an adequate analysis of enforcement issues, including vessel monitoring system issues.

Response:

Section 3.4.5 (Fishery Management and Enforcement) and Section 4.4.3.1(VMS Expansion) have been edited to reflect the current status of implementation of the VMS program and potential expansion. A complete analysis of the alternatives considered for this program can be found in the following Environmental Assessment:

NMFS (National Marine Fisheries Service). 2003. Environmental assessment/regulatory impact review/initial regulatory flexibility analysis for a program to monitor time-area closures in the Pacific coast groundfish fishery. National Marine Fisheries Service, Seattle, Washington, July 2003. (Available online at: http://www.nwr.noaa.gov/1sustfsh/groundfish/VMS/VMS_EA_Final.pdf).

5. Nongroundfish fisheries

The DEIS does not adequately analyze the potential impact of nongroundfish fisheries on overfished groundfish species.

Response:

The Council and NMFS believe sufficient information and anlaysis have been provided on the potential impact of nongroundfish fisheries on overfished groundfish species. Specifically, Table 2.2.1-1, Table 2.2.2-1, Table 2.2.3-1, Table 2.2.4-1, and Table 2.2.5-1 provide detailed estimates and a clear summary of impacts to overfished species by groundfish fisheries, nongroundfish fisheries, and research surveys for the *No Action*, *Low OY*, *Medium OY*, *High OY*, and *Council OY* alternatives respectively. Nongroundfish fisheries and their potential for incidental catch of groundfish are described in Section 3.5.2.2 (Open Access Groundfish Fishery).

6. Changes to Rockfish Conservation Areas (RCAs)

The DEIS must clearly explain changes to RCA boundaries and associated restrictions and analyze the potential consequences of these changes.

Response:

Changes to the RCA boundaries between alternatives are explained in the descriptions of each alternative in Chapter 2. Additionally, RCA boundaries by alternative are clearly illustrated and easily compared in the schematic in Figure 2.2.1-1. Changes in the size of the RCAs, and the habitats within them, are important criteria for estimating the impacts to overfished rockfish species. The consequences for overfished groundfish species, in terms of projected total fishing mortality, are presented for each alternative in Table 2.2.1-1, Table 2.2.2-1, Table 2.2.3-1, Table 2.2.4-1, and Table 2.2.5-1.

7. Habitat impacts

OYs and management measures for 2004 will increase fishing effort on the continental slope, increasing pressure on slope and offshore habitats, including corals sponges, and other marine life. The use of large footrope (roller) gear in these areas, identified as a problem in the DEIS, is still allowed. The DEIS fails to analyze the specific impacts of the preferred alternative, particularly impacts to biogenic slope habitats. It should also examine measures capable of mitigating those impacts.

Response:

The EIS, in Section 4.1.1, acknowledges that the information needed to fully evaluate habitat effects is incomplete and unavailable, making it impossible to quantify differential effects between the alternatives. In Section 4.1.4, the EIS acknowledges that more fishing effort is likely to occur in waters deeper than 150 fm as a result of the establishment of RCAs. However, the overall amount of trawl fishing effort in 2004 is likely to be reduced in comparison to past years because of implementation in late 2003 of a vessel buyback program, which has reduced the limited entry groundfish trawl fleet by about a third. Thus, though fishing effort may have shifted to deeper water, the absolute amount of fishing effort in these depths may be reduced in comparison to historical levels. NMFS is also preparing an EIS describing and identifying essential fish habitat (EFH) and measures to reduce adverse fishing impacts to EFH. As noted in Section 4.1.1, the draft EIS for this proposed action will be made available for public comment in February 2005, and resulting measures will be implemented in 2006. The Council is using this mechanism to comprehensively identify and mitigate adverse impacts to EFH.

8. Bycatch and minimizing bycatch

The DEIS fails to include an adequate discussion of bycatch and does not disclose and analyze empirical information from the groundfish observer program.

The DEIS must analyze all potentially practicable bycatch measures and NMFS must adopt all those that are practicable. In particular, the refusal to consider imposing bycatch caps on individual fishing vessels violates the Magnuson-Stevens Act requirement at 16 U.S.C. §1851(a)(9).

Response:

Section 4.4.2.1 (Fishery Management) has been edited to further discuss bycatch accountability and the availability of new data from the West Coast Groundfish Observer Program. Citations have been added to direct the reader to observer data reports and analyses currently available from National Marine Fisheries Service and the Council.

The Council and NMFS are considering a full range of alternative bycatch management strategies. Section 2.2.6 explains that fleetwide bycatch caps for 2004 have been implemented and that vessel-specific bycatch caps were considered but eliminated from detailed study. As discussed in Section 4.4.2.1, it is unlikely that existing fishery monitoring programs and observer coverage would be adequate for effective implementation of vessel-specific bycatch caps in 2004. The reader is referred a complete analysis of bycatch management alternatives considered in the following Preliminary Draft Programmatic Environmental Impact Statement:

NMFS (National Marine Fisheries Service). 2003. Groundfish Bycatch Preliminary Programmatic Environmental Impact Statement. National Marine Fisheries Service, Seattle, Washington, November 2003. (Available online at:http://www.nwr.noaa.gov/1sustfsh/groundfish/eis_efh/pseis/PrelimDEIS.htm).

