PROPOSED ACCEPTABLE BIOLOGICAL CATCH AND OPTIMUM YIELD SPECIFICATIONS AND MANAGEMENT MEASURES FOR THE 2009-2010 PACIFIC COAST GROUNDFISH FISHERY

FINAL ENVIRONMENTAL IMPACT STATEMENT

INCLUDING
REGULATORY IMPACT REVIEW AND INITIAL REGULATORY FLEXIBILITY ANALYSIS

PREPARED BY
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COVER SHEET
2009-2010 Groundfish Harvest Specifications and Management Measures Environmental Impact Statement

Proposed Action:	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, in accordance with the Pacific Coast Groundfish Fishery Management Plan (FMP). These harvest specifications and management measures will be established for calendar years 2009 and 2010. A related regulatory action revises the target rebuilding year and/or harvest control rule for four of seven groundfish species that are currently declared overfished pursuant to §304(e) in the MSA and the stock rebuilding described in the groundfish FMP (section 4.5), as amended by Amendment 16-4. These changes in rebuilding parameters revise the rebuilding plans and affect the OY values for these species for the 2-year period and beyond. Management measures are intended to keep total fishing mortality during each year within the OY established for that year. Specifications include, revised rebuilding plans for four overfished species, new harvest levels for species with new stock assessments and projected harvest levels for species with stock assessments completed in prior years. Management measures may be modified during the biennial period, so total fishing mortality is constrained to the OYs identified in the preferred alternative. The environmental impacts of any such changes in management measures are expected to fall within the range of impacts evaluated in this EIS. Federally-managed Pacific groundfish fisheries occurring off the coasts of Washington, Oregon, and California (WOC) establish the geographic context for the proposed action.
Type of Statement:	Environmental Impact Statement

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Abstract:

The *Pacific Coast Groundfish Fishery Management Plan* 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 optimum yield. 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 Groundfish Fishery Management Plan.

Allocations to tribal fisheries off Washington State are also identified. Seven groundfish species are currently declared overfished and measures to prevent overfishing and rebuild these overfished stocks are a central element of this action. Rebuilding plans for these species, which, among other things, establish targets for recovery, are re-evaluated and some are revised, consistent with the rebuilding requirements of the FMP, as part of the action. The proposed action establishes harvest levels for groundfish species, species groups, and geographic subunits, which for overfished (depleted) species are based on targets identified in the revised rebuilding plans. In order to constrain fisheries to these harvest levels, 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.

EXECUTIVE SUMMARY

ES.1 The Actions Evaluated in this Environmental Impact Statement

This Environmental Impact Statement (EIS) evaluates the Council/NMFS proposed action 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, in accordance with the Pacific Coast Groundfish Fishery Management Plan (FMP). These specifications and management measures will be established for calendar years 2009 and 2010, consistent with the periodic management framework described in the FMP. A related regulatory action revises the target rebuilding year and/or harvest control rule for four of seven groundfish species that are currently declared overfished pursuant to §304(e) in the MSA and the stock rebuilding described in the groundfish FMP (section 4.5), as amended by Amendment 16-4. These changes in rebuilding parameters revise the rebuilding plans and affect the OY values for these species for the 2-year period and beyond.

ES.2 Alternatives Including the Proposed Action

Two sets of alternatives are evaluated to address the action described above. The first is the selection of ABCs and OYs for 2009–10. For four of the depleted species, revised rebuilding plans are considered, with the selection of OYs based on revised key rebuilding parameters consistent with the approach adopted in amendment 16-4. For the other three depleted species, the OYs are consistent with the rebuilding plans adopted in amendment 16-4. The second set of alternatives is a range of management measures for the 2009-10 period, consistent with the range of OYs considered.

ES.2.1 Harvest Specification (OY) Alternatives

Decision-making on harvest specifications began at the June 2007 Council meeting when new stock assessments were initially reviewed by the Council. This led to the adoption of the stock assessments and associated OY alternatives for each stock and stock complex at the November 2007 meeting. These OY alternatives represent a range of possible values for each stock or stock complex, including a No Action alternative representing the OY values in place for 2008. Harvest limits for depleted species act as a constraint on the harvest of target species; because some level of bycatch is unavoidable, the management measures needed to keep the catch of depleted species below their OYs also may serve to keep target species harvest below their OYs. For this reason, and because of the long-term implications for stock rebuilding, decision-making focused on the OYs for these depleted stocks. The table below (adapted from Tables 2-2 and 2-5 in Chapter 2) shows the range of OYs considered by the Council for implementation in 2009-10 for the seven depleted stocks. The 2008 OYs represent the No Action Alternative.

Table ES-1. Range of 2009-10 OYs (mt) for depleted groundfish species decided at the November 2007 and April 2008 Council meetings and the preferred alternative chosen at the June 2008 Council meeting.

Stock	Association	2008 OY (projected 2008 catch)	Range of OYs Considered (Alternatives 1–6)	Council-Preferred OYs (2009–10)
Yelloweye	Northern Shelf	20 (18.9)	0 – 14 –15 – 17	17 (2009) – 17 mt (2010) under ramp-down [a/]
Canary		44 (44)	0 – 35 – 44 – 85 – 105 – 155	105
Cowcod [b/]	Southern Shelf	4 (0.9)	0 – 2 –3 –4	4
Bocaccio		218 (99.6)	0 – 227 – 288 –302	288
Darkblotched	Northern Slope	330 (302.9)	0 – 165 – 235 – 285 –306	285 (2009) – 291 (2010)
POP		150 (90.1)	0 – 137 – 173 – 200	189 (2009) – 200 (2010)
Widow	Midwater	368 (342.5-363.5)	0 – 362 – 522	522 (2009) – 509 (2010)

a/ Under this strategy the harvest rate is successively reduced from the status quo harvest rate in 2006 to a new constant harvest rate in 2011, consistent with the rebuilding plan.
b/ OY alternatives for Conception and Monterey areas combined.

Combinations of OYs for depleted species can be used to explore possible differential effects on fishery sectors. Differential effects are related to the general distribution of the species, indicated by association in the table above, and the areas where different fishery sectors operate. For example, a suite of alternatives with less constraining OYs for species found on the continental shelf would increase relative fishing opportunity for bottom trawlers targeting flatfish. In contrast, the Dover-sole-thornyhead-sablefish (DTS) bottom trawl fishery operates on the continental slope and would be more affected by the OYs for species such as POP and darkblotched rockfish.

The Council also chose OYs for all remaining stock and stock complexes, which are not overfished. These included important commercial and recreational target species, such as lingcod, sablefish, Pacific whiting (hake), thornyheads, and several flatfish stocks. Longnose skate, previously managed as part of the Other Fish complex was newly assessed for the 2009–10 biennial cycle and the Council chose an OY for that stock for the first time. Pacific whiting is an important groundfish fishery both in terns of volume and revenues. Pacific whiting are assessed annually and the OY is determined early each year for the fishery that begins April 1. Beginning with this management cycle, decision making occurs under a new international Pacific whiting commission, established based on a treaty between the U.S. and Canada. Since the OY for Pacific whiting is chosen in a separate process and unknown for 2009 and 2010 at this time, placeholder values expected to encompass the range of possible values are used for the analysis.

ES.2.2 Management Measure Alternatives

Management measure alternatives were developed based on the preferred OY alternative. A variety of measures were considered for each of the groundfish fishery sectors to arrive at a preferred alternative projected to constrain harvests to the preferred OYs. The types of management measures available under the FMP framework are described in the following section, with reference to the fishery sectors to which different combinations of such measures are applied. Key features of the preferred management alternative are then described. The same basic measures, as used in the recent past and described below, would be used to achieve and stay within the different OY alternatives considered, with the magnitude or severity of the different measures changing for the different OY alternatives.

ES.2.2.1 General Description of Available Management Measures and Managed Fisheries

When formulating management measures, certain set asides are used to reserve a portion of relevant OYs for specified activities. Thus, expected tribal, non-groundfish fishery (i.e., incidental open access), scientific research, and exempted fishing permit (EFP) catches are deducted as set asides. Management measures are intended to keep total catch in all other fisheries within OY levels minus these set-aside catches. Set asides can also be expressed as harvest guidelines for certain fishery sectors. Harvest guidelines for canary and yelloweye rockfish are established for Washington-Oregon combined and California recreational fisheries. Black rockfish harvest guidelines for Oregon and California recreational and commercial fisheries are also established.

Commercial fishery management measures are organized around three regulatory sectors based on the current permitting regime. These are limited entry trawl, limited entry fixed gear, and open access. The groundfish fishery is subject to a license limitation or limited access regime. In order to use trawl gear to target groundfish a vessel owner must possess a trawl-endorsed groundfish limited entry permit. Vessels targeting Pacific whiting comprise a distinct subsector of the limited entry trawl sector. They use midwater nets, which do not ordinarily make contact with the sea bottom. This subsector is further divided into an additional three sectors based on vessel type: motherships and catcher vessels that deliver to them, catcher-processors, and shore-based vessels. The Pacific whiting fishery is seasonal and subject to quota-based management for the target species, normally beginning in the spring and ending when the quota is attained. Fixed allocations have been established to divide the quota among these sectors.

Limited entry fixed gear permit holders use longline or pot gear principally to target high-value sablefish during an April 1-October 31 season. Permit holders are assigned a sablefish quota for the season based on their permit “tier,” which determines the amount of quota for which they are eligible. A “permit stacking” program allows permit holders to acquire up to three permits, making them eligible for the sum of the associated quotas.

The open access sector refers to those vessels either targeting groundfish or catching them incidentally but not in possession of a Federal groundfish limited entry permit. From a vessel perspective it can be difficult to distinguish between target, or directed, and incidental groundfish catch. For analytical purposes, any landing (and associated trip) where half or more of the catch by weight is groundfish is considered a directed groundfish trip. This includes fixed gear fishers targeting sablefish outside the primary season described above and subject to comparatively small daily trip limits and nearshore fisheries supplying the live fish market using hook-and-line. Fixed gear fishers may also target rockfish in deeper water (on the continental slope), Pacific cod, and spiny dogfish. Groundfish are caught incidentally by trawl vessels targeting pink shrimp, California sea cucumbers, and ridgeback prawns. The salmon troll fishery also catches small amounts of rockfish incidentally. Starting in February 2008, any open access fisherman desiring to land groundfish caught in Federal waters was subject to new VMS requirements. This will help enumerate the size of the fleet fishing in Federal waters, but does not include the fleet fishing solely in state waters for groundfish.

A fourth commercial sector comprises tribal fisheries prosecuted by Washington coastal tribes (Makah, Quileute, Hoh, and Quinault) in their usual and accustomed grounds and stations, under treaties with the Federal government. Fixed allocations of commercial groundfish species have been established for the tribes through the treaty framework, and the tribes implement requisite management measures to access these allocations within their usual and accustomed fishing areas. The tribes participate in groundfish bottom trawl, whiting trawl, and fixed gear fisheries.

The main commercial fishery management measures are applied differently to each of these three sectors. The principal types of measures used include:

- Two-month or monthly cumulative landing limits, frequently referred to as “trip limits,” are imposed for various combinations of species and species groups related to fishery targets and gear configurations. Landing depleted species during certain periods or fisheries may be prohibited. Separate sets of trip limits are established for commercial regulatory sectors and north and south of a management line at 40°10’ N latitude (approximately Cape Mendocino, California). Trip limits are often adjusted inseason if information indicates OYs may be exceeded.

- Gear requirements, principally relating to trawl gear, have been implemented in recent years to reduce depleted species bycatch. The two principal measures are a requirement to use small footrope trawl gear on the continental shelf (shoreward of the Rockfish Conservation Area [RCA]) and selective flatfish trawl, shoreward of the RCA and north of 40°10’ N latitude. The use of small footrope gear prevents trawling in rocky areas where some depleted species are more abundant. This requirement has an additional benefit in terms of habitat protection and this requirement was recently made permanent for areas shallower than 100 fm for that purpose. Selective flatfish gear has a lower bycatch rate for some depleted species because they can more easily escape from the net. The Council may extend the current requirement for its use to areas south of 40°10’ N latitude. The pink shrimp trawl fishery, which catches groundfish incidentally, must used bycatch reduction devices on their nets.

- A variety of time/area closures applicable to commercial vessels have been implemented in recent years. The most extensive of these are the RCAs, which have been in place since 2002 to prohibit vessels from fishing in depths where depleted groundfish species are more abundant. Different RCA configurations apply to the limited entry trawl sector and the limited entry fixed gear and open access sectors. In addition, the depth ranges covered can vary by latitudinal zone and 2-month cumulative limit period. The alternatives vary in terms of the extent of RCAs. In the Southern California Bight two Cowcod Conservation Areas (CCAs) have been in place since 2000 to reduce bycatch of the depleted cowcod stock. Off of Washington a Yelloweye Rockfish Conservation Area (YRCA) identifies an area where bycatch of this species is higher, and commercial fixed gear vessels are directed to avoid the area on a voluntary basis. Bycatch of Chinook salmon listed under the Endangered Species Act has been a concern in Pacific whiting fisheries. In response, in 2007 NMFS implemented a mechanism to close areas within 100 fm, where Chinook salmon are more abundant during the months when this fishery occurs, to these fisheries in response to information showing that bycatch is too high.

- Total catch limits, or bycatch caps, are applied to certain depleted species. A framework for the application of total catch limits was incorporated into the groundfish FMP by Amendment 18. Total catch limits are applied to a defined fishery sector; if the limit is reached, the sector must cease fishing. Catch limits for canary and widow rockfish were imposed on the Pacific whiting fishery during the 2005-06 management period. An additional catch limit for darkblotched rockfish was added for the 2007-08 period. As discussed above, this type of management measure is also proposed for the 2009-10 period. To effectively apply bycatch caps, a fishery sector must have sufficient real-time monitoring to allow accurate and timely determination of the attainment of the cap. Currently, only the whiting fishery is subject to this level of monitoring.

Recreational fishery management is implemented principally at the state level, since most recreational fishing occurs in state waters and recreational fishing differs between the states. The Council coordinates management and the states conform their management regulations to Council recommendations implemented at the Federal level. Recreational management measures have to take into account recreational fisheries for non-groundfish species, such as Pacific halibut and sanddabs. The main recreational management measures are listed below.

- Seasonal closures can be implemented using state recreational management zones.

- Depth-based area closures are used under which retention of different groundfish species is prohibited. The closures usually apply to fishing in depths greater than a specified depth contour. Area closures can vary by month or fishing season. The YRCAs described above for commercial fisheries are closed to recreational fisheries. As previously discussed, two additional YRCAs are proposed under the preferred alternative.

- Overall bag limits and limits for certain species apply on a per-trip and/or per-angler basis. Retention of some species may be prohibited.

- Gear restrictions may specify the size of hook that may be used.

ES.2.2.2 Management Measures Adopted for the 2009-10 Biennial Cycle

The preferred management measure alternative focuses on the need to reduce the yelloweye rockfish bycatch to adhere to the ramped down OY of 17 mt in each year, but also to optimize fishing opportunities under the constraints imposed by OYs specified for other groundfish stocks. The limited entry non-whiting trawl fishery will be largely constrained by yelloweye and darkblotched in the north and cowcod in the south.

The non-tribal whiting trawl fishery will have sector-specific bycatch limits for canary, darkblotched, and widow rockfish that are apportioned according to an established pro rata allocation of whiting. Any unused bycatch limits will be rolled over to the remaining sectors using the same pro-rata apportionment if a sector is closed due to attaining their whiting quota or a species' bycatch limit. There will also be the ability to impose sector-specific depth restrictions on the fishery to minimize bycatch.

Finer scale seasonal management of the non-trawl RCA will be used for fixed gear fisheries north of 40°10' N latitude in 2009-10 to maximize fishing opportunities while minimizing bycatch. The Council also adopted a new Federal logbook requirement for all fixed gear groundfish fisheries to enable better catch, effort, and spatial modeling of these fisheries.

Tribal fisheries, prosecuted by the Makah, Quileute, Hoh, and Quinault tribes, are managed independently subject to a treaty between the tribes and the U.S. government. For this reason, a portion of the OY must be set aside for each biennial cycle to accommodate tribal harvests. The expectation that the Quileute Tribe will participate in the whiting fishery beginning in 2009 and the Quinault Tribe will enter the whiting fishery in 2010 requires larger set asides, which are identified in the preferred alternative. These include a 2009 tribal set-aside of whiting of 50,000 mt and set-asides for depleted species' bycatch. The 2010 set aside will be developed during government-to-government discussions among the state, tribes and federal government.

Recreational fisheries in northern California and Washington were also further constrained by the need to reduce yelloweye impacts. The preferred alternative includes a new YRCA off Westport, Washington that will be implemented on January 1, 2009, and new YRCAs off northern California that could be implemented inseason in the next two years if needed to reduce yelloweye impacts. The Council also adopted the status quo 42:58 catch sharing plan between California and Oregon for the southern black rockfish OY. A variety of other season and bag limit changes were adopted for west coast recreational fisheries.

Table ES-2. Comparison of expected total depleted species fishing mortality under the status quo and the preferred management measure alternative.

	Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
2008 OY	**218**	**44**	**4**	**330**	**150**	**368**	**20**
2009 OY	**288**	**105**	**4**	**285**	**189**	**522**	**17**
				Projected Catches			
Preferred Alternative a/	120.8	100.0	2.1	277.4	95.4	522.0 b/	16.5
No Action b/	99.6	44.0	0.9	302.9	90.1	342.5-363.5	18.9

a/ Projected impacts under the preferred alternative are from Table 2-39.
b/ Assumes the whiting fishery will use all the available yield of widow. The Council will formally set widow bycatch limits in March of each year during 2009-10.
c/ No Action is projected total catch in 2008 (from Table 2–27).

ES.3 Impacts of the Alternatives

ES.3.1 West Coast Marine Ecosystems and Essential Fish Habitat

The currently rebuilding rockfish stocks on the west coast, and indeed all rockfish more generally, occupy a broad range of ecological niches and trophic roles in the California Current ecosystem, since both juvenile and adult rockfish are important prey items to a wide range of other rockfish, other piscivorous fishes, seabirds and marine mammals. From a holistic perspective, the fishing-down of any species, whether to or below target levels, alters energy pathways and has the potential to affect ecological structure. Unfortunately, the research and data necessary to understand such potential impacts, or to develop and adequately parameterize multispecies models to evaluate such impacts reliably, are lacking for most ecosystems, including the California Current.

As a result, there is no foundation upon which to consider the consequences of historical overfishing, or alternative strategies in rebuilding depleted species, with respect to the potential impacts or trade-offs to ecological integrity and future sustainability. For several rebuilding species, particularly those at higher trophic levels (piscivorous species such as cowcod, yelloweye, and bocaccio), these impacts may be more significant at smaller spatial scales for some habitat types and regions. Existing spatial closures for essential fish habitat protection and overfished species bycatch reduction should provide adequate protection to sustain ecological relationships and interactions. However, there is no meaningful way of quantitatively assessing the potential difference with respect to the risk of undesirable consequences to the ecosystem of choosing one OY alternative over the other. As the estimated impacts to the rebuilding trajectories for most of these species are forecast to be relatively modest, it stands to reason that the potential consequences of the differing OY alternatives to the ecosystem are relatively modest as well.

ES.3.2 Affected Fish Species

Table ES-3 compares the current targets for depleted groundfish species and those proposed under the preferred alternative (see Table 2–3 in Chapter 2). OY Alternative 1, which is the “F = 0” or no fishing alternative, so-called because OYs are set to zero for all depleted species, is included in the range of alternatives to evaluate the effects of rebuilding depleted stocks to their target biomasses in as short a time as possible. (The target year for this alternative is shown in Table ES-3 for comparison with the targets under the preferred alternative.) This alternative would have the most beneficial impact in terms of biological resources but would result in significant adverse socioeconomic impacts, as discussed below. Targets for other alternatives are discussed in Chapter 4. The target rebuilding year (T_{TARGET}) under the preferred alternative is the same or earlier than the current (status quo) target year for five stocks (bocaccio, canary, Pacific ocean perch, widow, and yelloweye) and higher for two (cowcod and darkblotched rockfish). The change in the cowcod rebuilding year reflects a technical correction in the stock assessment and returns the stock to a rebuilding trajectory close to what had been estimated in 2004. The most recent canary stock assessment changed scientific understanding of the productivity of that stock leading to a more optimistic outlook and an earlier target year. The higher than status quo canary OY under the preferred alternative is based on a lower harvest rate than status quo. The most recent darkblotched stock assessment changed scientific understanding of the productivity of that stock leading to a more pessimistic outlook, and a later target year, even though the OY is reduced in comparison to status quo. P_{MAX}, an indicator of the likelihood of achieving rebuilding within the maximum allowable time to rebuild as specified in NMFS's National Standard Guidelines, is estimated to remain the same or be more favorable under the proposed changes, with the exception of cowcod, due to the technical correction just referenced, yelloweye rockfish, which shows a modest increase in risk, and darkblotched rockfish, due to the changed understanding of stock productivity. Overall, the rebuilding strategies associated with the Council-preferred OY alternative remain risk averse.

Table ES–3. Comparison of current and proposed OYs and rebuilding targets for depleted species.

Species	OY		P_{MAX}		T_{TARGET}		
	2008	Proposed (2009)	Current	Proposed	Current	Proposed	F = 0
Bocaccio	218	288	78%	89%	2026	2026 [a/]	2020
Canary	47	105	55%	75%	2063	2021	2019
Cowcod	4	4	91%	66%	2039	2072	2061
Darkblotched	330	285	100%	80%	2011	2028	2018
POP	150	189	93%	94%	2017	2017 [a/]	2010
Widow	368	522	95%	100%	2015	2015 [a/]	2009
Yelloweye	20	17 [b/]	80%	69%	2084	2084	2049

[a/] Although T_{TARGET} for these stocks remains at current values, the estimate of the median time to rebuild is lower. For bocaccio it is 2023, canary rockfish 2020, POP 2011, and widow rockfish 2009.
[b/] The yelloweye OY is based on a strategy to ramp down the harvest rate from the 2008 (status quo) harvest rate to a new constant harvest rate strategy in 2011.

As discussed above, the management measure alternatives are intended to constrain total catch of depleted species below their rebuilding-target-associated OYs and constrain target species catches to proposed 2009-10 OYs. Yelloweye and canary rockfish continue to impose the greatest constraints in terms of developing management measures, because the 2009-10 OYs consistent with proposed rebuilding strategies are comparatively low and because they are caught in a range of fisheries on the continental shelf. Cowcod has a very low OY (4 mt), but fisheries have adjusted to some degree to the management constraints placed on them over the past few years, so this stock presents less of a challenge in terms of designing management measures for the current biennial cycle. The management measure alternatives include a variety of measures to constrain harvests to OYs. These include non-retention of these species in almost all fisheries, implementation of additional YRCAs for recreational fisheries, region-specific recreational harvest guidelines for yelloweye rockfish, bycatch caps for canary, darkblotched, and widow rockfish in the whiting fishery, and the requirement of selective flatfish trawl gear north of 40°10' N latitude and shoreward of the RCA and small footrope gear south of this management line to reduce bycatch of canary and yelloweye rockfish in the bottom trawl sector. As shown in Table ES-2, all of the preferred management measure alternatives are projected to result in catches below the preferred OY alternatives.

ES.3.3 Protected Species

This EIS focuses its evaluation of impacts to protected species on Chinook salmon listed under the ESA and caught in the Pacific whiting and groundfish bottom trawl fisheries. Previous EISs examined effects to other protected species and found no significant impacts. There is no new information to suggest that the nature of these salmon impacts changed. However, a consultation threshold, take of 11,000 or more Chinook in the whiting fishery, has been established for ESA-listed Chinook salmon. Data from the West Coast Groundfish Fishery Observer Program provides an indication of Chinook take in that fishery. Beginning in 2007, NMFS has had automatic action authority to close depths under 100 fm to the whiting fishery if data indicate a likelihood that the 11,000 fish threshold will be exceeded before the end of the season. The whiting fishery has full observer coverage with close to real time reporting, allowing the implementation of such a strategy.

Take of Chinook salmon cannot be predicted because the available data do not show a clear correlation between target species' catch and take. Furthermore, the Pacific whiting OY, which will determine the level of fishing activity in this sector, is determined annually and is not specified as part of the proposed action. The seasonal and spatial distribution of Chinook salmon is generally understood, but not at a level that would allow prediction of incidental take. For these reasons, comparison of the alternatives can only be made at a very broad level. The various rebuilding strategies associated with the OY alternatives have long-term implications in terms of possible future OYs for depleted species and resulting constraints on groundfish fisheries. More aggressive rebuilding is likely to constrain fisheries more than strategies with later target years. In the extreme, the no fishing (F = 0) alternative would eliminate the Pacific whiting and groundfish trawl fisheries and their adverse impacts in terms of Chinook take. The Council-preferred OY alternative, combined with the preferred management measure alternative is likely to result in fishing opportunity similar to, or slightly reduced from, status quo. Annual Chinook take in the whiting fishery has averaged 7,459 fish, 1998-2007, and has exceeded 11,000 fish three times (1995, 2000, and 2005). Based on the average level of take, it is reasonable to conclude that the 11,000 fish threshold will not be exceeded in 2009-10.

Take of humpback whales has been demonstrated for the sablefish pot fisheries. NMFS is currently assessing the information.

ES.3.4 Fishery Sectors and Fishing Communities

The evaluation of socioeconomic impacts, especially on fishing communities, is thus an important consideration in determining the proper rebuilding time period. Figures ES-1 and ES-2 provide a bottom-line snapshot of the relative income impact on commercial fisheries under preferred alternative compared to status quo. Table ES-4 is a similar assessment for recreational fisheries.

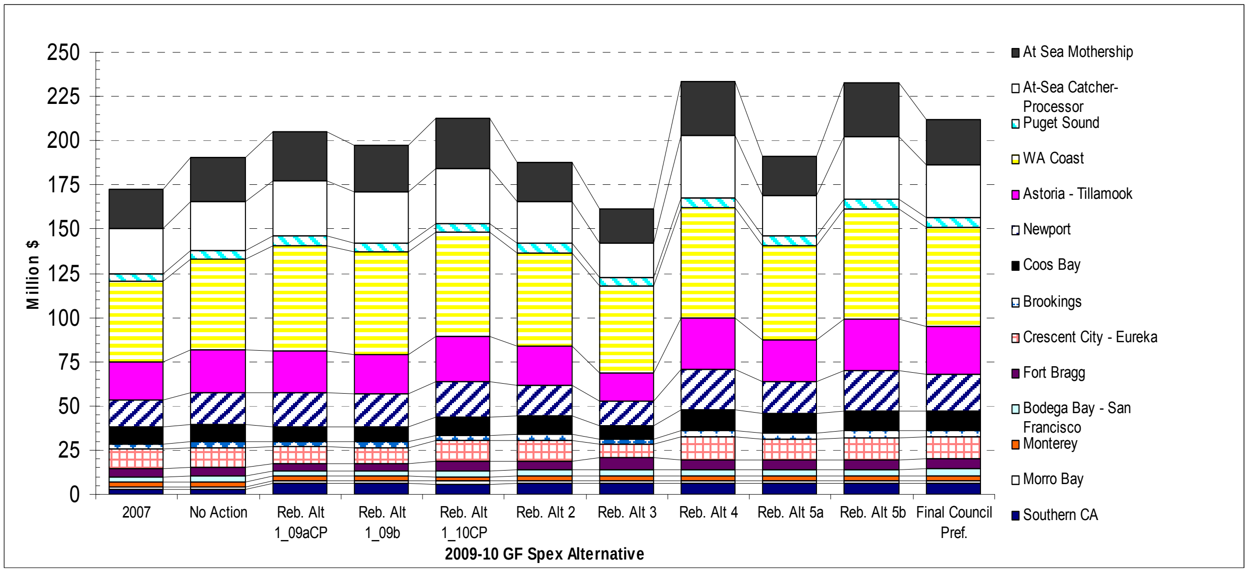

Figure ES-1 . Income impacts by port area under the 2009-2010 management alternatives (including treaty groundfish, excluding nearshore open access). (Income impacts are a measure of total harvesting, processing, and support activities connected with Council-managed ocean area commercial fisheries.) (Figure 7-7)

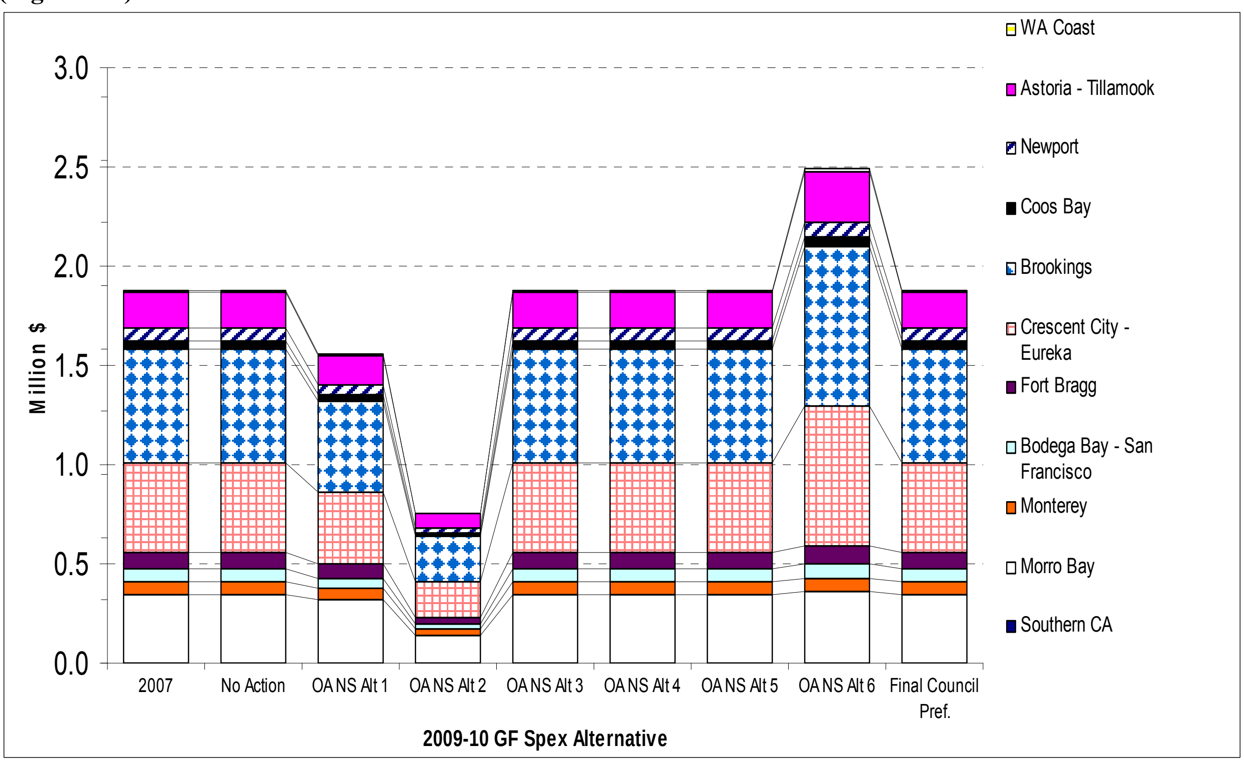

Figure ES-2. Nearshore open access groundfish sector income impacts by port area under the 2009-2010 management alternatives. (Income impacts are a measure of total harvesting, processing, and support activities connected with Council-managed ocean area commercial fisheries.) Figure 7-8

Table ES-4. Change in recreational angler income impacts by port area from No Action (million $). (Income impacts are a measure of total economic activity connected with Council-managed ocean area recreational angler trip expenditures.) (Table 7-68b)

Region	No Action	"Zero Yelloweye" Alternative	Council Preferred Alt
North Washington Coast	*1.4*	-1.4	-
South & Central WA Coast	*12.2*	-11.9	-
Astoria-Tillamook	*1.9*	-1.9	+1.4
Newport	*5.3*	-5.0	+1.3
Coos Bay	*1.6*	-1.5	+1.1
Brookings	*1.6*	-1.6	+0.5
Crescent City-Eureka	*2.2*	-2.2	-0.3
Fort Bragg	*1.3*	-1.3	-0.4
Bodega Bay - San Francisco	*9.3*	-9.3	-0.9
Monterey - Morro Bay	*6.4*	-6.3	-0.1
Santa Barbara	*5.0*	-5.0	-
Los Angeles - San Diego	*41.9*	-40.9	-
TOTAL	*90*	-88.2	+2.6

ES.4 Delay of Implementation of the 2009-2010 Harvest Specifications and Management Measures

Following the Council's June 2008 meeting, Sustainable Fisheries Division (SFD) of NMFS, Northwest Region, deliberated on how to complete the harvest specifications and management measures for 2009-2010. SFD staff reviewed the tasks relative to a final rule implementation date of January 1, 2009. Given the complexity of the task, along with the other work of the division, it was determined that there was not enough time to complete the draft EIS; prepare and publish proposed and final rules; and allow adequate time for the public to review the documents and provide comment, and for NMFS to consider and to respond to public comment before January 1, 2009. In this situation, the Pacific Coast groundish FMP states that the current harvest specifications and management measures remain in place until replaced or modified. Specifically, the 2008 ABC and OYs would remain in place. In addition, the 2008 trip limit tables would also remain in place, but could be modified as necessary by inseason actions based on the most current fishery information in order to ensure harvests stayed within the 2008 OYs. During these deliberations, the SFD staff considered the conservation and management implications of delaying the effective date until March 1, 2009.

During these deliberations, SFD prepared a side-by-side comparison of the trip limits that had been in place in 2008 for January-February (period one) and the limits recommended by the Council in the management measures for period one in 2009 to better understand the implications of delaying the action. In addition to the side-by-side comparison, other factors informed the agency decision, including the OY levels proposed for 2009. NMFS goals were to ensure that no conservation problems would be caused by the delay, and to understand other potential effects on the fishery.

The most significant differences in trip limits proposed for period one were increased trawl limits for Dover sole, arrowtooth flounder, and some other flatfish due to a proposed increase in the canary rockfish OY for 2009. There was also a recommended reduction in the petrale sole limits in period one. The petrale OYs for 2008 and 2009 were very similar, so the trip limit reduction was to allow opportunity later in the year because prior year harvests revealed petrale catch was too high in period one. Finally, fixed-gear and open access RCAs were proposed to be expanded in 2009. The 2008 yelloweye OY is 20. Under the status-quo rebuilding plan, the 2009 OY for yelloweye is to be 17 mt., which is what was in the proposed rule. Yelloweye is taken primarily in the recreational fisheries and the line fisheries. There is almost no recreational fishing in period one, and very little line fishing in yelloweye areas in period one, so this potential change did not seem to be a problem. All of these factors together led SFD staff to conclude that delaying the effective date of the action by two months would not pose any conservation concerns. In addition, there is a low level of fishing that occurs during the first period of the year and thus the likelihood of significant economic impacts to fishermen not able to access higher trip limits would be low and any economic losses to fishermen could be offset by greater opportunity to the fleet later in 2009.

NOAA Fisheries notified the Council that the 2009-2010 harvest specifications would not be effective on January 1, 2009 and thus the Council would have to manage the 2009 period one fishery based on the 2008 OYs and management measures. However, the management measures could be adjusted based on inseason information. Based on the best available fishery information at the November 2008 meeting, the Council recommended inseason adjustments to management measures to ensure that the fishery stayed within the 2008 harvest specifications (most of which were more conservative than those being proposed for 2009). The Council recommended increases to some limits for sablefish and longspine thornyheads because the fisheries had come in below the OYs in 2008. The Council also recommended lowering the trip limits for petrale sole because of the excessive petrale sole harvest in period one in 2008. The Council did not recommend other increases to fisheries, particularly flatfish fishing, because those increases that had been proposed for 2009 depended on the higher canary OY proposed for 2009. Finally, even though there is very little line fishing in period one, the Council recommended the expanded RCA that had been proposed in order to ensure the 2009 mortality stayed within the Amendment 16-4 rebuilding plan. The Council specifically did not recommend higher trip limits for other species for which the 2008 OYs of either the target or incidental catch species would not accommodate the higher trip limits that had been included in the proposed rule. See Agenda Item F.1.b, Supplemental GMT Report, November 2008.