9. Alternative harvest levels for yelloweye rockfish and cowcod

Even if there is no new stock assessment on an overfished species the agency should use other information on catch and bycatch as a basis for considering adopting more protective harvest levels.

Response:

The Council and NMFS believe all available information and analysis have been considered when developing a range of alternate harvest levels for overfished species including yelloweye rockfish and cowcod. Specifically, 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 2003). Yelloweye rockfish were last assessed in 2002 and, like cowcod, non-retention regulations and area closures have been effective in constraining mortality. This has the additional effect of limiting the availability of current fishery independent data. New information on catch and bycatch of overfished species is more applicable to adopting more protective management measures than alternative harvest levels. The Council and NMFS are prepared to review new catch and bycatch information from the West Coast Groundfish Observer Program and consider inseason adjustments to 2004 management measures as appropriate.

10. Adequacy of the DEIS

We ask NMFS to revise the draft EIS to bring it into compliance with the requirements of NEPA and the Magnuson-Stevens Act.

Response:

The Council and NMFS believe that the DEIS meets the requirements of NEPA. Specifically, the Council and NMFS believe the DEIS provides a robust analysis of the potential environmental impacts and has provided sufficient information upon which NMFS can make an informed decision. The proposed action is also consistent with the requirements of the Magnuson-Stevens Act. Chapter 5 in this EIS summarizes how the proposed action is consistent with the goals and objectives of the groundfish FMP and MSA National Standards.

The Ocean Conservancy

Rebuilding Depleted Species

1. Recommendation to change previously adopted rebuilding targets

For overfished species with a minimum rebuilding time (T_{MIN}) greater than or equal to 10 years, the target year should be the midpoint between this value and the maximum allowed rebuilding time (T_{MAX}). The rebuilding probability (P_{MAX}) should be 90%. This would be consistent with the Technical Guidance. This recommendation should be adopted for bocaccio, cowcod, and canary rockfish.

Response:

The Council did not consider an OY alternative based on the 90% P_{MAX} in all cases because this information was not available for all overfished species at the time of their decision. However, the Council and NMFS have considered or will consider a range of rebuilding policies encompassing this probability when adopting final rebuilding plans for overfished species. Furthermore, the Council and NMFS have adopted a rebuilding framework that is consistent with the Technical Guidance and believe that the information available when making the decision on 2004 harvest specifications was sufficient to make a reasoned choice of OYs based on probabilities other than 90%. This approach is discussed further below.

The Council has completed action on rebuilding plans for darkblotched rockfish, canary rockfish, Pacific ocean perch, and lingcod (by means of Amendment 16-2, evaluated in an EIS and under NMFS Review). In 2004 the Council and NMFS will complete action on rebuilding plans for bocaccio, cowcod, widow rockfish, yelloweye rockfish, and Pacific whiting (as Amendments 16-3 and 16-4). The rebuilding analysis program has only been recently reconfigured to provide results for the 90% P_{MAX}. Therefore, in Amendment

16-2 a 90% P_{MAX} alternative was not considered. However, bracketing alternatives were considered. These were the 80% P_{MAX} value and a "no fishing" alternative under which fishing mortality is zero until the stock has recovered. (The P_{MAX} for this strategy equals or approaches 100%.) Furthermore, exploratory analysis by the rebuilding analysis program author, Dr. Andre Punt, suggests that the harvest control rule for this probability cannot be determined by simple linear interpolation between already computed values for the 80% and 100% probabilities. Rather, it would be closer to the "no fishing" strategy evaluated in Amendment 16-2. Impacts to fishing communities are thus likely to be severe under such a strategy. Now that the rebuilding analysis program is capable of producing results for a 90% P_{MAX}, such an alternative will be considered in Amendment 16-3.

While rebuilding plans are developed, evaluated, and approved, interim rebuilding plans have been in place. The alternatives evaluated in the 2003 groundfish harvest specifications EIS were arrayed according to different rebuilding probabilities, and thus also served as a means to evaluate and disclose the direct, indirect, and cumulative impacts of choosing different rebuilding strategies, including the strategies in interim rebuilding plans. Thus both the interim and approved rebuilding plans have been analyzed in EISs, and the alternatives considered in this EIS are generally based on these already-established and evaluated strategies. For most of the overfished species, differences in the OYs among the alternatives in this EIS are instead based on different stock assessment model outputs (reflecting scientific uncertainty) or (in the case of canary rockfish) the effects of harvest allocations on stock productivity. The exceptions are bocaccio and widow rockfish, where the target year does vary among the alternatives. These differences result largely from the underlying stock assessment model, or model assumptions, used to provide input into the rebuilding analysis. Section 4.2.1.2 in this EIS evaluates these different model results. As noted above, different rebuilding strategies for these two species will be evaluated in an EIS for Amendment 16-3, to be completed in the coming year, which will evaluate rebuilding strategies based on a 90% rebuilding probability. In summary, the Council has considered or will consider rebuilding targets encompassing the 90% P_{MAX} as part of the process of developing rebuilding plans, as evaluated in other EISs. Section 2.2.6 in this EIS (alternative considered, but eliminated from detailed study) further discusses the reasons why OYs based on the 90% P_{MAX} were eliminated from consideration. As noted above, results for the 90% P_{MAX} were not available for all overfished species when considering 2004 harvest specifications.