NOAA Fisheries approved the council recommendation on December 24, 2008 (73 FR 79008). Fishing Mortality that occurs during January and February will be taken into account in the total mortality estimates for 2009, and will count towards the ABCs and OYs ultimately implemented for 2009.

Table ES-5. Comparison of trip limits for January-February (Period 1)

	Jan-Feb 2008	**Jan-Feb -inseason (December 24, 2008, 73 FR 79008)**	**Jan-Feb - Proposed rule (December 31, 2008, 73 FR 80516)**
TRAWL North (Table 3 North)			
RCA			
N of 48°10'	shore - modified 200 fm	Same	same
48°10' - 46°38.17'	75 fm – modified 200 fm	Same	same
46°38.17' - 46°16			
46°16 - 45°46'			
45°46' - 43°20.83'			
43°20.83' - 42°40.50'	shore - modified 200 fm	Same	75 fm – modified 200
42°40.50' - 40°10	75 fm – modified 200	Same	same
Minor slope rockfish & darkblotched	1,500 lb/2 mo	Same	same
POP	1,500 lb/2 mo	Same	same
Sablefish	Lg & sm footrope 14,000 lb/ 2 mo,	↑ Lg & sm footrope 18,000 lb/2	↑ Lg & sm footrope 18,000 lb/2

	selective flatfish 5,000 lb/ 2 mo, multiple bottom trawl 5,000 lb/ 2 mo	mo, selective flatfish & multiple bottom trawl - same	mo, selective flatfish & multiple bottom trawl - same
Longspine Thornyhead	Lg & sm footrope 25,000 lb/ 2 mo, selective flatfish 3,000 lb/ 2 mo, multiple bottom trawl 3,000 lb/ 2 mo	Same	↓ Lg & sm footrope 22,000 lb/ 2 mo, selective flatfish 3,000 lb/ 2 mo, multiple bottom trawl 3,000 lb/ 2 mo
Shortspine Thornyhead	Lg & sm footrope 12,000 lb/ 2 mo, selective flatfish 5,000 lb/ 2 mo, multiple bottom trawl 5,000 lb/ 2 mo	↑ Lg & sm footrope 17,000 lb/ 2 mo, selective flatfish 3,000 lb/ 2 mo, multiple bottom trawl 3,000 lb/ 2 mo	↑ Lg & sm footrope 17,000 lb/ 2 mo, selective flatfish 3,000 lb/ 2 mo, multiple bottom trawl 3,000 lb/ 2 mo
Dover sole	Lg & sm footrope 80,000 lb/ 2 mo, selective flatfish 40,000 lb/ 2 mo, multiple bottom trawl 40,000 lb/ 2 mo	↑Lg & sm footrope 110,000 lb/ 2 mo, selective flatfish 40,000 lb/ 2 mo, multiple bottom trawl 40,000 lb/ 2 mo	↑Lg & sm footrope 110,000 lb/ 2 mo, selective flatfish 40,000 lb/ 2 mo, multiple bottom trawl 40,000 lb/ 2 mo
Whiting	Midwater – CLOSED, lg & sm footrope 20,000 lb/trip	Same	same
Arrowtooth	Lg & sm footrope 150,000 lb/ 2 mo, selective flatfish 10,000 lb/ 2 mo, multiple bottom trawl 10,000 lb/ 2 mo	Same	↑Lg & sm footrope 150,000 lb/ 2 mo, selective flatfish 90,000 lb/ 2 mo, multiple bottom trawl 90,000 lb/ 2 mo
Other flatfish, English sole, starry flounder & petrale sole	Lg & sm footrope gear for Other flatfish, English sole, & starry flounder – 110,000 lb/2 mo Lg & sm footrope gear for Petrale sole – 40,000 lb/2 mo Selective flatfish trawl gear for Other flatfish, English sole, & starry flounder - 70,000 lb/ 2 mo, no more than 10,000 lb/ 2 mo of which may be petrale sole. Selective flatfish trawl gear for Petrale sole - 70,000 lb/ 2 mo, no more than 10,000 lb/ 2 mo of which may be petrale sole. Multiple bottom trawl gear Other flatfish, English sole, & starry flounder - 70,000 lb/ 2 mo, no more than 10,000 lb/ 2 mo of which may be petrale sole.	Lg & sm footrope gear for Other flatfish, English sole, & starry flounder – same ↓ Lg & sm footrope gear for Petrale sole – 25,000 lb/2 mo Selective flatfish trawl gear for Other flatfish, English sole, & starry flounder – same Selective flatfish trawl gear for Petrale sole - same Multiple bottom trawl gear Other flatfish, English sole, & starry flounder - same	Lg & sm footrope gear for Other flatfish, English sole, & starry flounder – same ↓ Lg & sm footrope gear for Petrale sole – 25,000 lb/2 mo ↑Selective flatfish trawl gear for Other flatfish, English sole, & starry flounder - 90,000 lb/ 2 mo, no more than 16,000 lb/ 2 mo of which may be petrale sole. ↑Selective flatfish trawl gear for Petrale sole - 90,000 lb/ 2 mo, no more than 16,000 lb/ 2 mo of which may be petrale sole. Multiple bottom trawl gear Other flatfish, English sole, & starry flounder - 90,000 lb/ 2 mo, no more than 16,000 lb/ 2 mo of which may be petrale sole.
Minor shelf rockfish1/, Shortbelly, Widow & Yelloweye rockfish	Lg & sm footrope – 300 lb/ 2 mo; Selective falatfish trawl gear – 300 lb/mo; Multiple gears – 300 lb/mo	same	same
Widow	Midwater trawl - before the primary whiting season: CLOSED	same	same
Canary	Lg & sm footrope – CLOSED; Selective flatfish trawl gear – 100 lb/mo; Multiple gears - CLOSED	same	same
Yellowtail	Before the primary whiting season: CLOSED; Lg & sm footrope – 300 lb/ 2 mo; Selective falatfish trawl gear – 2,000 lb/2 mo; Multiple gears – 300 lb/2 mo	same	same
Minor nearshore rockfish & black	Lg & sm footrope –CLOSED; Selective falatfish trawl gear –300 lb/2 mo; Multiple gears – CLOSED	same	same

Lingcod	1,200 lb/ 2 mo all footropes	same	same
Pacific cod	30,000 2/mo	same	same
Spiny dogfish	200,000 2/mo	same	same
Other fish	Not limited	same	same
TRAWL South (Table 3 South)			
RCA			
South of 40°10	100 fm – 150 fm	same	same
Minor slope rockfish & darkblotched	40°10 - 38° - 15,000 lb/2 mo South of 38°- 55,000 lb/2 mo	same	same
Splitnose	40°10 - 38° - 15,000 lb/ 2 mo South of 38°- 40,000 lb/ 2 mo	same	40°10 - 38° - 15,000 lb/2 mo ↑ South of 38°- 55,000 lb/2 mo
Sablefish	14,000 lb/ 2 mo	↑ 40°10 - 38° - 20,000 lb/ 2 mo South of 38°- 14,000 lb/ 2 mo	↑ 20,000 lb/ 2 mo
Longspine thornyhead	25,000 lb/ 2 mo	same	↓ 22,000 lb/ 2 mo
Shortspine thornyhead	12,000 lb/ 2 mo	↑ 17,000 lb/ 2 mo	↑ 17,000 lb/ 2 mo
Dover sole	80,000 lb/ 2 mo	↑ 110,000 lb/ 2 mo	↑ 110,000 lb/ 2 mo
Other flatfish, English sole, starry flounder	100,000 lb/ 2 mo	same	↑ 110,000 lb/ 2 mo
Petrale sole	50,000 lb/ 2 mo	same	same
Arrowtooth	10,000 lb/ 2 mo	same	same
Whiting	Midwater – CLOSED, lg & sm footrope 20,000 lb/trip	same	same
Minor shelf rockfish1/, Shortbelly, Widow & Yelloweye rockfish	Lg footrope or midwater for minor shelf & shortbelly -300 lb/mo Lg footrope or midwater for chilipepper -2,000 lb/2 mo Lg footrope or midwater for widow and yelloweye – CLOSED Sm footrope trawl for minor shelf, shortbelly, widow & yelloweye – 300 lb/mo Sm footrope for chilipepper – 2,000 lb/2 mo.	same	Lg footrope or midwater for minor shelf & shortbelly- same ↑ Lg footrope or midwater for chilipepper -5,000 lb/2 mo Lg footrope or midwater for widow and yelloweye – same Sm footrope trawl for minor shelf, shortbelly, widow & yelloweye – same ↑ Sm footrope for chilipepper – 5,000 lb/2 mo.
Bocaccio	Lg footrope or midwater – 300 lb/ 2 mo Sm footrope- CLOSED	same	same
Canary	Lg footrope or midwater – CLOSED Sm footrope- 100 lb/mo	same	same
Cowcod	CLOSED	same	same
Minor nearshore rockfish & black	Lg footrope or midwater – CLOSED	same	same

	Sm footrope- 300 lb/mo		
Lingcod	Lg footrope or midwater – 1,200 lb/2 mo Sm footrope- 1,200 lb/2 mo	same	same
Pacific cod	30,000 lb/ 2 mo	same	same
Spiny dogfish	200,000 lb/2 mo	same	same
Other fish & Cabazon	Not limited	same	same
LE FIXED GEAR North (Table 4 North)			
RCAs			
North of 46°16'	Shoreline -100 fm	same	same
46°16'-40°10	30 fm-100 fm	NA	NA
46°16'-45°03.83	NA	30 fm-100 fm	30 fm-100 fm
45°03.83- 42º 50'	NA	30 fm-125 fm	30 fm-125 fm
42º 50'- 40°10	NA	20 fm-100 fm	20 fm-100 fm
Minor slope rockfish & darkblotched	4,000 lb/ 2 mo	same	same
POP	1,800 lb/ 2 mo	same	same
Sablefish	300 lb/day, or 1 landing per week of up to 1,000 lb, not exceeded 5,000 lb/2 mo	same	same
Longspine thornyhead	10,000 lb/ 2 mo	same	same
Shortspine thornyhead	2,000 lb/ 2 mo	same	same
Dover sole/ Arrowtooth/Petrale sole/English sole/ starry flounder/ other flatfish	5,000 lb/month, South of 42o N. lat., when fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to two 1 lb (0.45 kg) weights per line are not subject to the RCAs.	same	same
Whiting	10,000 lb/trip	same	same
Minor shelf rockfish, shortbelly, widow & yellowtail	200 lb/mo	same	same
Canary	CLOSED	same	same
Yelloweye	CLOSED	same	same
Minor nearshore rockfish & black	N of 42°- 5,000lb/2 mo no more than 1,200lb of which may be species other than black or blue 42°-40°10' – 6,000lb/2 mo no more than 1,200lb of which may be species other than black or blue	same	same
Lingcod	CLOSED	same	same
Pacific cod	1,000 lb/ 2 mo	same	same
Spiny dogfish	200,000 lb/2 mo	same	same
Other fish	Not limited	same	same

LE FIXED GEAR South (Table 4 South)			
RCAs			
40º10' - 34º27'	30 fm – 150 fm	same	same
South of 34º27'	60 fm – 150 fm (islands too)	same	same
Minor slope rockfish & darkblotched	40,000 lb/2 mo	same	same
Splitnose	40,000 lb/2 mo	same	same
Sablefish	40°10 - 36° - 300 lb/day, or 1 landing per wk up to 1,000 lb, not to exceed 5,000 lb/2 mo South of 36°- 300 lb/day, or 1 landing per wk up to 1,050 lb	40°10 - 36° - Same ↑South of 36°- 350 lb/day, or 1 landing per wk up to 1,050 lb	40°10 - 36° - Same ↑South of 36°- 400 lb/day, or 1 landing per wk up to 1,500 lb
Longspine thornyhead	10,000 lb/2 mo	same	same
Shortspine thornyhead	40°10 - 34°27 -2,000 lb/2 mo South of 34°27 -3,000 lb/2 mo	same	same
Dover sole/ Arrowtooth/Petrale sole/English sole/ starry flounder/ other flatfish	5,000 lb/month. South of 42º N. lat., when fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to two 1 lb (0.45 kg) weights per line are not subject to the RCAs.	same	same
Whiting	10,000 lb/trip	same	same
Minor shelf rockfish, shortbelly, widow & yellowtail (including chilipepper between 40°10 - 34°27)	40°10 - 34°27 -2,500 lb/2 mo of which no more than 500 lb/ 2 mo may be any species other than chilipepper South of 34°27 -3,000 lb/2 mo	same	same
Chilipepper	South of 34°27 – 2,000/ 2 mo seaward of nontrawl RCA	same	same
Canary	CLOSED	same	same
Yelloweye	CLOSED	same	same
Cowcod	CLOSED	same	same
Bocaccio	40°10 - 34°27 – (with minor rockfish) South of 34°27 -300 lb/2 mo	same	same
Minor nearshore rockfish & Black	Shallow nearshore – 600 lb/2 mo Deeper nearshore - 40°10 - 34°27 – 700 lb/ 2 mo; South of 34°27 500 lb/ 2 mo CA scorpionfish – 600 lb/2 mo	same	same
Lingcod	CLOSED	same	same
Pacific cod	1,000 lb/ 2 mo	same	same
Spiny dogfish	200,000 lb/2 mo	same	same
Other fish & Cabazon	Not limited	same	same

OA North (Table 5 North)			
RCA			
North of 46°16’	Shoreline -100 fm	same	same
46°16’-40°10	30 fm-100 fm	NA	NA
46°16’-45°03.83	NA	30 fm-100 fm	30 fm-100 fm
45°03.83- 42º 50’	NA	30 fm-125 fm	30 fm-125 fm
42º 50’- 40°10	NA	20 fm-100 fm	20 fm-100 fm
Minor slope rockfish & darkblotched	Per trip, no more than 25% of the wt of sablefish	same	same
POP	100 lb/mo	same	same
Sablefish	300 lb/day, or 1 landing per week of up to 800 lb, not exceeded 2,400 lb/2 mo	same	same
Thornyheads	CLOSED	same	same
Dover sole/ Arrowtooth/Petrale sole/English sole/ starry flounder/ other flatfish	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs. South of 42o N. lat., when fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to two 1 lb (0.45 kg) weights per line are not subject to the RCAs.	same	same
Whiting	300 lb/mo	same	same
Minor shelf rockfish, shortbelly, widow & yellowtail	200 lb/mo	same	same
Canary	CLOSED	same	same
Yelloweye	CLOSED	same	same
Minor nearshore rockfish & black	N of 42°- 5,000lb/2 mo no more than 1,200lb of which may be species other than black or blue 42°-40°10’ – 6,000lb/2 mo no more than 1,200lb of which may be species other than black or blue	same	same
Lingcod	CLOSED	same	same
Pacific cod	1,000 lb/2 mo	same	same
Spiny dogfish	200,000 lb/2 mo	same	same
Other fish	Not limited	same	same
Pink shrimp trawl	NA – starts 4/1	same	same
Salmon troll	NA	same	same
OA South (Table 5 South)			
RCAs			
40º10’ - 34º27’	30 fm – 150 fm	same	same
South of 34º27’	60 fm – 150 fm (islands too)	same	same
Non-groundfish trawl			
40º10’ - 38º	100 fm - modified 200 fm	same	same
38º - 34º27’	100 fm – 150 fm	same	same

South of 34º27'	100 fm – 150 fm along mainland, shoreline to 150 fm around islands	same	same
Minor slope rockfish & darkblotched	40º10' - 38º - Per trip, no more than 25% of the wt of sablefish South of 38º - 10,000 lb/ 2 mo	same	same
Splitnose	200 lb/ mo	same	
Sablefish	40°10 - 36° - 300 lb/day, or 1 landing per wk up to 800 lb, not to exceed 2,400 lb/2 mo South of 36°- 300 lb/day, or 1 landing per wk up to 700 lb	same	40°10 - 36° - same ↑ South of 36°- 400 lb/day, or 1 landing per wk up to 1,500 lb not to exceed 8,000 2/mo
Thornyheads	40°10 - 34°27 -CLOSED South of 34°27 -50 lb per day no more than 1,000 lb//2 mo	same	same
Dover sole/ Arrowtooth/Petrale sole/English sole/ starry flounder/ other flatfish	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs. South of 42o N. lat., when fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to two 1 lb (0.45 kg) weights per line are not subject to the RCAs.	same	same
Whiting	300 lb/mo	same	same
Minor shelf rockfish, shortbelly, widow & yellowtail & chilipepper	40°10 - 34°27 -300 lb/ 2 mo South of 34°27 – 750 lb/ 2 mo	same	same
Canary	CLOSED	same	same
Yelloweye	CLOSED	same	same
Cowcod	CLOSED	same	same
Bocaccio	40°10 - 34°27 -200 lb/ 2 mo South of 34°27 – 100 lb/ 2 mo	same	same
Minor nearshore rockfish & Black	Shallow nearshore – 600 lb/2 mo Deeper nearshore - 40°10 - 34°27 – 700 lb/ 2 mo; South of 34°27 500 lb/ 2 mo CA scorpionfish – 600 lb/2 mo	same	same
Lingcod	CLOSED	same	same
Pacific cod	1,000 lb/2 mo	same	same
Spiny dogfish	200,000 lb/2 mo	same	same
Other fish & Cabazon	Not limited	same	same
Pink shrimp trawl	NA – starts 4/1	same	same
Non- groundfish trawl	300 lb/ trip (see table for specifics)	same	same

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CHAPTER 1 INTRODUCTION

1.1 How This Document is Organized

This document provides background information about, and analyses of the 2009–10 biennial harvest specifications and management measures for fisheries covered by the *Pacific Coast Groundfish Fishery Management Plan* (FMP), which are developed by the Pacific Fishery Management Council (Council) in collaboration with the National Marine Fisheries Service (NMFS). This harvest specification action includes regulatory action to change rebuilding parameters for four of seven currently overfished species. Groundfish harvest specifications are set every 2 years for a 2-year period. The current harvest specifications are generally similar to those established in previous years and are analyzed in similar fashion. These actions must conform to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the principal legal basis for fishery management within the Exclusive Economic Zone (EEZ), which extends from the outer boundary of the territorial sea to a distance of 200 nautical miles (nm) from shore.