The commenter also differentiates between those stock assessments that contain uncertainty and those that do not contain uncertainty. It is important to recognize that scientific uncertainty is an expression of different sources of error, for example in sample data or the exact specification of causal relationships in a model. Results that are close to the assessment's best estimate are likely to be close to the true situation, and other results are possible but unlikely. Even assessments with high certainty are never going to be perfect, but they can still be good at describing the status of the stock. This concept differs from the lay definition of uncertainty meaning "lack of knowledge." All overfished species fall in Category 1, as defined in the FMP, which accords with either data rich or data moderate cases as discussed in the Technical Guidance.

The commenter also recommends managing overfished species to a target year that is the midpoint between T_{MIN} and T_{MAX}, suggesting that the same strategy could be based on both this target year and the 90% P_{MAX}. However, it is not feasible to choose a rebuilding probability and a target year independently. In the rebuilding analysis methodology, the rebuilding probability and target year are both products of the choice of a given fishing mortality rate.[33/] In order to respond to this comment, a midpoint target year (T_{MID}) is considered here separately from the 90% rebuilding probability. Although T_{MID} has not been considered for

33/ For a given fishing mortality rate, P_{MAX} is the probability that the stock will reach the target biomass by T_{MAX}, and for the same fishing mortality rate, the target year is when there is a 50% probability that the stock has reached the target biomass. Policy makers can choose a value for any one of these parameters in order to develop a rebuilding strategy and then derive the values for the other two parameters. The cannot choose more than one parameter value independently.

all overfished species in developing rebuilding plans, the range of alternatives in the rebuilding plan EISs mentioned above will encompass this midpoint target year. More generally, basing a strategy on T_{MID} by itself is less informative than basing it on P_{MAX}. Although P_{MAX}, as a measure of risk, can be calculated for any given target year, in choosing a target year it is better to consider the long-term risk described by P_{MAX} against the short-term cost of projected harvest levels. For this reason, both when considering harvest specifications and adopting rebuilding plans, the Council has preferred to identify a target year by considering different levels of risk rather than choosing a year (such as T_{MID}) and then determining the risk (P_{MAX}) associated with that target year. Looking at the Council OY alternative, the target years are greater than the respective T_{MID} values for each overfished species, except for Pacific ocean perch, for which the target year equals T_{MID}. (There is no approved rebuilding plan for Pacific whiting, so a comparison cannot be made in that case.) In choosing rebuilding strategies the Council evaluated the tradeoff between long-term risk, represented by the rebuilding probability, and the short-term costs of alternative OY levels.

2. Do not manage based on short-term yields

The rebuilding control rule should not create a management response where an overfished species' OY are increased in response to potential increases in short-term yields due to a strong year class entering the fishery.

Response:

As discussed in the environmental assessment for Amendment 16-1, the rebuilding strategy is to manage to a particular target year and associated rebuilding probability. As a stock recovers, the fishing mortality rate (or rebuilding control rule) may be changed, because of new information, in order to maintain the same long-term risk (i.e., target year and rebuilding probability). The rebuilding analysis methodology uses past recruitment as an input in computing rebuilding parameters. A strong year class would be represented as one among a pool of historical recruitment values that are randomly sampled as part of the rebuilding analysis. If large historical recruitments are added to this pool, a higher rebuilding probability and/or earlier target year would be computed for a given fishing mortality rate. By the same token, a higher fishing mortality rate could be chosen for a given target year. This would allow an increase in future OYs. Within this framework, the Council must evaluate the tradeoff between the short-term costs of a reduction of the harvest level from what could be allowed to achieve rebuilding by a given target year, and the long-term lowered risk or benefit of choosing a new, earlier target year as the basis for the rebuilding strategy.

3. Follow the California Fish and Game Commission's endorsement of the Low OY alternative for bocaccio

We urge NMFS to follow the lead of the Commission by incorporating overage data from the recreational fishery into their decision and choose an OY value most consistent with NMFS nad PFMC policies.

Response:

Although the Council did not choose the Low OY alternative for bocaccio, the OY they did choose represents a precautionary reduction to 250 mt from the Medium OY alternative level of 306 mt. (The Medium OY for bocaccio is based on rebuilding analysis results using the STATc model with a P_{MAX} of 70%.) Furthermore, as discussed in Section 2.1.1.2, the Council directed that management measures stay within the 199 mt Low OY for bocaccio in order to provide a buffer for overages. Projected total bocaccio fishing mortality under the Council OY alternative is 136 mt (see Table 2.2.5-1). Thus, the projected impacts are consistent with the Commission's recommendation and the management strategy deals with the potential for overages by imposing measures intended to constrain fishing well below the OY threshold. The response to The Ocean Conservancy's comment #8 provides more information on how the Council and NMFS deal with the potential of OY being exceeded.

4. Specific OY recommendations

The OYs evaluated for bocaccio, widow rockfish, and Pacific ocean perch should be based on a rebuilding probability (P_{MAX}) of 90%. These are for bocaccio (127 mt, consistent with the STAR B2 model), widow rockfish (<1 mt, 3.7 mt, and 205 mt, depending on model scenario), and Pacific ocean perch (163 mt).

Response:

These harvest levels were not chosen by the Council. For the reasons discussed in response to The Ocean Conservancy's Comment #1, estimates of the OY at the 90% probability were not available for all overfished species when the Council approved the range of alternatives at their June 2003 meeting and selected their preferred alternative at their September 2003 meeting. Section 2.1.1 details the rationale for the range of OYs represented in the alternatives considered by the Council. The analyses in Chapter 4 detail the projected biological and socioeconomic impacts of the alternatives on the human environment. Section 4.6.2 details the rationale for selecting the preferred alternative.

Achieving OY on a Continuing Basis

5. Species above the minimum stock size threshold

For non-overfished species, we urge NMFS to adopt catch levels that achieve OY on a continuing basis, according to the requirements of the Magnuson-Stevens Act and national standard guidelines.

Response:

Chapter 4 of the groundfish FMP (as amended by Amendment 16-1) describes the framework by which the Council and NMFS determine harvest levels for groundfish stocks. This framework is consistent with the requirements of the Magnuson-Stevens Act and National Standard Guidelines and is intended to ensure achieving OY on a continuing basis.

Counting and Minimizing Bycatch

6. Minimizing bycatch

The 2004 management measures should minimize bycatch of depleted species, prey species, and other marine life through measures including, but not limited to, capacity reduction, time and area closures, a network of no-take marine protected areas, trip or bag limits, caps on total mortality (bycatch caps on a fleet-wide, sector-wide, and vessel level), and gear modifications. The DEIS should also analyze current data collection systems for assessing bycatch and bycatch mortality and identify needed improvements, consistent with MSA requirements, to ensure annual total mortality goals are met.

Response:

See response to NRDC comment #8 above.

Protecting Essential Fish Habitat

7. Habitat impacts

OYs and management measures for 2004 will increase fishing effort on the continental slope, increasing pressure on slope and offshore habitats, including corals sponges, and other marine life. The use of large footrope (roller) gear in these areas, identified as a problem in the DEIS, is still allowed. The DEIS fails to analyze the specific impacts of the preferred alternative, particularly impacts to biogenic slope habitats. It should also examine measures capable of mitigating those impacts.

Response:

See response to NRDC comment #7 above.

Mechanisms for Accountability

8. Keeping annual fishing mortality within OYs

We recommend adoption of the following methodology: (1) On an annual basis either the PFMC, NMFS, or both should compare annual total mortality to the appropriate OY to determine if overages have occurred. If an overage has occurred, an inseason adjustment is made to compensate for the overage. This should be done through mechanisms such as downward adjustments of mortality rates in subsequent years. Other possible solutions include reducing OYs to account for past overages or through inseason monitoring. (2) Use information from the groundfish observer program to adjust management measures inseason if bycatch mortality is higher than anticipated. (3) Do not change agreed-upon fishing mortality rates and rebuilding strategies for depleted species when large year classes appear to ensure a successful rebuilding plan.

Response:

Chapter 5 and Section 6.2 of the groundfish FMP describe the framework under which periodic management (annual through 2004, biennial thereafter) is conducted. Generally, changes to the management process at this level are outside the scope of the proposed action evaluated in this EIS. However, the Council and NMFS follow procedures that are broadly similar to the points enumerated by the commentor. Harvest levels (OYs) are established prior to the beginning of the fishing year and management measures intended to constrain total fishing mortality within these OYs are implemented (which is the subject of this EIS). If catch monitoring during the fishing year indicates that the OY for a particular species is likely to be exceeded, management measures are adjusted to reduce the amount of fish that can be caught (e.g., through changes to RCA boundaries) or landed (e.g., through changes in cumulative landing limits).