In addition to addressing MSA mandates, this document is an environmental impact statement (EIS), pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended. According to NEPA (Section 102(2)(C)), any "major Federal action significantly affecting the quality of the human environment" must be evaluated in an EIS. Based on a preliminary determination by Council and NMFS staff, implementing the two actions referenced above may have significant impacts. Therefore, rather than preparing an environmental assessment (EA), which provides "sufficient evidence and analysis for determining whether to prepare an environmental impact statement," NMFS and the Council have decided to proceed directly to preparation of an EIS. This document is organized so that it contains the analyses required under NEPA and other applicable law (see Chapter 10).

In this EIS, Chapters 1 and 2 cover the purpose and need for the action and describe the alternatives, and the next five chapters focus on parts of the biological, physical, and human environments potentially affected by the proposed action. These chapters describe both the status quo environment potentially affected by the proposed action and the predicted impacts of each of the alternatives. Based on this structure, the document is organized in 14 chapters:

The rest of this chapter, Chapter 1, discusses the reasons for Federal regulation of west coast groundfish fisheries in 2009–10 and for considering revisions to established groundfish rebuilding plans. This description of purpose and need defines the scope of the subsequent analysis.

- Chapter 2 outlines different alternatives that have been considered to address the purpose and need. The Council chose their final preferred alternative from among these alternatives, which provided the basis for establishing the regulations governing groundfish fisheries in 2009–10.

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

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

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

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

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

- Chapter 8 addresses additional requirements of NEPA and implementing regulations, including the identification of any measures that will be implemented to mitigate significant impacts of the proposed action.

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

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

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

1.2 Purpose and Need for the Proposed 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 [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 (ABCs and 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/NMFS *proposed action* 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 years 2009 and 2010. A related regulatory action revises the target rebuilding year and/or harvest control rule for four of seven groundfish species that are currently declared overfished pursuant to §304(e) in the MSA and the stock rebuilding strategy described in the groundfish FMP (section 4.5), as amended by Amendment 16-4. These changes in rebuilding parameters affect the OY values for these species for the 2-year period.

Management measures are intended to keep total fishing mortality during each year within the harvest specifications established for that year. Specifications include new harvest levels for species with new stock assessments and projected harvest levels for species with stock assessments completed in prior years. Management measures may be modified during the biennial period, so total fishing mortality is constrained to the OYs identified in the preferred alternative. The environmental impacts of any such changes in management measures are expected to fall within the range of impacts evaluated in this EIS.

Federally-managed Pacific groundfish fisheries occurring off the coasts of Washington, Oregon, and California (WOC) establish the geographic context for the proposed action.

1.2.2 Need (Problems for Resolution)

The 2009–10 harvest specifications are needed to 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 the proposed action is to ensure Pacific Coast groundfish subject to Federal management are harvested at OY during 2009 and 2010 in a manner consistent with the groundfish FMP, National Standards Guidelines (NSG) (50 CFR 600 Subpart D), and other requirements of the MSA and other applicable law, using routine management tools available to the management measures process (FMP at 6.2.1, 50 CFR 660.323(b)). Chapter 10 of this EIS describes how the proposed action (preferred alternative) is consistent with the FMP, MSA, and other applicable laws.

Harvest specifications and associated management measure are also the principal way in which the objectives of rebuilding plans for depleted (overfished) groundfish stocks will be achieved. Harvest constraints are intended, over the long term, to return these stocks to a size and structure capable of supporting maximum sustained yield (MSY) according to the requirements of the MSA (especially §304(e)).

1.3 Description of the Decision Making Process

The 2007–08 harvest specifications EIS (PFMC 2004d) describes various aspects of the decision making process that lead to the Council's choice of a preferred alternative. That discussion is incorporated by reference here and briefly summarized below. This summary discussion covers: (1) the need to respond to new information on groundfish stock status, especially for overfished stocks, to determine new OYs; (2) the range of management measures available to the Council through the framework established in the groundfish FMP; (3) changes to the management regime resulting from

FMP amendments implemented during the previous 2-year cycle; and (4) the actual schedule used by the Council in deciding on a preferred alternative.

The Council decision making process begins with periodic assessments of the status of groundfish stocks, and rebuilding analyses of those stocks that are depleted and managed under rebuilding plans. This work is peer reviewed through Stock Assessment Review (STAR) panels; the Council's Scientific and Statistical Committee (SSC) then uses the STAR panel results to make a recommendation to the Council on whether the assessments represent the best available science for groundfish management. A total of 15 groundfish stock assessments were conducted and approved in support of the process for setting 2009–10 OYs.

Determining OYs for depleted stocks is generally more complicated because of the legal and policy framework constraining decision making. As part of the 2007–08 harvest specifications process, the groundfish FMP was amended to revise the FMP framework for rebuilding plans and to revise key aspects of the rebuilding plans themselves. This amendment, Amendment 16-4, was developed to respond to an opinion rendered by the Ninth Circuit Court of Appeals in *Natural Resources Defense Council, Inc. and Oceana, Inc.* v. *National Marine Fisheries Service, et al.,* 421 F.3d 872 (9th Cir. 2005). This opinion, referring to the controlling language in the MSA (§304(e)(4)(A)(i)), stresses that the rebuilding strategy (essentially the target year and related harvest control rule and associated management measures) must rebuild stocks in as short a time as possible, taking into account: (1) the status and biology of the stocks, (2) the needs of fishing communities, and (3) interactions of depleted stocks within the marine ecosystem. In essence, the rebuilding strategy must favor rapidly rebuilding the stock but may take into account adverse socioeconomic impacts (effects to fishing communities) as a mitigating factor. Decision making should also take into account the marine ecosystem. More generally, the groundfish FMP rebuilding framework is based on National Standard 1 Guidelines (50 CFR 600.310).

For each depleted stock the annual OY is based on a harvest control rule (harvest rate) estimated to rebuild the stock to a target level of 40 percent of unfished biomass ($B_{40\%}$) by a target year, T_{TARGET}. A rebuilding analysis estimates the probability (likelihood) that a given harvest rate will result in the stock reaching $B_{40\%}$ in any given year from the current year going forward. This analysis informs the decision on T_{TARGET} and the harvest control rule, and furthermore an adopted harvest rate (the harvest control rule) must result in at least a 50 percent probability that the stock will be rebuilt by the chosen target year.

The choice of the target year is determined by two additional parameters, T_{MIN}, defined as the time needed to rebuild the stock in the absence of fishing from the year the stock was declared overfished[1], and T_{MAX}, T_{MIN} plus one mean generation time, a stock-specific biological parameter. A target year closer to T_{MIN} implies reducing harvests to rebuild the stock in a shorter amount of time, while a target year closer to T_{MAX} favors higher harvest levels and a longer time to rebuild.

Periodic stock assessments provide new information, which for overfished stocks can result in the recalculation of various rebuilding parameters. In some instances, depending on the magnitude and type of change, the Council will consider choosing a new target year and/or harvest control rule. In some cases the new information indicates that the stock is rebuilding more rapidly than expected at the current harvest rate. Although the projected year in which the stock is rebuilt is earlier, the Council may opt not to revise rebuilding parameters to formally re-specify T_{TARGET}. This is the case for three overfished

[1] T_{MIN} is distinguished from another term, $T_{F=0}$, which is the shortest time to rebuild the stock if all fishing mortality ceased starting in the year new regulations are to be implemented. In the case of this action, $T_{F=0}$ would be the predicted time to rebuild if all fishing-related mortality ceased beginning in 2009.

stocks, bocaccio (at the current harvest rate projected to rebuild by 2023 versus the rebuilding plan T_{TARGET} of 2026), Pacific ocean perch (2011 versus 2017), and widow rockfish (2009 versus 2015). New assessment results for canary rockfish are also more optimistic; in this case the Council chose to reduce the harvest rate and adopt the associated earlier T_{TARGET} (2021 versus 2063). Because of this more optimistic information on the status of the stock, the 2009–10 OYs can be increased from the current level (105 mt in 2009 versus 44 mt in 2008), although the adopted harvest rate used to determine the 105 mt OY is less than status quo. New assessments are more pessimistic for two stocks, cowcod and darkblotched rockfish. For cowcod, this resulted from a correction of an error in the previous assessment and essentially returns the stock to the rebuilding trajectory similar to that identified in 2004 (in 2004 T_{TARGET} was specified as 2090 while the current preferred alternative includes a T_{TARGET} of 2074). In this case the Council opted to keep the OY at the same level, 4 mt, as in 2007–08, although this decision results in a higher harvest rate than computed previously. The 4 mt OY is considered a minimum to accommodate unavoidable bycatch; specifying a lower value would likely require closing a range of fisheries. Finally, the Council opted to continue with the current T_{TARGET} for yelloweye rockfish, 2084, but modified the harvest rate strategy. In 2006 the Council adopted a “ramp down” strategy to reduce OYs from 23 mt in 2007 to 14 mt in 2010 and then implement a constant harvest rate associated with the rebuilding trajectory thereafter. This OY reduction schedule gives managers and harvesters time to adapt to the severe harvest constraints associated with the ultimate harvest rate while not appreciably lengthening the rebuilding time. In this case the Council changed the 2010 OY to 17 mt because the increase does not noticeably slow down rebuilding while allowing some additional latitude to adapt management to very low harvest levels. Section 2.1 describes the range of OY alternatives considered by the Council.

Once the Council determines the OYs for overfished species (along with those for target and other incidentally-caught groundfish stocks), management measures projected to keep harvests at or below those OY amounts have to be identified. The types of management measures considered by the Council for 2009–10 fisheries include:

- Yield set-asides for constraining species, which are amounts deducted from the OY to account for fishery-related mortality not constrained by the management measures alternatives. The set-asides cover tribal, incidental open access, research, and exempted fishing permit fishing mortality.
- Catch shares for canary and yelloweye rockfish, which are de facto allocations between the various commercial and recreational fishery sectors.
- A variety of time/area closures for recreational and commercial vessels intended to keep fishing out of high abundance areas for depleted stocks, protected species (ESA-listed salmon), or other purposes. The configuration of these areas may be re-specified as part of the harvest specifications process.
- Two-month or monthly cumulative landing limits frequently referred to as “trip limits.”
- Gear requirements, principally relating to trawl gear.
- For recreational gear, size limits and bag limits.

These same basic measures have been used in the recent past and would be used to achieve and stay within the different OY alternatives considered, with the magnitude or severity of the different measures changing for the different OY alternatives. Section 2.2 describes the management measure alternatives considered by the Council.

One action will modify the management framework for the 2009–10 biennial cycle. Amendment 15 to the groundfish FMP was approved on June 18, 2008. Its purpose is to address conservation and socioeconomic issues in the shoreside, catcher-processor, and mothership sectors of the Pacific whiting fishery by requiring vessels to qualify for an additional license to participate in a given sector, based on their historical participation. It is an interim measure, which will sunset when the trawl rationalization program (Amendment 20) is implemented. Implementing regulations are expected to be in place for the 2009 whiting fishing season, which begins on April 1.

Council decision making related to biennial harvest specifications occurs in three phases, as outlined above: determining the best available science for management, in the form of stock assessments and rebuilding analyses; selecting ABC/OYs for each stock or stock complex in the management unit; and formulating the management measures necessary to constrain harvests at or below those OYs. For this cycle the review and adoption of stock assessments and rebuilding analyses occurred at the June, September, and November 2007 meetings; the adoption of a range of OY alternatives and selection of preferred OYs occurred at the November 2007 and April and June 2008 meetings; and the formulation of management measure alternatives and selection of a preferred management measure alternative occurred at the April and June 2008 meetings. After the Council final action at the June 2008 meeting NMFS reviews the management package and undertakes Federal rulemaking so that that new regulations for groundfish fisheries become effective on January 1, 2009. This EIS contains the analyses used in the decision making process and describes the projected environmental impacts of the proposed action.

1.4 Key Management Issues in 2009 and 2010

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

Inseason management of California recreational fisheries to constrain mortality of depleted groundfish and stay within other harvest allocations made to that sector will again play an important role in the formulation of management measures for the 2009-10 period. Data from the California Recreational Fisheries Survey (CRFS) will be used in preseason and inseason recreational harvest projections.

As mentioned above, regionalizing recreational fisheries management will continue as an important management tool. Historically, the recreational fisheries have had some degree of regional management based on differing state regulations and the geographic distribution of groundfish stocks caught in the sport fishery. For 2009-10, the Council, along with the states, is again considering more explicit regional allocations in the form of harvest guidelines or targets. The concern that a given sector or region could harvest a disproportionate share of the very low coastwide OYs for certain depleted groundfish, such as canary and yelloweye rockfish, has sparked this discussion.

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

Likewise, a "take" of humpback whales has been demonstrated recently in a west coast fixed gear fishery, the sablefish pot fishery. There may be a re-categorization of this fishery from Category III to Category II, under the MMPA, which would then require further evaluation.

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

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, in general terms, that 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. The tribes also have a harvest guideline for Pacific cod beginning in 2006 and for lingcod beginning in 2008. 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 recommend trip limits for these species to the Council, which tries to accommodate these fisheries. It is anticipated that the Quileute Tribe will participate in the tribal whiting fishery in 2009 and the Quinault Tribe will enter the fishery in 2010. The proposed action includes a set-aside of 50,000 mt of whiting to accommodate 2009 tribal whiting fisheries. The tribes, NOAA, and the states of Washington and Oregon will be meeting to determine a 2010 and longer term tribal allocation.

In instances of depleted species, where the harvestable surplus is estimated to be small or non-existent, there are usually no directed fisheries for that species. Conservation measures may be considered in other fisheries that may impact the depleted species, while protecting the treaty rights to other groundfish in accordance with *U.S.* v. *Washington*. For ESA-listed stocks, the standards of Principle 3(C) (i.e., the ''Conservation Necessity Principle'') of the June 1997 Secretarial Order No. 3206 should be met before other restrictions apply. Species under rebuilding fall somewhere in between: they do not require the same level of restriction as ESA-listed species, but are also not allocated in the same manner as healthy target species. In these instances the tribes, the federal government, and the state of Washington, acting as co-managers, will enter more informal negotiations to determine acceptable levels of harvest by both tribal and non-tribal fisheries while rebuilding the species.

Ad hoc tribal/non-tribal allocations[2] under the status quo management regime have been worked out in the Council process. However, some of the lower OY alternatives for depleted species, such as canary

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[2] Ad hoc tribal/non-tribal allocations exist for the depleted species and many target groundfish species. However, such allocations do not include those for sablefish and Pacific whiting, which are long-term allocations

and yelloweye rockfish, may prompt formal government to government negotiations to resolve concerns regarding the need to protect the treaty right to other groundfish. Any unresolved issues over proper tribal and non-tribal allocations and the need to preserve treaty access to other species may then need to be resolved within the framework of the ongoing *U.S.* v. *Washington* case. This is an added step in the process of deciding revised rebuilding plans and the 2009–2010 harvest specifications and management measures. It is unclear how any delay in this allocation decision, if it occurs in the more formal *U.S.* v. *Washington* process, will affect final decisions on the actions contemplated in this EIS.

1.5 Scoping Summary

On May 30, 2008 (73 FR 31067), NMFS published a Notice of Intent (NOI) in the *Federal Register* announcing their intent to prepare an EIS in accordance with NEPA for the 2009–10 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.

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

In addition to Council-sponsored meetings, both Oregon and California state fish and game departments held public hearings to solicit input on the formulation of management measures.

1.6 Criteria Used to Evaluate Impacts of the Proposed Action

Early in the scoping process NMFS Northwest Region (NWR) and Council staff engaged in internal scoping to preliminarily determine the type and intensity of impacts anticipated from the proposed action. Staff used the groundfish scoping matrix included in the NMFS NWR NEPA Quality Assurance Plan. This served as a basis for deciding on the type of NEPA document to prepare (in this case an EIS). These internal scoping results were also used determine what components of the human environment may be affected and therefore the range of impacts to be evaluated in this EIS. The results are reproduced below.

For each category below the impacts of the proposed action (preferred alternative) were scored as follows: H=High potential for significant impact; M=Moderate potential for significant impact; L=Low potential for significant impact; N/A = Not applicable/no expected impact. A brief explanation is given for each score.

Overfished Groundfish Potential for significant impacts: M

frameworked in the groundfish FMP and specified in Federal regulations.

The proposed action establishes harvest limits (OYs) for overfished species and management measures intended to constrain total catch within those limits. Adopted OYs are consistent with targets in adopted rebuilding plans. There is a risk that: (1) OYs are mis-specified due to errors/uncertainty in rebuilding plans and/or (2) actual catches exceed OYs because of inadequate monitoring and enforcement. Exceeding OYs could result in a significant impact if rebuilding of overfished species stocks is substantially impeded as a result.

Groundfish at Healthy and Precautionary Levels Potential for significant impacts: L-M

The proposed action establishes harvest limits (OYs) for precautionary/healthy stocks and management measures intended to constrain total catch within those limits. OYs are set at or below the ABC, which is the maximum fishing mortality threshold. There is a risk that: (1) OYs are mis-specified due to errors/uncertainty in stock assessments and/or (2) actual catches exceed OYs because of inadequate monitoring and enforcement. If such such overages result in overfishing that reduces stock size below the level necessary to achieve MSY on a continuing basis that could be a significant impact.