The Council does not make deductions from or additions to OYs in subsequent years to compensate for over- or under-harvest. However, actual historical harvests are incorporated into subsequent stock assessments, which will influence the OYs resulting from them, and if applicable, rebuilding analyses. NMFS is required to annually report to Congress on whether ABC values have been exceeded, as exceeding an ABC set at FMSY would be considered overfishing. In looking at whether ABC values have been exceeded, NMFS also notes whether OY values have been exceeded and works with the Council to revise management measures so that OYs for the same species for subsequent years are not exceeded. Under the Technical Guidance, OYs are target levels that, so long as they are less than or equal to MSY, should not be exceeded more than 50% of the time, nor on average. None of the West Coast groundfish OYs are knowingly set higher than MSY. Management measures are intended to achieve OYs without exceeding them, unless the achievement of a particular species' OY would negatively affect the rebuilding of a co-occurring overfished species. Thus, NMFS will continue to monitor whether the fisheries have exceeded ABCs or OYs and will continue to work with the Council to make inseason adjustments to management measures to prevent the fisheries from regularly exceeding OY target levels. Consistent with the Technical Guidance, however, NMFS does not intend to adjust harvest levels themselves inseason to account for either overages or underages from the preceding year.

In reference to the second point, observer data are not suitable for real-time catch monitoring, but can be used to adjust estimates of bycatch mortality. In 2003, for example, data from the first year (August 2001-August 2002) of the West Coast Groundfish Observer Program became available in early 2003 and the Council used bycatch rates resulting from these data to make inseason adjustments to management measures. The second year of observer data (through August 2003) will become available for use by management in early 2004. This information will be used to update and expand the bycatch estimation models which the Council uses to estimate total fishing mortality; as in 2003, these updates could contribute to decisions about modifying management measures during 2004 to keep total mortality below a species' OY.

The third point has already been addressed in response to The Ocean Conservancy's comment #1.

10.3 Incorporation of New Information in the Final EIS

At its November meeting the Council recommended that NMFS implement regulations governing requirements for vessels transiting RCAs. These regulations are not anticipated to materially affect the evaluation of the environmental impacts of the proposed action described in this EIS. However, these regulations may be considered part of the proposed action because they will be implemented through the same regulatory process. Therefore, to fully document the proposed action, new information about these transiting regulations has been added to Sections 2.2.5.2 (Council OY Alternative– Limited Entry Fixed Gear), 4.4.2.2 (Public Sector Impacts– Enforcement), and 4.5.2.3 (Commercial Fleets– Cumulative Impacts). This is not considered significant new information which would raise new environmental concerns or substantially affect the impact analysis in this EIS.

NRDC
THE EARTH'S BEST DEFENSE

NATURAL RESOURCES DEFENSE COUNCIL

December 8, 2003

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PFMC

BY FAX (206-526-6736) AND MAIL

D. Robert Lohn
Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way, N.E., Bldg. 1
Seattle, WA 98115-0070

Dear Mr. Lohn:

We are writing on behalf of the Natural Resources Defense Council to comment on the draft environmental impact statement ("EIS") on the 2004 specifications and management measures ("specifications") for the Pacific groundfish fishery. The draft EIS fails to comply with the requirements of the National Environmental Policy Act ("NEPA").

The draft EIS omits critical data necessary to understand and evaluate the proposed specifications. For example, the document omits nearly all data on the actual landings and bycatch experienced in the Pacific groundfish fishery in 2002 and 2003. The National Marine Fisheries Service ("NMFS") must include and analyze this data in the EIS, especially for each of the individual overfished species. NMFS and the public cannot understand the consequences of the fishing mortality NMFS proposes to authorize for 2004 unless and until we understand the fishing mortality that has occurred for each of these overfished species in the previous years. If NMFS does not yet have full-year data for 2003, it must include and analyze the partial-year data it does have. This 2002 and 2003 data are critical, extremely relevant data that NMFS has failed to disclose and analyze in the draft EIS. Another example of missing data in the draft EIS is on page 4-15, where Table 4.2-1-1 fails (a) to present the fishing harvest rate, target rebuilding year, and rebuilding probability for the preferred harvest alternative for canary rockfish and (b) to explain that different OY alternatives would result in different target rebuilding years for darkblotched rockfish, lingcod, and POP. Without that information, a reader is erroneously led to believe that more fishing will result in a higher probability of achieving rebuilding.

NMFS is proposing to increase the optimum yields for five of the overfished groundfish species, but the draft EIS fails to present an adequate analysis of the consequences for the species and the ecosystem of these increases in fishing harvest. Perhaps most significant, NMFS is proposing to increase the harvest rate for darkblotched rockfish and Pacific ocean perch ("POP"). The draft EIS's explanation and analysis for these proposed increases fall far short of NEPA's

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requirements. Among other things, the document fails to explain how much more quickly darkblotched rockfish and POP could be expected to be rebuilt if NMFS did not increase the fishing harvest rate for these species.

The draft EIS analysis of harvest issues relating to Pacific whiting is inadequate, with NMFS deferring analysis and decisions until sometime in 2004. The document fails to discuss adequately what the consequences of this delay might be and fails to explain in what subsequent EIS the public will be able to consider Pacific whiting harvest issues before NMFS makes its decisions on managing that species.

The document fails to include an adequate analysis of enforcement issues, including vessel monitoring system issues.

The draft EIS does not include an adequate analysis of the potential impact on overfished groundfish species from fisheries that target species other than groundfish.