Non-Groundfish Species (Non-Listed Salmonids, P&C Halibut, CPS, HMS, Dungeness crab, Shrimp/Prawns, Sea Cucumbers) Potential for significant impacts: N/A-L

Non-groundfish species are caught incidentally and the proposed action has no direct impact on constraining or authorizing resulting catch. All of these species are subject to monitoring and management through various plans, frameworks and regulations intended to prevent overfishing and measures in the proposed action will be consistent with non-groundfish management objectives.

Listed Salmonids Potential for significant impacts: N/A-L

These species are bycatch in the trawl fishery. The proposed action indirectly affects catch of listed salmonids by authorizing target groundfish species catch. Listed salmonid catches is the whiting fishery are fully monitored and well monitored (through fishery observer based estimates) in other trawl sectors. Various mitigation measures have been established through the section 7 consultation process to prevent jeopardy.

Marine Mammals & Turtles Potential for significant impacts: N/A

Past NEPA evaluations of the groundfish fishery have not identified significant impacts to these species because takes are negligible across all gear types.

Seabirds Potential for significant impacts: N/A

Observed seabird takes are negligible across groundfish fisheries and no significant impacts have been identified in previous NEPA analyses, but longline gear has been documented elsewhere to kill seabirds. By establishing harvest limits and management measures the proposed action affects the total amount of fishing effort deployed and the potential for seabird incidental take.

Marine Ecosystem & Fish Habitat (including wetlands, if applicable)
Potential for significant impacts: N/A-L

Trawl gear has been documented to adversely affect benthic habitat. Various mitigation measures have been implemented to address the impacts (gear restrictions, closed areas) but the distribution of biogenic habitat vulnerable to trawl gear is not well documented. By establishing harvest limits and management measures the proposed action affects the total amount and distribution of trawl fishing effort deployed with indirect effects on benthic habitat. Because of existing mitigation measures the likelihood of significant impacts is expected to be low.

Community & Economic Impacts Potential for significant impacts: L-M

The proposed action affects the amount and distribution of fishing effort. This indirectly affects employment and income in port communities. Fishing opportunity and related employment and income is not expected to change substantially from the baseline. However, the cumulative reduction in groundfish fishing opportunity over the past decade has been substantial.

Tourism & Recreation Potential for significant impacts: L-M

Recreational groundfish fisheries could be affected by management measures adopted through the proposed action. The need to limit recreational bycatch of depleted species, principally yelloweye rockfish, may require additional limits on recreational fishing opportunity.

Environmental Justice Potential for significant impacts: N/A-L

Port communities vary in demographic characteristics related to environmental justice (race, ethnicity, income). The rationale provided for community and economic impacts also applies to environmental justice. However, because low income and minority communities are a subset of all communities the potential for significant impact is rated low rather than low to moderate.

Safety of Human Life at Sea Potential for significant impacts: N/A

The proposed action will affect fishing activity across groundfish gear types. There could be changes in risks to safety related to difference across sectors/gear types, but any such changes are unlikely to be discernable.

Air Quality Potential for significant impacts: N/A

The action does not affect the design or operation of fishing vessels, so no changes in emissions would result.

Water Quality Potential for significant impacts: N/A

Some discharge of pollutants into the marine environment occurs in the normal course of fishing activities. However, the action does nothing that will discernibly change the level of such discharge.

Geology, Soils, Groundwater & Hydrology Water Quality Potential for significant impacts: N/A

The action area is within the marine environment so this category is not applicable.

Listed Plants & General Vegetation Potential for significant impacts: N/A

The action area is within the marine environment so this category is not applicable.

Cultural Resources Potential for significant impacts: N/A

Cultural resources in the proposed action context include the built environment in port communities and the values and preferences of those involved in fishing. Any effect would be similar to the rationale provided for community and economic impacts. Because the likelihood of significant impacts to communities is expected to be low to moderate the specific effect on cultural resources is not expected to result in significant impacts.

Noise Potential for significant impacts: N/A

The action does not affect the design or operation of fishing vessels and related activities, so no changes in emissions would result.

Aesthetics Potential for significant impacts: N/A

As noted above, the proposed action could indirectly affect the built environment in port communities because of economic effects. The effect on aesthetics of the built environment in this context is indirect and likely to negligible.

Land Use & Ownership Potential for significant impacts: N/A

The action area is within the marine environment so this category is not applicable.

Cumulative Impacts Potential for significant impacts: L-M

Principal past, present, and reasonably foreseeable actions contributing to cumulative effects are annual and biennial groundfish harvest specifications. These specifications cumulatively affect stock status by determining fishing mortality and related stock size over time. There are related cumulative socioeconomic impacts since catch directly and indirectly determines income and employment in port communities. Other past, present, and reasonably foreseeable actions include mitigation actions for bycatch monitoring/reduction (Amendment 18), habitat (Amendment 19) and ESA-listed salmonids (section 7 consultation/re-initiation); adoption/implementation of rebuilding plan FMP amendments (Amendments 16-1, 16-2, 16-3, 16-4); a buyback program for the trawl sector; transition from annual to biennial specifications (amendment 17); whiting sector participation limitation (Amendment 15); trawl rationalization (Amendment 21 in process); inter-sector allocation (Amendment 22 in process), and license limitation for the groundfish open access fishery (Amendment 23 in process). Past harvest specifications resulted in significant impacts by resulting overfishing and stock depletion below the minimum stock size threshold. Past responses to address overfishing and overfished stocks likely had significant adverse socioeconomic effects but may have significant beneficial effects by establishing targets for stock rebuilding.

CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

There are two suites of alternatives analyzed in this EIS. The first suite of alternatives is the range of 2009-10 harvest specifications or acceptable biological catches (ABCs) and optimum yields (OYs) considered for groundfish stocks and stock complexes managed under the Groundfish FMP. The range of harvest specifications for depleted groundfish species is also analyzed under this suite to understand the potential conservation and socioeconomic consequences of alternative depleted species' rebuilding plans. Therefore, the Council's preferred 2009-10 OY alternative serves two purposes: both as the harvest specifications for the years 2009 and 2010 and, for depleted species, as the next step in the longer term mortality schedules for rebuilding plans. Harvest specification (and rebuilding plan) alternatives are described in section 2.1.

The second suite of alternatives analyzed in this EIS is alternative 2009-10 management measures. Alternative management measures adopted for analysis are designed to illustrate the potential efficacy and tradeoffs of management strategies and allocations considered for the next biennial management period by the Council. The overarching objectives of 2009-10 management measures are to stay within the Council-preferred annual OYs for groundfish stocks and stock complexes and to equitably allocate fishing opportunities and other fishery benefits across fishing sectors and regions under Council jurisdiction. Alternative 2009-10 management measures are described in section 2.2.

2.1 Alternative Harvest Specifications

Tables 2-1a and 2-1b depict the alternative harvest specifications for groundfish stocks and stock complexes managed under the FMP and considered by the Council for 2009 and 2010, respectively. The Council's preferred OY alternatives were decided at their June 2008 meeting. All 2009-10 ABCs adopted and recommended by the Council were recommended by the Council's Scientific and Statistical Committee (SSC). These ABCs were based on base models in the most recent assessments for assessed stocks and methodology prescribed in the Groundfish FMP for unassessed stocks.

For this management cycle, the Council reviewed and adopted 9 new stock assessments (not including Pacific whiting) and 6 updated assessments. Not every stock can be assessed every management cycle. For species without a new stock assessment the Council uses the most recent stock assessment and projects forward from that. Since there is no new stock assessment information, there is no reason to develop alternative OYs. New biological information that is gathered between stock assessments is taken into account in a new stock assessment.

Table 2-1a. PFMC-recommended alternatives for acceptable biological catches (ABCs) and total catch optimum yields (OYs) (mt) for 2009, including final preferred alternatives. (Overfished stocks in CAPS; Stocks with new assessments in bold).

Stock	No Action Alternative			2009 Action Alternatives								
	2007 ABC a/	2008 ABC a/	2008 OY a/	2009 ABC	2010 ABC	Alt 1 OY	Alt 2 OY	Alt 3 OY	Alt 4 OY	Alt 5 OY	Alt 6 OY	Final preferred OY alternative
Lingcod - coastwide b/	6,706	5,853		5,278	4,829	5,205	5,278					5,278
N of 42º (OR & WA)			5,558			4,593	4,593					4,593
S of 42º (CA)			612			612	685					685
Pacific Cod	3,200	3,200	1,600	3,200	3,200	1,600						1,600
Pacific Whiting (U.S.)	612,068 (2007 U.S. & Can.)	400,000 (2008 U.S. & Can.)	269,545 (2008)	To be determined in March 2009	To be determined in March 2010	134,773	269,545	404,318				To be determined in March 2009
Sablefish (Coastwide)	6,210	6,058	5,934	9,914	9,217	9,795	8,423	6,250				8,423
N of 36º (Monterey north)			5,723			9,452	7,052	5,233				7,052
S of 36º (Conception area)			210			343	1,371	1,018				1,371
PACIFIC OCEAN PERCH	900	911	150	1,160	1,173	0	130	164	189			189
Shortbelly Rockfish	13,900	13,900	13,900	6,950	6,950	3,475	6,950	-				6,950
WIDOW ROCKFISH	5,334	5,144	368	7,728	6,937	0	371	475	522			522
CANARY ROCKFISH	172	179	44	937	940	0	35	44	85	105	155	105
Chilipepper Rockfish	2,700	2,700	2,000	3,037	2,576	2,000	2,099	3,037				2,885
BOCACCIO	602	618	218	793	793	0	218	288				288
Splitnose Rockfish	615	615	461	615	615	461						461
Yellowtail Rockfish	4,585	4,510	4,548	4,562	4,562	4,562						4,562
Shortspine Thornyhead - coastwide	2,488	2,463		2,437	2,411							
Shortspine Thornyhead - N of 34º27'			1,634			1,608						1,608
Shortspine Thornyhead - S of 34º27'			421			414						414
Longspine Thornyhead - coastwide	3,953	3,860		3,766	3,671							
Longspine Thornyhead - N of 34º27'			2,220			2,231						2,231
Longspine Thornyhead - S of 34º27'			476			395						395
COWCOD	36	36	4	13	14	0	2	3	4			4
DARKBLOTCHED	456	487	290 (2007) 330 (2008)	437	440	0	159	229	285	300		285
YELLOWEYE	47	47	Ramp-down c/	31	32	0	13	17	15	17		17 d/
Black Rockfish (WA)	540	540	540	490	464	490						490
Black Rockfish (OR-CA)	725	719	722	1,469	1,317	920	1,000	1,469				1,000

Table 2-1a. PFMC-recommended alternatives for acceptable biological catches (ABCs) and total catch optimum yields (OYs) (mt) for 2009, including final preferred alternatives. (Overfished stocks in CAPS; Stocks with new assessments in bold) (continued).

Stock	No Action Alternative			2009 Action Alternatives								
	2007 ABC a/	2008 ABC a/	2007-08 OY a/	2009 ABC	2010 ABC	Alt 1 OY	Alt 2 OY	Alt 3 OY	Alt 4 OY	Alt 5 OY	Alt 6 OY	Final preferred OY alternative
Blue Rockfish (CA)	Managed under the Minor Nearshore Rockfish complexes			241	**239**	Managed under minor nearshore rockfish complexes		207	230			Managed under minor nearshore rockfish complexes with a 220 mt statewide HG
Minor Rockfish North	3,680	3,680	2,270	3,678	3,678	2,280	2,283	2,255				2,283
Nearshore Species			142			152	155	127				155
Blue rockfish contribution				28	28	25	28					
Shelf Species			968			968						968
Slope Species			1,160			1,160						1,160
Minor Rockfish South	3,403	3,403	1,904	3,384	3,382	1,970	1,990	1,788				1,990
Nearshore Species			564			630	650	448				650
Blue rockfish contribution				213	211	182	202					
Shelf Species			714			714						714
Slope Species			626			626						626
California scorpionfish	236	202	175	175	155	111	175					175
Cabezon (off CA only)	94	94	69	106	111	69	74	69				69
Dover Sole	28,522	28,442	16,500	29,453	28,582	16,500						16,500
English Sole	6,773	5,701	6,237	14,326	9,745	14,326						14,326
Petrale Sole (coastwide) b/	2,917	2,919	2,499	2,811	2,751	2,433						2,433
Arrowtooth Flounder	5,800	5,800	5,800	11,267	10,112	5,245	11,267					11,267
Starry Flounder	1,221	1,221	890	1,509	1,578	1,004						1,004
Other Flatfish	6,731	6,731	4,884	6,731	6,731	4,884						4,884
Other Fish	14,600	14,600	7,300	11,200	11,200	6,399	5,951	3,872				5,600
Longnose Skate	Managed under the Other Fish complex			3,428	3,269	901	1,349	3,428				1,349
Kelp Greenling HG (OR)			OR HG			OR HG						OR HG

a/ The Council elected to average OY projections for 2007 and 2008. ABCs were year-specific.

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

c/ The yelloweye ramp-down strategy ramps the harvest rate down from the status quo harvest rate and assumes a constant harvest rate strategy in 2011. The 2009-10 OYs are 17 mt and 14 mt, respectively under the status quo ramp-down strategy.

d/ The alternative yelloweye ramp-down strategy ramps the harvest rate down from the status quo harvest rate and assumes a constant harvest rate strategy in 2011. The 2009 and 2010 OYs are 17 mt.

Table 2-1b. PFMC-recommended alternatives for acceptable biological catches (ABCs) and total catch optimum yields (OYs) (mt) for 2010, including final preferred alternatives. (Overfished stocks in CAPS; Stocks with new assessments in bold).

Stock	No Action Alternative			2010 Action Alternatives								
	2007 ABC a/	2008 ABC a/	2007-08 OY a/	2009 ABC	2010 ABC	Alt 1 OY	Alt 2 OY	Alt 3 OY	Alt 4 OY	Alt 5 OY	Alt 6 OY	Final preferred OY alternative
Lingcod - coastwide b/	6,706	5,853		5,278	4,829	4,785	4,829					4,829
N of 42º (OR & WA)			5,558			4,173	4,173					4,173
S of 42º (CA)			612			612	656					656
Pacific Cod	3,200	3,200	1,600	3,200	3,200	1,600						1,600
Pacific Whiting (U.S.)	612,068 (2007 U.S. & Can.)	400,000 (2008 U.S. & Can.)	269,545 (2008)	To be determined in March 2009	To be determined in March 2010	134,773	269,545	404,318				To be determined in March 2010
Sablefish (Coastwide)	6,210	6,058	5,934	9,914	9,217	8,988	7,729	5,777				7,729
N of 36º (Monterey north)			5,723			8,673	6,471	4,837				6,471
S of 36º (Conception area)			210			315	1,258	941				1,258
PACIFIC OCEAN PERCH	900	911	150	1,160	1,173	0	137	173	200			200
Shortbelly Rockfish	13,900	13,900	13,900	6,950	6,950	3,475	6,950	-				6,950
WIDOW ROCKFISH	5,334	5,144	368	7,728	6,937	0	362	475	509			509
CANARY ROCKFISH	172	179	44	937	940	0	35	44	85	105	155	105
Chilipepper Rockfish	2,700	2,700	2,000	3,037	2,576	2,000	2,099	2,576				2,447
BOCACCIO	602	618	218	793	793	0	227	302				288
Splitnose Rockfish	615	615	461	615	615	461						461
Yellowtail Rockfish	4,585	4,510	4,548	4,562	4,562	4,562						4,562
Shortspine Thornyhead - coastwide	2,488	2,463		2,437	2,411							
Shortspine Thornyhead - N of 34º27'			1,634			1,591						1,591
Shortspine Thornyhead - S of 34º27'			421			410						410
Longspine Thornyhead - coastwide	3,953	3,860		3,766	3,671							
Longspine Thornyhead - N of 34º27'			2,220			2,175						2,175
Longspine Thornyhead - S of 34º27'			476			385						385
COWCOD	36	36	4	13	14	0	2	3	4			4
DARKBLOTCHED	456	487	290 (2007) 330 (2008)	437	440	0	165	235	291	306		291
YELLOWEYE	47	47	Ramp-down c/	31	32	0	14	14	15	17		17 d/
Black Rockfish (WA)	540	540	540	490	464	464						464
Black Rockfish (OR-CA)	725	719	722	1,469	1,317	831	1,000	1,317				1,000

Table 2-1b. PFMC-recommended alternatives for acceptable biological catches (ABCs) and total catch optimum yields (OYs) (mt) for 2010, including final preferred alternatives. (Overfished stocks in CAPS; Stocks with new assessments in bold) (continued).

Stock	No Action Alternative			2010 Action Alternatives								
	2007 ABC a/	2008 ABC a/	2007-08 OY a/	2009 ABC	2010 ABC	Alt 1 OY	Alt 2 OY	Alt 3 OY	Alt 4 OY	Alt 5 OY	Alt 6 OY	Final preferred OY alternative
Blue Rockfish (CA)	Managed under the Minor Nearshore Rockfish complexes			**241**	**239**	Managed under minor nearshore rockfish complexes		207	230			Managed under minor nearshore rockfish complexes with a 220 mt statewide HG
Minor Rockfish North	3,680	3,680	2,270	3,678	3,678	2,280	2,283	2,255				2,283
Nearshore Species			142			152	155	127				155
Blue rockfish contribution				28	28	25	28					
Shelf Species			968			968						968
Slope Species			1,160			1,160						1,160
Minor Rockfish South	3,403	3,403	1,904	3,384	3,382	1,970	1,990	1,788				1,990
Nearshore Species			564			630	650	448				650
Blue rockfish contribution				213	211	182	202					
Shelf Species			714			714						714
Slope Species			626			626						626
California scorpionfish	236	202	175	175	155	99	155					155
Cabezon (off CA only)	94	94	69	106	111	69	74	79				79
Dover Sole	28,522	28,442	16,500	29,453	28,582	16,500						16,500
English Sole	6,773	5,701	6,237	14,326	9,745	9,745						9,745
Petrale Sole (coastwide) b/	2,917	2,919	2,499	2,811	2,751	2,393						2,393
Arrowtooth Flounder	5,800	5,800	5,800	11,267	10,112	5,245	10,112					10,112
Starry Flounder	1,221	1,221	890	1,509	1,578	1,077						1,077
Other Flatfish	6,731	6,731	4,884	6,731	6,731	4,884						4,884
Other Fish	14,600	14,600	7,300	11,200	11,200	6,398	5,951	4,031				5,600
Longnose Skate	Managed under the Other Fish complex			3,428	3,269	902	1,349	3,269				1,349
Kelp Greenling HG (OR)			OR HG			OR HG						OR HG

a/ The Council elected to average OY projections for 2007 and 2008. ABCs were year-specific.

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

c/ The yelloweye ramp-down strategy ramps the harvest rate down from the status quo harvest rate and assumes a constant harvest rate strategy in 2011. The 2009-10 OYs are 17 mt and 14 mt, respectively under the status quo ramp-down strategy.

d/ The alternative yelloweye ramp-down strategy ramps the harvest rate down from the status quo harvest rate and assumes a constant harvest rate strategy in 2011. The 2009 and 2010 OYs are 17 mt.

2.1.1 Alternative Harvest Levels Analyzed for Depleted Groundfish Species

Depleted groundfish species are those with spawning biomasses that have dropped below the Council's depletion or overfished threshold of 25 percent of initial spawning biomass (or $B_{25\%}$). The Groundfish FMP mandates these stocks need to be rebuilt through harvest restrictions and other conservation measures to 40 percent of unfished biomass (or $B_{40\%}$). Furthermore, the MSA mandates these rebuilding periods need to be the shortest time possible while taking into account the status and biology of the depleted stock, the needs of fishing communities, and the interaction of the depleted stock within the marine ecosystem. This mandate was underscored in an August 2005 ruling by the Ninth Circuit Court of Appeals in a challenge to the Council's darkblotched rockfish rebuilding plan. In accordance with that ruling, the Council decided to reconsider all adopted rebuilding plans under FMP amendment 16-4 to ensure they comply with the MSA as interpreted by the courts. Amendment 16-4 was adopted in 2006 with the rebuilding plan specifications described in Table 2-2.

Table 2-2. Rebuilding plan specifications for seven depleted groundfish species adopted in 2006 under Groundfish FMP Amendment 16-4.

Species	B_0	B_{MSY}	T_{MIN} a/	T_{MAX}	$T_{F=0}$ a/	P_{MAX}	T_{TARGET}	Harvest Control Rule (SPR Harvest Rate)
Bocaccio	13,402 B eggs in 2005	5,361 B eggs	2018	2032	2021	77.70%	2026	F77.7%
Canary	34,155 mt	13,662 mt	2048	2071	2053	55.40%	2063	F88.7%
Cowcod	3,045 mt	1,218 mt	2035	2074	2035	90.60%	2039	F90.0%
Darkblotched	26,650 M eggs	10,660 M eggs	2009	2033	2010	100%	2011	F60.7%
POP	37,838 units of spawning output	15,135 units of spawning output	2015	2043	2015	92.90%	2017	F86.4%
Widow	49,678 M eggs	19,871 M eggs	2013	2033	2013	95.20%	2015	F95.0%
Yelloweye	3,322 mt	1,328 mt	2046	2096	2048	80%	2084	F71.9% b/

a/ T_{MIN} is the shortest time to rebuild from the onset of the rebuilding plan or from the first year of a rebuilding plan, which is usually the year after the stock was declared overfished. The shortest possible time to rebuild the stocks with rebuilding plans under consideration in Amendment 16-4 was $T_{F=0}$, which was the median time to rebuild the stock if all fishing-related mortality were eliminated beginning in 2007.

b/ The yelloweye rebuilding plan specifies a harvest rate ramp-down strategy before assuming a constant harvest rate in 2011. F71.9% is the constant harvest rate beginning in 2011.

No new species were declared depleted from the 16 groundfish assessments conducted in 2007. However, new stock assessments and rebuilding analyses for all of the seven depleted groundfish species were developed and adopted in 2007. Therefore, the Council is continuing rebuilding plans for the seven species and only reconsidering those plans in response to the results of new assessments and rebuilding analyses, as well as the Ninth Circuit Court of Appeals ruling discussed above and in Chapter 1. To fully analyze both the conservation needs of each depleted stock and the socioeconomic effects of alternative rebuilding plans, a wide range of OYs have been specified for analysis for each depleted species (Tables 2-1a and 2-1b). Each of these OY alternatives is based on the best available science as recommended by Stock Assessment Review (STAR) panels and the SSC. This section describes the scientific basis for each depleted species' OY alternative and describes the strategic analyses of these alternatives that are presented in more detail in subsequent chapters of this EIS.

In considering potential rebuilding alternatives, first, the consequences of each depleted species' OY alternative was examined in isolation to understand the tradeoff between the amount of allowable harvest and alternative rebuilding periods and to identify the west coast fisheries that are affected by the constraints posed by alternative rebuilding plans for each particular depleted species. The predicted rebuilding periods and the annual OYs that describe the alternative rebuilding schedules, each of which define a rebuilding plan, are estimated using the SSC's endorsed rebuilding program (Punt 2005). The rebuilding program is a probabilistic population simulator that explores alternative harvest rates and predicts the annual OYs and duration of rebuilding for each depleted species under a range of harvest rates.

The depleted species' OY alternatives analyzed in this EIS, based on harvest rates estimated from the rebuilding simulation program, are calculated using an instantaneous rate of fishing mortality (F), which may be converted to a Spawning Potential Ratio. For ease of comparison among stocks and to standardize the basis of rebuilding calculations, it is useful to express any specific fishing mortality rate in terms of its effect on Spawning Potential Ratio (SPR = spawning per recruit at the current population level relative to that at the stock's unfished condition). Given fishery selectivity patterns and basic life history parameters, there is a direct inverse relationship between F and SPR (Figure 2-1). When there is no fishing, each new female recruit is expected to achieve 100 percent of its spawning potential. As fishing intensity increases, expected lifetime reproduction declines due to this added source of mortality. Conversion of F into the equivalent SPR has the benefit of standardizing for differences in growth, maturity, fecundity, natural mortality, and fishery selectivity patterns and, as a consequence, the Council's SSC recommends that it be used routinely. The rebuilding program is more thoroughly described in Chapter 6.

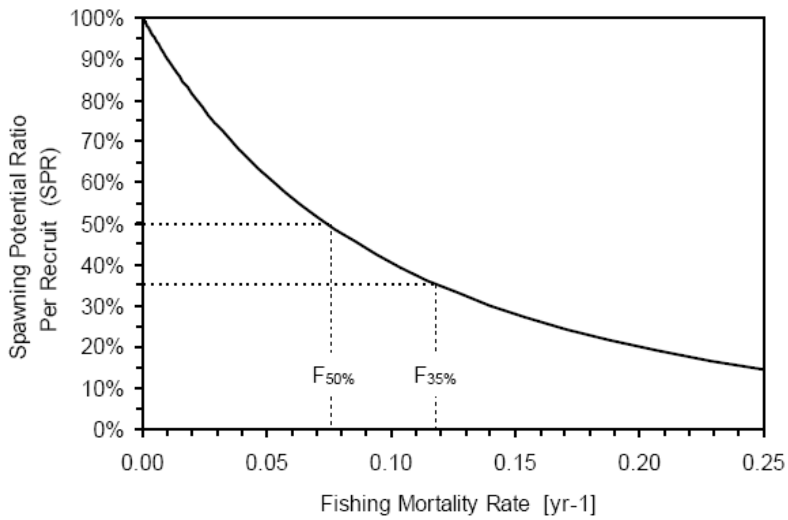


Figure 2-1. Relationship between SPR and instantaneous fishing mortality rate (F) for a hypothetical rockfish.

New rebuilding analyses for the seven depleted west coast species using the rebuilding program were completed, reviewed by the SSC, and adopted by the Council for use in deciding 2009-10 harvest specifications for these species. Results of the new rebuilding analyses were used to develop the depleted species' OY alternatives in Tables 2-1a and 2-1b. Each OY alternative is described by an SPR harvest rate, a median time to rebuild, and the median time to rebuild if all fishing-related mortality were eliminated beginning in 2009 ($T_{F=0}$). Table 2-3 shows these results and Figure 2-2 graphically depicts alternative OYs vs. the associated median time predicted to rebuild these species across the range of OYs that could be considered under current National Standard 1 guidelines.[3] The range of depleted species' OYs in Tables 2-1a and 2-1b are well below the range of available yields analyzed in new rebuilding analyses and depicted in Table 2-3 and Figure 2-2.

Next, rebuilding alternatives were developed by arranging the range of depleted species' OYs in various combinations (Table 2-4) and then modeling changes to the current management regime to understand how rebuilding plans for different species interact to constrain fishing opportunities. The OYs in these rebuilding alternatives are strategically arrayed to illuminate how each species might differentially constrain fishing opportunities by sector (or gear type) and region along the west coast, depending on the amount of allowable harvest of each species. It is important to note that the full range of OY alternatives described at Table 2-1a and 2-1b are not used to structure the suites of rebuilding alternatives.

At their April 2008 meeting, the Council selected a preliminary preferred OY alternative for all managed groundfish species and species complexes. The decision of preliminary preferred OYs was made based on GMT analysis of draft rebuilding alternatives provided at the April 2008 meeting. The final Council-preferred OYs and potential rebuilding plan revisions for depleted species were decided at the June 2008 Council meeting (Table 2-1a and 2-1b). The rebuilding alternatives in Table 2-4 were updated from the draft alternatives analyzed by the GMT in April 2008 using the final range of depleted species' OYs and the preliminary preferred OYs decided by the Council in April 2008. The final rebuilding alternatives in Table 2-4 are analyzed in section 4.3.1.2 of this EIS.

The final Council-preferred 2009-10 OY alternatives for depleted species must be consistent with their respective rebuilding plans. Therefore, the Council is explicitly revising any species' rebuilding plan if either the target rebuilding year (T_{TARGET}) or the SPR harvest rate in Table 2-2 is changed by Council's recommended 2009-10 OY. The Council can decide to maintain a target rebuilding year in a status quo rebuilding plan, but still specify lower 2009-10 OYs than those calculated using the status quo SPR harvest rate in the rebuilding plan. Such a decision would have the effect of increasing the probability of successfully rebuilding the stock by the target rebuilding year if the rebuilding SPR harvest rate is revised downward in the rebuilding plan without changing the target rebuilding year (i.e., a lower harvest rate is prescribed for the duration of the rebuilding plan). The choice of a final preferred OY alternative involves consideration of both short-term effects (during 2009-10) and long-term effects (the future application of rebuilding plans as revised by new stock assessments and rebuilding analyses) as discussed in section 4.3.1 in this EIS. Most rebuilding plan revisions are compelled by new stock assessment information that results in a fundamental change in our understanding of the status and biology of a stock.

[3] National Standard 1 guidelines are anticipated to be amended to comply with the new mandate to end overfishing in the re-authorized Magnuson-Stevens Act enacted in 2006. Depleted species' OYs analyzed in this EIS are well below recommended ABCs; therefore, there is negligible risk of exceeding depleted species' ABCs in 2009-10. See section 4.3.1 in this EIS for more details.

Table 2-3. Estimated time to rebuild and SPR harvest rate relative to alternative 2009-10 OYs for depleted west coast groundfish species.

Species	Ttarget in the FMP	OY Alt.	Median Time to Rebuild	OYs (mt) 2009	OYs (mt) 2010	SPR HR	T @ F=0	Current Tmax	Re-est. Tmax
Bocaccio (S of 40°10' N lat.)	2026	1	2020	0	0	F100%	2020	2032	2033
		2	2022	218	227	F82.6%			
		3	2023	288	302	F77.7%			
		Council-pref.	2023	288	288	F77.7%			
			2026	468	482	F66.4%			
Canary	2063	1	2019	0	0	F100%	2019	2071	2035
		2	2020	35	35	F97.3%			
		3	2020	44	44	F96.2%			
			2020	55	55	F95.8%			
		4	2020	85	85	F93.6%			
			2020	95	95	F92.9%			
		5	2020	105	105	F92.2%			
		Council-pref.	2021 a/	105	105	F92.2%			
		6	2021	155	155	F88.7%			
			2023	328	325	F77.8%			
			2035	637	623	F62.0%			
Cowcod	2039	1	2061	0	0	F100%	2061	2074	2098
		2	2065	2	2	F90.0%			
		3	2069	3	3	F83.6%			
		Council-pref.; 4	2072	4	4	F82.1%			
			2080	6	7	F69.7%			
			2089	8	8	F63.8%			
Darkblotched	2011	1	2018	0	0	F100%	2018	2033	2040
		2	2022	159	165	F75.6%			
		3	2025	229	235	F67.7%			
		Council-pref.; 4	2028	285	291	F62.1%			
		5	2030	300	306	F60.7%			
			2031	318	323	F59.2%			
			2040	385	390	F53.7%			
POP	2017	1	2010	0	0	F100%	2010	2043	2042
		2	2010	130	137	F90.3%			
		3	2011	164	173	F88.0%			
		Council-pref.; 4	2011	189	200	F86.4%			
			2012	565	589	F67.8%			
			2014	744	769	F61.4%			
			2017	971	992	F54.8%			
Widow	2015	1	2009	0	0	F100%	2009	2027	2023
		2	2009	371	362	F96.4%			
		3	2009	475	475	F95.7%			
		Council-pref.; 4 b/	2009	522	509	F95.0%			
			2009	4,338	4,051	F65.0%			
Yelloweye	2084	1	2049	0	0	F100%	2049	2096	2090
		2	2082	13	14	F71.9%			
		3	2082	Ramp-down c/		F66.3% in 2009 F71.3% in 2010 d/			
		4	2090	15	15	F69.3%			
		Council-pref.; 5	2082	Ramp-down e/		F66.3% in 2009 and 2010 f/			

Table 2-3. Estimated time to rebuild and SPR harvest rate relative to alternative 2009-10 OYs for depleted west coast groundfish species (continued).

a/ The Council's preferred canary OY alternative has a median time to rebuild of 2020, but the Council selected a revised target rebuilding year of 2021. Therefore, the probability of rebuilding the stock by 2021 under an SPR harvest rate of F92.2% is greater than 50%.

b/ The Council did not explicitly change the status quo target rebuilding year or SPR harvest rate in the widow rockfish rebuilding plan when selecting the preferred OY alternative. This decision implies a much higher probability of rebuilding the stock by the target rebuilding year of 2015 than 50%.

c/ 2009 and 2010 OYs under the status quo harvest rate ramp-down strategy are 17 mt and 14 mt, respectively.

d/ The status quo ramp-down strategy specifies SPR harvest rates of F66.3% and F 71.3% in 2009 and 2010, respectively before assuming a constant SPR harvest rate of F71.9% beginning in 2011.

e/ The 2009 and 2010 OY under the preferred yelloweye alternative harvest rate ramp-down strategy is 17 mt, while maintaining the status quo target rebuilding year of 2084.

f/ The preferred yelloweye alternative ramp-down strategy specifies an SPR harvest rate of F66.3% in 2009 and 2010 before assuming a constant SPR harvest rate of F71.9% beginning in 2011.

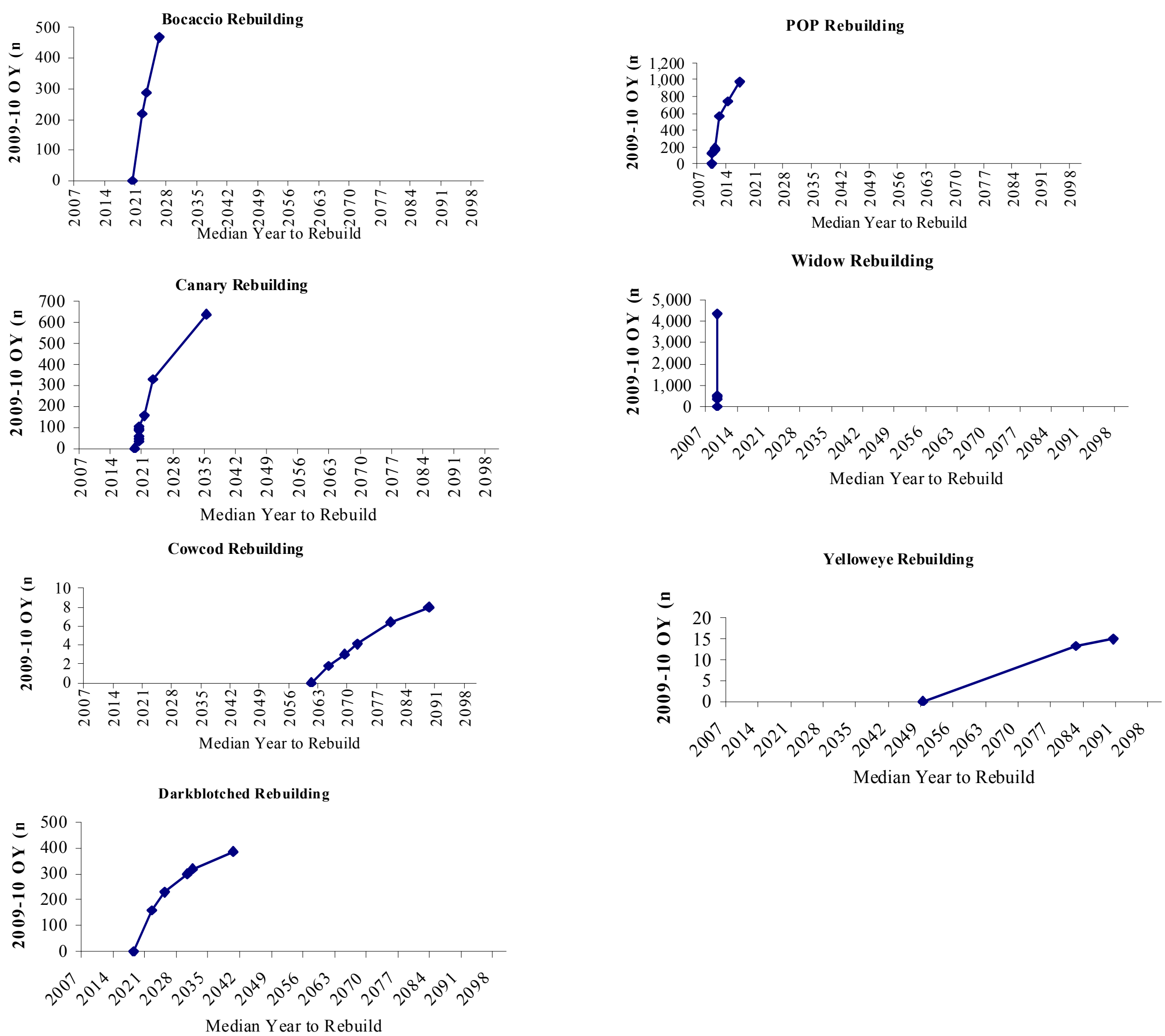


Figure 2-2. Alternative 2009-10 OYs (mt) for depleted species versus the predicted median time to rebuild the stock.