Since it adopted the management technique of using "rockfish conservation areas" in 2002, NMFS has been changing RCA locations and the restrictions that apply to at least some of these RCAs. NMFS must revise the draft EIS to explain clearly these changes and to analyze the potential consequences of the changes.

The draft EIS's discussion of habitat impacts is far too vague and general. NMFS must include in the document a full and detailed analysis of the potential habitat impacts of the proposed action. That is especially so because the 2004 OYs and management measures increase effort on the slope via increases in catches for darkblotched rockfish, sablefish and shortspined thornyhead. This effort shift is likely to place greater pressure on slope and offshore habitats, including corals, sponges, and other marine life that inhabit these areas. Furthermore, large roller gear, identified as a problem in the draft EIS, is still allowed for bottom trawl gear on the slope. The draft EIS makes general statements about potential habitat impacts of various activities but fails to analyze the specific impacts of the preferred alternative. The document should analyze those effects, particularly the impacts on biogenic slope habitats that grow slowly and are likely to have long recovery times. It should also examine measures capable of mitigating those impacts.

The draft EIS fails to include an adequate discussion of bycatch. In particular, NMFS now has in its possession considerable empirical information about bycatch obtained from the groundfish observer program. The draft EIS must disclose and analyze this information fully, but it fails to do so.

The Magnuson-Stevens Act requires that conservation and management measures minimize bycatch and bycatch mortality to the extent practicable. 16 U.S.C. § 1851(a)(9). The 2004 specifications constitute conservation and management measures. In order to comply with this statutory requirement, NMFS must analyze all potentially practicable bycatch minimization measures and adopt all those that are practicable. The draft EIS fails to do so. In particular, NMFS's refusal to consider fully the management alternative of imposing bycatch caps on individual fishing vessels, see draft EIS at 2-108, violates the Magnuson-Stevens Act requirement described above as well as NEPA's requirement to consider all reasonable alternatives in an EIS.

The draft EIS fails to consider a reasonable range of alternatives in other respects. For example, the document fails to consider alternative fishing harvest levels for yelloweye rockfish and cowcod. NMFS and the Council appear to believe that if there is no new stock assessment on an overfished species, there is no need for the agency to consider alternative harvest levels. That is not so, particularly since other types of new information (for example, information about catch and bycatch of the species in recent years) warrant consideration as a basis for adopting more-protective fishing harvest levels.

We ask NMFS to revise the draft EIS to bring it into compliance with the requirements of NEPA and the Magnuson-Stevens Act. We appreciate the opportunity to comment.

Sincerely,

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The Ocean Conservancy

December 8, 2003

Sent via facsimile and U.S. mail

D. Robert Lohn, Regional Administrator
National Marine Fisheries Service
Northwest Regional Office
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115-0070

RE: 2004 Groundfish Specifications DEIS

Dear Administrator Lohn:

The Ocean Conservancy submits this letter as our comments on the Draft Environmental Impact Statement (DEIS) analyzing management options for the 2004 groundfish fishery. This DEIS, which includes recommendations from the Pacific Fishery Management Council's (PFMC) for managing the groundfish fishery in 2004, is critical in ensuring depleted groundfish species are rebuilt, groundfish are managed at optimum yield, bycatch is properly accounted for and minimized, and essential fish habitat is protected pursuant to the Magnuson Stevens Fishery Conservation and Management Act (FCMA). We therefore offer a number of recommendations to ensure the DEIS meets these legal mandates and analyzes the environmental impacts of the PFMC's range of alternatives pursuant to the National Environmental Policy Act (NEPA).

Ending Overfishing, Achieving Optimum Yield and Rebuilding Depleted Species

The FCMA provides a comprehensive framework for defining reference points associated with the health of fish populations to meet required management goals including achieving optimum yield, ending the overexploitation of fish populations and rebuilding those species that are depleted. The FCMA requires any fishery management plan prepared by the PFMC or the Secretary of Commerce must specify criteria to determine a maximum sustainable yield (MSY) and optimum yield (OY) of each fishery and specify objective and measurable criteria for identifying when a fishery is overfished (identified as a minimum stock size threshold (MSST)) and if overfishing is occurring (identified as a maximum fishing mortality rate threshold (MFMT)).[1]

These "status determination criteria" form the basis for management of marine fish species including identifying and rebuilding overfished species to MSY, preventing overfishing and achieving OY on a continuing basis.[2] The PFMC has adopted values of forty percent of virgin biomass as a proxy for MSY and values of twenty-five percent of virgin biomass as a proxy for MSST. There are currently nine species with biomass values below the MSST, three species with biomass levels above MSST but below MSY, and twelve species with a value above MSY. The status of the remaining species has not

[1] 16 U.S.C. §1853(a); 50 CFR §600.310.
[2] 16 U.S.C. §1851(a), §1853(a), §1854(e).

and twelve species with a value above MSY. The status of the remaining species has not been assessed. Accordingly, management strategies for 2004 should fall into two classes: rebuilding species with biomass values below MSST back to MSY consistent with the FCMA and its accompanying guidance; and achieving OY on a continuing basis for the remaining species.