The scientific basis of each depleted species' OY alternative within the range decided by the Council for detailed analysis in April 2008 is explained in this section. Section 4.3.1 in this EIS analyzes and discusses the predicted effects of each OY alternative on the stock.

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

The SSC recommended maintaining the status quo bocaccio (*Sebastes paucispinis*) rebuilding plan adopted under Amendment 16-4 since the new assessment did not appreciably change our understanding of the stock's status from the previous assessment.

All the alternative 2009-10 OYs analyzed for bocaccio are based on the STATc base model in the 2007 assessment (MacCall 2008b), which is an update of the 2005 assessment, and the associated 2007 rebuilding analysis (MacCall 2008a). The OY alternatives specified for analysis for the bocaccio stock south of 40°10' N latitude are 0 mt in 2009 and 2010 (OY Alt, 1), 218 mt in 2009 and 227 mt in 2010 (OY Alt. 2), 288 mt in 2009 and 302 mt in 2010 (OY Alt. 3), and 288 mt in 2009 and 2010 (Final Pref. Alt.) (Tables 2-1a, 2-1b, and 2-3). This compares to the status quo OY of 218 mt in 2007 and 2008.

The zero harvest alternative (OY Alt. 1) is predicted to rebuild the stock by 2020, which is the median time to rebuild if all fishing mortality on the stock ceased beginning in 2009 ($T_{F=0}$), given our current understanding of stock productivity.

OY Alternative 2 (218 mt in 2009 and 227 mt in 2010) is based on the SPR harvest rate predicted to produce the 2007-2008 OY of 218 mt (in 2009 in this case), which is F82.6%. This harvest rate is lower than the status quo SPR harvest rate of F77.7% in the current bocaccio rebuilding plan. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 91.5%. The median time to rebuild the stock under this alternative is 2022, or two years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

OY Alternative 3 (288 mt in 2009 and 302 mt in 2010) is based on the status quo SPR harvest rate of F77.7% in the current bocaccio rebuilding plan. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 88.8%. The median time to rebuild the stock under this alternative is 2023, or three years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The Council's final preferred bocaccio OY alternative is 288 mt in 2009 and 2010. The Council elected to maintain the status quo target rebuilding year of 2026 and SPR harvest rate (F77.7%) in the current bocaccio rebuilding plan. The probability of rebuilding the bocaccio stock by the target rebuilding year is greater than 50 percent given that an SPR harvest rate of F77.7% has a median or 50 percent probability of rebuilding by 2023 and a 2010 OY of 288 mt is based on a lower SPR harvest rate than F77.7%.

2.1.1.2 *Canary Rockfish*

The SSC recommended revising the status quo canary rockfish (*Sebastes pinniger*) rebuilding plan adopted under Amendment 16-4 since the new assessment fundamentally changed our understanding of stock productivity. All the alternative 2009-10 OYs analyzed for canary rockfish are based on the base model in the new 2007 assessment (Stewart 2008b) and the associated 2007 rebuilding analysis (Stewart 2008a). The new assessment and rebuilding analysis provide a much different picture of the status and biology of the canary stock than the assessment and analysis that were used to develop the Amendment 16-4 canary rockfish rebuilding plan. This new assessment predicts that the status quo SPR harvest rate of F88.7% would rebuild the stock 42 years earlier than expected under Amendment 16-4 (2021 vs. 2063; Tables 2-2 and 2-3).

The OY alternatives specified for analysis for the coastwide canary rockfish stock are 0 mt in 2009 and 2010 (OY Alt. 1), 35 mt in 2009 and 2010 (OY Alt. 2), 44 mt in 2009 and 2010 (OY Alt. 3), 85 mt in 2009 and 2010 (OY Alt. 4), 105 mt in 2009 and 2010 (OY Alt. 5; Final Pref. Alt.), and 155 mt in 2009 and 2010 (OY Alt. 6) (Tables 2-1a, 2-1b, and 2-3). This compares to the status quo OY of 44 mt in 2007 and 2008.

The zero harvest alternative (OY Alt. 1) is predicted to rebuild the stock by 2019, which is the median time to rebuild if all fishing mortality on the stock ceased beginning in 2009 ($T_{F=0}$), given our current understanding of stock productivity.

OY Alternative 2 (35 mt in 2009 and 2010) is based on an SPR harvest rate of F97.3%. This harvest rate is lower than the status quo SPR harvest rate of F88.7% in the current canary rebuilding plan. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 75 percent. The median time to rebuild the stock under this alternative is 2020, or one year longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

OY Alternative 3 (85 mt in 2009 and 2010) is based on the SPR harvest rate predicted to produce the 2007-2008 OY, which is F96.2%. This harvest rate is lower than the status quo SPR harvest rate of F88.7% in the current canary rebuilding plan. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 75 percent. The median time to rebuild the stock under this alternative is 2020, or one year longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

OY Alternative 4 (44 mt in 2009 and 2010) is based on an SPR harvest rate of F93.6%. This harvest rate is lower than the status quo SPR harvest rate of F88.7% in the current canary rebuilding plan. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 75 percent. The median time to rebuild the stock under this alternative is 2020, or one year longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

OY Alternative 5 (105 mt in 2009 and 2010) is based on an SPR harvest rate of F92.2%. This harvest rate is lower than the status quo SPR harvest rate of F88.7% in the current canary rebuilding plan. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 75 percent. The median time to rebuild the stock under this alternative is 2020, or one year longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The Council's final preferred canary OY alternative is the same as OY Alternative 5 in terms of the actual 2009-10 OY (105 mt). However, the Council decided to specify a target rebuilding year of 2021, which is one year longer than the median rebuilding time predicted under OY Alternative 5 and two years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The target rebuilding year of 2021 under the Council's preliminary preferred revised rebuilding plan also maintains the status quo SPR harvest rate of F88.7% in the current canary rebuilding plan. If the lower harvest rate in OY Alternative 5 was maintained through the entire course of rebuilding, the probability of rebuilding by 2021 would be greater than 50 percent. The predicted probability of rebuilding the stock in the maximum allowable time under the status quo SPR harvest rate is 75 percent.

OY Alternative 6 (155 mt in 2009 and 2010) is based on the status quo SPR harvest rate of F88.7% in the current canary rebuilding plan. The predicted probability of rebuilding the stock in the maximum allowable time under the status quo SPR harvest rate is 75 percent. The median time to rebuild the stock under this alternative is 2021, or two years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

2.1.1.3 *Cowcod*

The SSC recommended revising the cowcod (*Sebastes levis*) rebuilding plan based on the new 2007 assessment (Dick et al. 2008) because of technical errors in the 2005 assessment (Piner et al. 2006) that led to a flawed understanding of the status and biology of the stock. The 2007 cowcod rebuilding analysis (Dick and Ralston 2008) indicates that rebuilding would take 26 years longer under the SPR harvest rate of F90.0% than predicted by Amendment 16-4 (2069 vs. 2039; Tables 2-2 and 2-3). The change in our understanding of cowcod status and biology is so fundamentally different that there would only be a 21.6% probability of rebuilding (P_{MAX}) by the Amendment 16-4 T_{TARGET} of 2039 even if fishing mortality on the stock ended in 2009 (Dick and Ralston, 2008). It is interesting to note that our current understanding of cowcod stock status does not vary much from that gained from the first assessment of the stock in 1999 (Butler et al. 1999), the only other assessment prior to 2005.

All the alternative 2009-10 OYs analyzed for cowcod are based on the base model in the new assessment and rebuilding analysis. Cowcod OY alternatives considered in this EIS apply to fisheries in the Conception and Monterey INPFC areas. However, the new assessment and rebuilding analysis, as well all preceding cowcod assessments and rebuilding analyses, pertain only to the portion of the stock occurring in the Conception area. The convention recommended by the GMT and adopted by the Council since the cowcod stock was first declared overfished or depleted in 2000 is to double the Conception area OY to account for fisheries in the Monterey area.

The OY alternatives specified for analysis for the cowcod stock are 0 mt in 2009 and 2010 (OY Alt. 1), 2 mt in 2009 and 2010 (OY Alt. 2), 3 mt in 2009 and 2010 (OY Alt. 3; Prelim. Pref. Alt.), and 4 mt in 2009 and 2010 (OY Alt. 4; Final Pref. Alt.) (Tables 2-1a, 2-1b, and 2-3). This compares to the status quo OY of 4 mt in 2007 and 2008.

The zero harvest alternative (OY Alt. 1) is predicted to rebuild the stock by 2061, which is the median time to rebuild if all fishing mortality on the stock ceased beginning in 2009 ($T_{F=0}$), given our current understanding of stock productivity. The predicted probability of rebuilding the stock in the maximum allowable time is 78.4 percent under the zero harvest alternative.

OY Alternative 2 (2 mt in 2009 and 2010) is based on the status quo SPR harvest rate of F90.0% in the current cowcod rebuilding plan. The predicted probability of rebuilding the stock in the maximum allowable time under the status quo SPR harvest rate is 72.4 percent. The median time to rebuild the stock under this alternative is 2065, or four years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The Council's preliminary preferred cowcod OY alternative of 3 mt in 2009 and 2010 (OY Alt. 3) is based on a higher SPR harvest rate (F83.6%) than status quo; although the OY is lower than the status quo 4 mt. The predicted probability of rebuilding the stock in the maximum allowable time under the preliminary preferred OY alternative is 72.4 percent. The median time to rebuild the stock under this alternative is 2069, or eight years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

OY Alternative 4 (4 mt in 2009 and 2010) is the Council's final preferred alternative and is based on the SPR harvest rate predicted to produce the 2007-2008 OY, which is F82.1%. This harvest rate is lower than the status quo SPR harvest rate of F90.0% in the current cowcod rebuilding plan. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 66.2 percent. The median time to rebuild the stock under this alternative is 2072, or eleven years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The Council recommends formally revising the target rebuilding year in the cowcod rebuilding plan from 2039 to 2072 and the SPR harvest rate from F90.0% to F82.1%.

2.1.1.4 *Darkblotched Rockfish*

The SSC recommended revising the status quo darkblotched rockfish (*Sebastes crameri*) rebuilding plan adopted under Amendment 16-4 since the new assessment fundamentally changed our understanding of stock productivity. In fact, the status quo target rebuilding year of 2011 in the current darkblotched rebuilding plan cannot be achieved even under a zero harvest rebuilding strategy; $T_{F=0}$ is now estimated to be 2018 (Table 2-3). All the alternative 2009-10 OYs analyzed for darkblotched rockfish are based on the base model in the new 2007 assessment (Hamel 2008c) and the associated 2007 rebuilding analysis (Hamel 2008a). The new assessment and rebuilding analysis indicate that darkblotched rebuilding would take 19 years longer than expected under Amendment 16-4 if the status quo SPR harvest rate of F60.7% was maintained (2030 vs. 2011; Tables 2-2 and 2-3).

The OY alternatives specified for analysis for the coastwide darkblotched rockfish stock are 0 mt in 2009 and 2010 (OY Alt. 1), 159 mt in 2009 and 165 mt in 2010 (OY Alt. 2), 229 mt in 2009 and 235 mt in 2010 (OY Alt. 3), 285 mt in 2009 and 291 mt in 2010 (OY Alt. 4; Final Pref. Alt.), and 300 mt in 2009 and 306 mt in 2010 (OY Alt. 5; Prelim. Pref. Alt.) (Tables 2-1a, 2-1b, and 2-3). This compares to the status quo OY of 290 mt in 2007 and 330 mt in 2008.

The zero harvest alternative (OY Alt. 1) is predicted to rebuild the stock by 2018, which is the shortest time to rebuild the stock if all fishing mortality ceased beginning in 2009 ($T_{F=0}$), given our current understanding of stock productivity.

OY Alternative 2 (159 mt in 2009 and 165 mt in 2010) is based on an SPR harvest rate of F75.6%. This harvest rate is lower than the status quo SPR harvest rate of F60.7% in the current darkblotched rebuilding plan. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 97.7 percent. The median time to rebuild the stock under this alternative is 2022, or four years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

OY Alternative 3 (229 mt in 2009 and 235 mt in 2010) is based on an SPR harvest rate of F67.7%. This harvest rate is lower than the status quo SPR harvest rate of F60.7% in the current darkblotched rebuilding plan. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 91.0 percent. The median time to rebuild the stock under this alternative is 2025, or seven years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The Council’s final preferred darkblotched OY alternative is OY Alternative 4 (285 mt in 2009 and 291 mt in 2010) and is based on a GMT recommendation made at the June 2008 Council meeting. Specifically, the GMT recommended consideration of a higher widow rockfish OY and a lower darkblotched OY than was recommended as preliminary preferred OY alternatives for both species. This tradeoff was recommended because there would be no projected difference in the time to rebuild for widow rockfish with faster rebuilding of darkblotched. As explained further in Chapter 4, this recommendation acknowledged a direct tradeoff in the whiting trawl fishery whereby a higher bycatch allowance for widow rockfish would allow the whiting fishermen to adjust their fishing strategy to further reduce their bycatch of darkblotched rockfish. The SPR harvest rate for this alternative is F62.1% and the predicted probability of rebuilding the stock in the maximum allowable time under this alternative is 80.3%. The median time to rebuild the stock is 2028, or ten years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The Council’s preliminary preferred OY alternative for darkblotched rockfish was OY Alternative 5 (300 mt in 2009 and 306 mt in 2010) and is based on the status quo SPR harvest rate of F60.7%. The predicted probability of rebuilding the stock in the maximum allowable time under the status quo harvest rate is 76.7 percent. The median time to rebuild the stock under this alternative is 2030, or twelve years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

2.1.1.5 *Pacific Ocean Perch*

The SSC recommended maintaining the status quo Pacific ocean perch (*Sebastes alutus*; POP) rebuilding plan adopted under Amendment 16-4 because the new assessment did not appreciably change our understanding of the stock's status or biology.

All the alternative 2009-10 OYs analyzed for POP are based on the base model in the updated 2007 assessment (Hamel 2008d) and the associated 2007 rebuilding analysis (Hamel 2008b). The OY alternatives specified for analysis for the coastwide POP stock are 0 mt in 2009 and 2010 (OY Alt, 1), 130 mt in 2009 and 137 mt in 2010 (OY Alt. 2), 164 mt in 2009 and 173 mt in 2010 (OY Alt. 3), and 189 mt in 2009 and 200 mt in 2010 (OY Alt. 4; Final Pref. Alt.) (Tables 2-1a, 2-1b, and 2-3). This compares to the status quo OY of 150 mt in 2007 and 2008.

The zero harvest alternative (OY Alt. 1) is predicted to rebuild the stock by 2020, which is the shortest possible time to rebuild if all fishing mortality ceased beginning in 2009 ($T_{F=0}$), given our current understanding of stock productivity.

OY Alternative 2 (130 mt in 2009 and 137 mt in 2010) is based on an SPR harvest rate of F90.3%. This harvest rate is lower than the status quo SPR harvest rate of F86.4% in the current POP rebuilding plan. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 95.6 percent. The median time to rebuild the stock under this alternative is 2010; no longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

OY Alternative 3 (164 mt in 2009 and 173 mt in 2010) is based on an SPR harvest rate of F88.0%. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 95.0 percent. The median time to rebuild the stock under this alternative is 2011, or one year longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The Council's final preferred POP OY alternative is OY Alternative 4 (189 mt in 2009 and 200 mt in 2010). The Council elected to maintain the status quo target rebuilding year of 2017 and the SPR harvest rate (F86.4%) in the current POP rebuilding plan. The probability of rebuilding the POP stock by the target rebuilding year of 2017 is much greater than 50 percent given that an SPR harvest rate of F86.4% has a predicted median year to rebuild of 2011.

2.1.1.6 *Widow Rockfish*

All 2009-10 OY alternatives for widow rockfish (*Sebastes entomelas*) are based on the 2007 assessment (He et al. 2008a), which is an update of the 2005 assessment, and the new 2007 rebuilding analysis (He et al. 2008b), which is based on the 2007 updated assessment. The SSC noted that the new assessment and rebuilding analysis indicated the stock was on track to rebuild in the next management cycle (2009) due to low catches since the stock was declared overfished and recruitment of the strong 1999 year class into the spawning population. The rebuilding outlook is well ahead of the scheduled target rebuilding year of 2015. All widow OY alternatives analyzed in this EIS are predicted to rebuild the stock by 2009.

The zero harvest alternative (OY Alt. 1) is predicted to rebuild the stock by 2009, which is the shortest possible time to rebuild if all fishing mortality ceased beginning in 2009 ($T_{F=0}$), given our current understanding of stock productivity.

OY Alternative 2 (371 mt in 2009 and 362 mt in 2010) is based on the SPR harvest rate predicted to produce the 2007-2008 OYs, which is F96.4% and lower than the status quo SPR harvest rate of F95% in the current widow rebuilding plan. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 100 percent. The median time to rebuild the stock under this alternative is 2009, the same as $T_{F=0}$ (Table 2-3 and Figure 2-2).