Rebuilding Depleted Species

For those species identified as overfished, the FCMA requires that the PFMC and the NMFS prepare a fishery management plan, plan amendment or proposed regulations to rebuild the species within one year of being identified as overfished by the NMFS.[3] Rebuilding measures must meet a number of criteria including specifying a time period for ending overfishing and rebuilding the stock, rebuilding the fishery in as short a time as possible, not to exceed ten years, except in certain prescribed instances and allocate restrictions and recovery benefits fairly and equitably among sectors of the fishery.[4] In the absence of formal rebuilding plans (currently under various stages of development), the annual specifications process serves as the vehicle for rebuilding these depleted species.

There are two key components in rebuilding overfished species with particular applicability to Pacific groundfish. The first is defining rebuilding time periods with high probabilities of success. According to the *Technical Guidance on the Use of the Precautionary Approaches to implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act*[5] (Technical Guidance), rebuilding plans for those species that cannot be rebuilt within ten years in the absence of any fishing mortality should use a timeframe that is as short as possible with a target date for rebuilding at the midpoint between the time needed to rebuild a species in the absence of fishing mortality (Tmin) and the maximum allowable timeframe pursuant to the national standard guidelines (Tmax).[6] The probability of achieving rebuilding by Tmax should be ninety percent or higher for those species whose assessments involve uncertainty, the case in groundfish stock assessments. The upper boundary of the target date should then be the midpoint of the Tmin and this computed Tmax value. The PFMC currently uses a range of probabilities of achieving rebuilding for depleted groundfish though none are at the recommended ninety percent level considering the uncertainty contained in the stock assessments. For those species with biomass values well below the MSST (less than or equal to half of MSST) the Technical Guidance recommends setting the fishing mortality rate as close to zero as possible.[7] This recommendation should be adopted for bocaccio, cowcod and canary rockfish.

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[3] 16 U.S.C. §1854(e)

[4] *Id.*

[5] Restrepo, V.R. (convener), et. al. 1998. *Technical Guidance on the Use of Precautionary Approaches to implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act.* NOAA Technical Memorandum, NMFS-F/SPO-31, NOAA/NMFS, Washington, D.C.

[6] Id. at 38

[7] We note that the PFMC has adopted a policy consistent with the Technical Guidance through its use of the "40-10" rule. However, this rule was not adhered to in the 2003 specification process and is not included in alternatives for 2004 management.

The second issue is rebuilding depleted species in light of the magnitude and variability of future recruitment. The technical guidance speaks specifically to the issue of strong year classes within the rebuilding time period. According to the Technical Guidance it is key that a rebuilding control rule be established that guides rebuilding so that the occurrence of a strong year class does not create a management response where short term yields are increased in response to a strong recruitment event.

Considering that none of the options presented for overfished groundfish are consistent with the Technical Guidance, and no OY values corresponding to the ninety percent probabilities exist for these species with the exception of bocaccio, Pacific Ocean perch and widow rockfish, we recommend the NMFS endorse an approach consistent with a Pmax value of ninety percent which can be utilized to generate applicable OY values for overfished groundfish in the 2004 specifications EIS. If this is not administratively possible, we ask that that NMFS adopt the low OY values for overfished groundfish in this DEIS and develop Pmax values of ninety percent in the completion of formal rebuilding plans.

In the case of bocaccio, OY values corresponding with a Pmax value of ninety percent were generated for all three of the assessment model runs. Since the PFMC chose low, medium, and high OY values from three different model runs, its difficult to get a sense of which model run the council and the NMFS considers most likely. Considering the severely depleted state of bocaccio and the PFMC's own 40-10 policy, we urge the adoption of the OY value of 127 metric tons consistent with the STAR B2 model run in the rebuilding analysis.

Furthermore, information provided by the California Department of Fish and Game for consideration by their Commission revealed an on average sixty percent mortality overage in the recreational fishery for bocaccio. In order for rebuilding to occur in the allowable time frame, its absolutely essential that these overages are factored into annual morality. This information played a role in the commission's endorsement of the low OY for bocaccio, which was the option most consistent with the Technical Guidance that the Commission had before them. We urge the NMFS to follow the lead of the Commission by incorporating overage data into their decision and choosing an OY value most consistent with NMFS and PFMC policies.

In the case of widow rockfish, the choice of an OY consistent with the ninety percent probability is dependent upon the choice of model. OY values for models the councils preferred model runs include less than one, 3.7 and 205 metric tons. The NMFS should use these values in formulating appropriate management measures for 2004 in this DEIS.

In the case of Pacific Ocean perch, the OY consistent with a ninety percent probability from the preferred PFMC model run is 163 metric tons. This value should be adopted for formulating 2004 management measures.

Achieving OY on a Continuing Basis

The second case involves managing those species above MSST to achieve OY on a continuing basis, the management target established by the FCMA. According to the FCMA, optimum yield is defined as the amount of fish which:

(A) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems;
(B) 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
(C) in the case of an overfished fishery provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.[8]

Further direction is provided by the national standard guidelines which state that:

> Target reference points, such as OY should be set safely below limit reference points, such as the catch level associated with the fishing mortality rate or level defined by the status determination criteria.

This approach is consistent with the trend in fisheries management of treating MSY as a management limit that should rarely be exceeded and using OY as a management target safely below the MSY threshold. This change in approach is based on past experiences of overfishing occurring despite MSY based management.[9]

In deciding upon appropriate mortality levels for those groundfish species not identified as overfished via the stock assessment process, we urge the NMFS to adopt catch levels that achieve OY on a continuing basis.

Counting and Minimizing Bycatch

Considering the depleted nature of many groundfish species and the resulting fishing management scheme utilizing depth and trip restrictions, effectively controlling regulatory discards is crucial to meeting applicable management goals. The FCMA requires that any fishery management plan amendment must establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery and include measures that minimize bycatch and unavoidable bycatch mortality to the extent practicable.[10]

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[8] 16 U.S.C. §1802 (28).
[9] Goodman, et. al, 2002. *Draft Scientific Review of the Harvest Strategy Currently Used in the BSAI and GOA Groundfish Fishery Management Plans*. Report prepared for the North Pacific Fishery Management Council.
[10] 16 U.S.C. §1853(a)(11) and 16 U.S.C. §1851(a)(9).

With these FCMA requirements in mind, the DEIS should ensure that management measures for 2004 minimize bycatch of both depleted species which are the subject of this amendment and prey species and other marine life through measures including, but not limited to, capacity reduction, time and area closures, a network of no take marine protected areas, trip or bag limits, caps on total mortality (bycatch caps on a fleet wide, sector wide and vessel level), and gear modifications. The DEIS should also analyze current data collection systems for assessing bycatch and bycatch mortality and identify needed improvements to current data collection that will meet the requirements of the FCMA and ensure annual total mortality goals are met.

Protecting Essential Fish Habitat

Another key tenet of the FCMA is the requirement that managers minimize, to the extent practicable, the adverse impacts of fishing operations on essential fish habitat.[11] The current management regime uses a combination of trip limits and depth based measures to keep catches within annual guidelines. As a result of this management scheme, fishing effort is being shifted from the shelf to the slope. Specifically, if catch is considered a proxy for effort, the 2004 OYs and management measures increase effort on the slope via increases in catches for darkblotched rockfish, sablefish and shortspined thornyhead. This effort shift is likely to place greater pressure on slope and offshore habitats, including corals, sponges, and other marine life that inhabit these areas. Furthermore, large roller gear, identified as a problem in the DEIS, is still allowed for bottom trawl gear on the slope. The DEIS makes general statements about potential habitat impacts of various activities, but fails to analyze the specific impacts of the preferred alternative. The document should analyze those effects, particularly the impacts on biogenic slope habitats that grow slowly and are likely to have long recovery times. It should also examine measures capable of mitigating those impacts.

Mechanisms for Accountability

A key to ensuring the successful rebuilding of depleted groundfish species is keeping annual fishing mortality within the established OYs. Exceedances of annual mortality limits, as seen in 2003 for canary rockfish and lingcod can not only jeopardize rebuilding but can cause further decline in the population of a species. Accordingly, we recommend adoption of the following methodology to ensure adequate progress for 2004 management measures. First, on an annual basis the reviewing entity (either the PFMC, the NMFS or both) should compare annual total mortality levels with specified OY values to determine if any overages have occurred. If overages have occurred, an in-season adjustment shall be made to compensate for the overage. This should be done, as recommended in the Technical Guidance, through mechanisms such as downward adjustments of mortality rates in subsequent years.[12] Other possible solutions include reductions in OY values to account for past exceedances of annual mortality levels or a management regime whereby inseason monitoring can be used to accurately guide management. Second, the NMFS and PFMC must remain committed to the use of

[11] 16 U.S.C. §1853.

[12] Technical Guidance at 39.

information from the groundfish observer program to adjust management measures in-season based on higher than anticipated bycatch mortality. Finally, agreed upon fishing mortality rates and strategies to rebuild the depleted species should be upheld when large year classes appear to ensure a successful rebuilding plan.[13]

Conclusion

The 2004 groundfish specifications DEIS presents an important opportunity for the NMFS to ensure that key tenets of the FCMA, including ending overfishing, rebuilding depleted species, achieving optimum yield, counting and minimizing bycatch and protecting essential fish habitat, are achieved. We urge the NMFS to adopt our recommendations above to meet these legal mandates and move the groundfish fishery towards long term sustainability. We thank the NMFS for considering our comments and look forward to future work in protecting the marine life of the Pacific Ocean.

Sincerely,

Chris Dorsett
Pacific Fish Conservation Manager
The Ocean Conservancy

[13] *Id.*

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