The Council's preliminary preferred widow OY alternative was OY Alternative 3 (475 mt in 2009 and 2010). The SPR harvest rate would be revised downward to F95.7% under this alternative. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 100 percent. The median time to rebuild the stock under this alternative is 2009, the same as $T_{F=0}$ (Table 2-3 and Figure 2-2).

The Council's final preferred widow OY alternative is OY Alternative 4 (522 mt in 2009 and 509 mt in 2010) and is based on the status quo SPR harvest rate of F95.0%. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 100 percent; however, as the SSC cautioned, a new full assessment in 2009 will be needed to verify this result. The median time to rebuild the stock under this alternative is 2009, the same as $T_{F=0}$ (Table 2-3 and Figure 2-2). The Council elected to maintain the target rebuilding year (2015) and the harvest control rule (F95.0%) in the widow rockfish rebuilding plan.

2.1.1.7 *Yelloweye Rockfish*

The 2009-10 OY alternatives for yelloweye rockfish (*Sebastes ruberrimus*) are based on the 2007 assessment (Wallace 2008a), which is an update of the 2006 assessment, and the 2007 rebuilding analysis (Wallace 2008b), which is based on the 2007 updated assessment. The 2007 updated assessment did not significantly change our understanding of stock productivity, although the median time to rebuild under the status quo harvest rate ramp-down strategy is now predicted to be 2082 instead of 2084, largely due to a higher assumed natural mortality rate. The Council added an alternative harvest rate ramp-down strategy to the analysis in April 2008. While the original 2007 yelloweye rebuilding analysis did not analyze this alternative, this analysis was completed before the June 2008 Council meeting and used to decide final 2009-10 yelloweye OYs and to revise the status quo rebuilding plan.

The zero harvest alternative (OY Alt. 1) is predicted to rebuild the stock by 2049, which is the shortest possible time to rebuild if all fishing mortality ceased beginning in 2009 ($T_{F=0}$), given our current understanding of stock productivity.

OY Alternative 2 (13 mt in 2009 and 14 mt in 2010) is based on specifying the constant SPR harvest rate of F71.9% beginning in 2009 rather than 2011, which is when the status quo yelloweye rebuilding plan assumes that constant harvest rate. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 69.5 percent. The median time to rebuild the stock under this alternative is 2082, which is 33 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The Council's preliminary preferred yelloweye OY alternative was OY Alternative 3, which is the status quo harvest rate ramp-down strategy and which specifies a 17 mt OY in 2009 and a 14 mt OY in 2010. The status quo harvest rate ramp-down strategy specifies SPR harvest rates of F66.3% and F71.3% in 2009 and 2010, respectively before assuming a constant SPR harvest rate of F71.9%

beginning in 2011. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative is 68.9 percent. The median time to rebuild the stock under this alternative is 2082, which is 33 years longer than $T_{F=0}$, but two years shorter than the target rebuilding year of 2084 in the status quo yelloweye rebuilding plan (Table 2-3 and Figure 2-2).

OY Alternative 4 (15 mt in 2009 and 2010) is based on a constant SPR harvest rate of F69.3%. The predicted probability of rebuilding the stock in the maximum allowable time under this alternative harvest rate is 50 percent, which is the lowest probability allowed by federal court precedent. The median time to rebuild the stock under this alternative is 2090, which is 41 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The Council's final preferred OY alternative is OY Alternative 5, which is the alternative harvest rate ramp-down strategy decided for analysis at the April 2008 Council meeting. This alternative specifies a 17 mt OY in 2009 and 2010 under an SPR harvest rate of F66.3%, before resuming a constant SPR harvest rate of F71.9%. The median time to rebuild the stock is 2082, which is 33 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). However, the Council does not recommend revising the target year to rebuild the stock of 2084 in the rebuilding plan, inferring a higher than 50 percent probability by 2084. Although the 2010 harvest rate under this alternative is higher than what was analyzed under Amendment 16-4, there is no appreciable difference in the time or probability to rebuild between this alternative and the status quo ramp-down strategy. As detailed further in Chapter 4, the Council opted for this alternative strategy to allow one more year to explore management measures, including potential new YRCAs, needed to minimize bycatch of yelloweye and mitigate the adverse economic impacts during the constant harvest rate period that begins in 2011.

2.1.1.8 *Rebuilding Alternatives*

Rebuilding alternatives are strategically constructed suites of depleted species' OYs designed by the GMT to show how the available yields of these species constrain fishing opportunities by sector north and south of 40°10' N latitude and on the continental shelf and slope. Arranging rebuilding alternatives this way also reveals how the various sectors are differentially constrained by the available yields of these rebuilding species. Sectors are constrained by some species more than others based on gear types and areas fished. Management measures by sector and the corresponding impacts associated with each of these rebuilding alternatives are indicative of potential impacts to west coast fishing communities, which are a useful measure of socioeconomic consequences of alternative rebuilding plans. The GMT originally presented their analysis of rebuilding alternatives at the April 2008 Council meeting, which aided the Council in deciding the preliminary preferred OYs for depleted groundfish species.

The original rebuilding alternatives analyzed by the GMT in April 2008 were designed using the original range of depleted species' OYs decided by the Council in November 2007 and those OY alternatives proposed early in the April 2008 Council meeting for initial analysis. The final rebuilding alternatives depicted in Table 2-4 use the final range of depleted species' OYs ultimately decided for analysis by the Council in April 2008, including the preliminary preferred 2009-10 OYs, but not the zero harvest alternatives.

Analysis of rebuilding alternatives and other analyses provided by the GMT at the June Council meeting helped the Council decide the final preferred OYs for depleted species depicted in Tables 2-1a and 2-1b. Final preferred OYs recommended by the Council for cowcod, darkblotched, widow, and yelloweye varied from the preliminary preferred OYs decided in April. Final preferred rebuilding plans for all depleted species are provided in Table 2-5.

Table 2-4. Rebuilding alternatives strategically structured to vary the available 2009-10 OYs (mt) of depleted species north and south of 40°10' N latitude and on the continental shelf and slope. The Council's preliminary-preferred 2009-10 OY alternatives are also shown.

Area	Species	Shelf to Slope Impacts (OYs in mt)						Council Prelim.-Pref. Alt. (2009)	Council Prelim.-Pref. Alt. (2010)
		Higher-Lower	Lower-Higher	Lower-Lower	Higher-Higher	Mixed			
		Reb. Alt. 1	Reb. Alt. 2	Reb. Alt. 3	Reb. Alt. 4	Reb. Alt. 5a	Reb. Alt. 5b		
Northern Shelf	Canary	155	44	44	155	85	105	105	105
	Yelloweye	17	14	13	17	17	17	17	14
Southern Shelf	Bocaccio	288	218	218	288	218	218	288	288
	Cowcod	4	2	2	4	2	2	3	3
Slope	POP	130	189	130	189	164	164	189	200
	Darkblotched	159	300	159	300	300	300	300	306
Pelagic	Widow	522	371	371	522	371	522	475	475

Rebuilding Alternative 1 is designed to allow more fishing opportunities on the continental shelf north and south of 40°10' N latitude by specifying relatively higher OYs for bocaccio, canary rockfish, cowcod, widow rockfish and yelloweye rockfish, while allowing fewer fishing opportunities on the slope by specifying relatively lower OYs for darkblotched rockfish and POP.

Rebuilding Alternative 2 is conversely designed to allow fewer fishing opportunities on the shelf north and south of 40°10' N latitude by specifying relatively lower OYs for the shelf species (bocaccio, canary, cowcod, widow, and yelloweye), and higher fishing opportunities on the slope by specifying relatively higher OYs for the slope species (darkblotched and POP).

Rebuilding Alternative 3 is the most restrictive coastwide since it is constructed with relatively low OYs for all the depleted species.

Rebuilding Alternative 4 is the most liberal coastwide since it is constructed with relatively high OYs for all the depleted species.

Rebuilding Alternatives 5a and 5b allow mixed fishing opportunities by sector north and south of 40°10' N latitude and in shallow and deeper waters and are designed to show further trade-offs between rebuilding OYs that may not be captured by rebuilding alternatives 1 through 4.

Table 2-5. Rebuilding plan specifications for seven depleted groundfish species adopted in June 2008 under the Council's final preferred alternative.

Species	B_0	B_{MSY}	T_{MIN} a/	T_{MAX}	$T_{F=0}$ a/	P_{MAX}	T_{TARGET}	Harvest Control Rule (SPR Harvest Rate)
Bocaccio	13,572 B eggs in 2007	4,549 B eggs	2019	2033	2020	77.7%	2026	F77.7%
Canary	32,561 mt in 2007	13,024 mt	2019	2035	2019	75.0%	2021	F88.7%
Cowcod	2,488 mt in 2007	995 mt	2060	2098	2061	66.2%	2072	F82.1%
Darkblotched	30,640 units of spawning output in 2007 b/	12,256 units of spawning output b/	2015	2040	2018	80.3%	2028	F62.1%
POP	36,983 mt in 2007	14,793 mt	2009	2037	2010	94.4%	2017	F86.4%
Widow	50746 M eggs in 2007	20,298 M eggs	2013	2033	2009	100%	2015	F95.0%
Yelloweye	3,062 mt in 2007	1,225 mt	2046	2090	2049	68.6%	2084	F71.9% c/

a/ T_{MIN} is the shortest time to rebuild from the onset of the rebuilding plan or from the first year of a rebuilding plan, which is usually the year after the stock was declared overfished. The shortest possible time to rebuild the stocks with rebuilding plans under consideration in June 2008 was $T_{F=0}$, which was the median time to rebuild the stock if all fishing-related mortality were eliminated beginning in 2009.

b/ Darkblotched spawning output is defined in units of 100 million eggs.

c/ The yelloweye rebuilding plan specifies a harvest rate ramp-down strategy before assuming a constant harvest rate in 2011. F71.9% is the constant harvest rate beginning in 2011.

2.1.2 Alternative Harvest Levels Analyzed for Precautionary Zone Groundfish Species

Groundfish species in the precautionary zone are those with spawning biomasses that are below the Council's target MSY biomass of 40 percent of estimated initial biomass (or $B_{40\%}$), but above the depletion threshold of $B_{25\%}$. Spawning biomasses for such stocks have not declined below the depletion threshold since the biomass-based management framework was implemented in the Groundfish FMP under Amendment 11 in 1998. Depleted stocks managed under rebuilding plans that have a currently estimated spawning biomass above $B_{25\%}$, but have not attained the target $B_{40\%}$ biomass are still considered depleted stocks, not precautionary zone stocks.

The Groundfish FMP has a default OY rule that calls for a precautionary reduction of the OY from the ABC when a stock's spawning biomass drops below $B_{40\%}$ (Figure 2-3). This rule, called the "default 40-10 adjustment", mandates a decrease of the harvest rate below that estimated to produce an equilibrium biomass at MSY (denoted F_{MSY}) when setting an OY for a stock with a spawning biomass below $B_{40\%}$. The harvest rate reduction increases linearly the farther below $B_{40\%}$ the stock's spawning biomass is estimated to be until, at $B_{10\%}$, the OY is set to zero. The 40-10 adjustment is designed to increase the stock's spawning biomass to the target $B_{40\%}$ level. While this default OY rule can be used as an interim rebuilding strategy until a formal rebuilding plan is developed for a stock declared overfished or depleted, it is more commonly the default OY rule used to set harvest specifications for precautionary zone species.

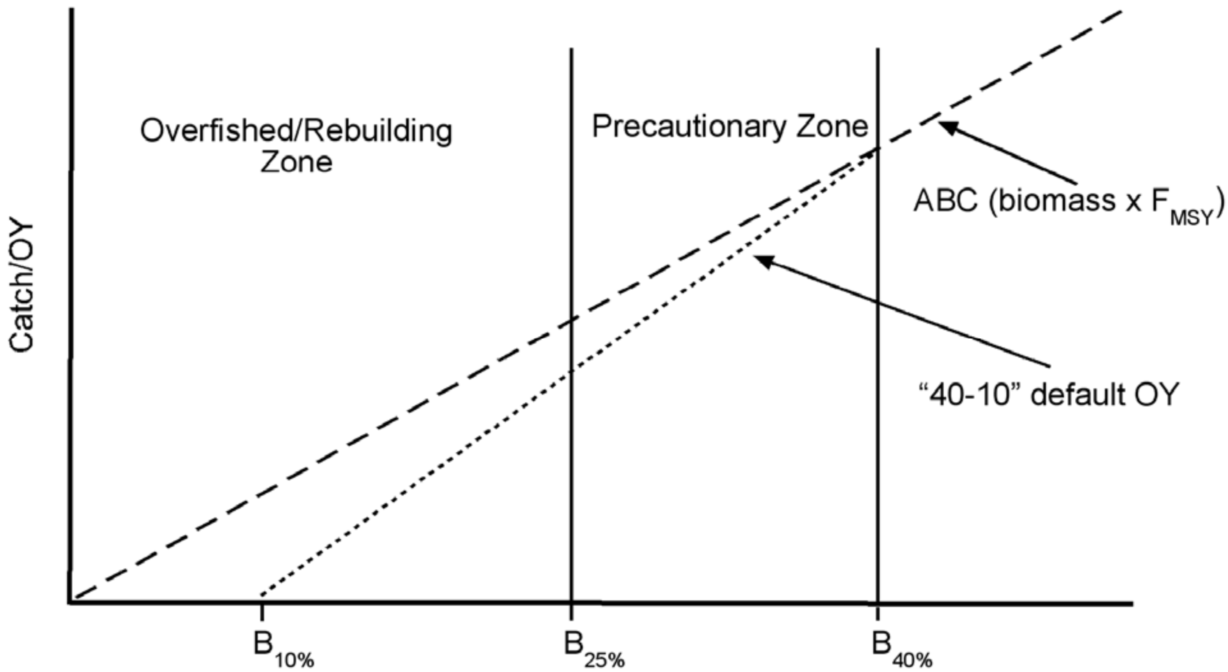


Figure 2-3. Illustration of the default OY rule compared to the ABC.

2.1.2.1 *Blue Rockfish (in Waters off California)*

The first blue rockfish (*Sebastes mystinus*) assessment on the west coast was conducted in 2007 for the portion of the stock occurring in waters off California north of Pt. Conception (Key et al. 2008). The base model in the assessment estimated spawning stock biomass at 29.7 percent of initial, unfished biomass in 2007; therefore, the stock is considered in the precautionary zone. There are two 2009-10 OY alternatives that contemplate managing blue rockfish off California with species-specific harvest specifications (OY alternatives 3 and 4) and two OY alternatives that contemplate continuing to manage blue rockfish in the minor nearshore rockfish complexes north and south of 40°10' N latitude (OY alternatives 1 and 2; see section 2.1.4 for a description of these two OY alternatives). All four OY alternatives are based on results from the new assessment.

OY Alternative 3 (207 mt in 2009 and 2010) would apply to the portion of the stock occurring off California and is based on the 40-10 adjusted harvestable yield from the assessment base model using an F50% harvest rate for the assessed portion of the California stock north of Pt. Conception at 34°27' N latitude plus 9 mt for the contribution to the OY south of Pt. Conception. The south of Pt. Conception portion of the OY (9 mt) is a 50 percent adjustment of the original ABC contribution of blue rockfish to the southern minor nearshore rockfish complex (18 mt), which represents the average 1994-99 harvest of blue rockfish in those waters.

OY Alternative 4 (230 mt in 2009 and 2010) would apply to the portion of the stock occurring off California and is based on setting the north of Pt. Conception OY equal to the ABC using the high productivity model (high natural mortality) from the new assessment as constrained by the base model ABC plus 9 mt for the contribution to the OY south of Pt. Conception. The south of Pt. Conception portion of the OY (9 mt) is a 50 percent adjustment of the original ABC contribution of blue rockfish to the southern minor nearshore rockfish complex (18 mt), which represents the average 1994-99 harvest of blue rockfish in those waters.

2.1.2.2 *Cabezon (in Waters off California)*

All cabezon (*Scorpaenichthys marmoratus*) OY alternatives are based on the most recent cabezon assessment, which was done for the portion of the stock occurring in waters off California in 2005 (Cope and Punt 2006). The assessment stratified analyses for two substocks, north and south of Pt. Conception at 34°27' N latitude, with an estimated spawning output for the northern California substock of $B_{40.1\%}$ and $B_{28.3\%}$ for the southern California substock. Since the two substocks collectively have an estimated spawning output less than $B_{40\%}$, cabezon in waters off California are considered a precautionary zone stock.

OY Alternative 1 (69 mt in 2009 and 2010) is the status quo OY and is based on the average of the 2007 and 2008 OYs projected in the 2005 assessment using an F50% harvest rate with a 60-20 adjustment. The 60-20 adjustment is analogous to the Council's default 40-10 rule, where, in this case, the OY equals the ABC at spawning biomasses ≥60 percent of initial biomass and sequentially reduced from the ABC until, at 20 percent of initial biomass, the OY is set to zero.

OY Alternative 2 (74 mt in 2009 and 2010) is based on the average of the 2009 and 2010 OYs projected in the 2005 assessment using an F50% harvest rate with the 60-20 adjustment.

The preferred OY Alternative is OY Alternative 3 (69 mt in 2009 and 79 mt in 2010), which are the year-specific 2009 and 2010 OYs projected in the 2005 assessment using an F50% harvest rate with the 60-20 adjustment.

2.1.2.3 *Petrale Sole*

The most recent petrale sole (*Eopsetta jordani*) assessment was done in 2005 (Lai et al. 2006). The portion of the stock in the northern assessment area (Columbia and U.S.-Vancouver INPFC areas) had an estimated spawning stock biomass of $B_{34\%}$ in 2005 and the portion of the stock in the southern assessment area (Conception, Monterey, and Eureka INPFC areas) had an estimated spawning stock biomass of $B_{29\%}$ in 2005. Since the stock's spawning biomass is less than $B_{40\%}$, this is considered a precautionary zone stock.

Only one alternative OY alternative was considered for petrale sole for 2009-10. The OY was projected from the 2005 assessment using the same methodology as used for the final preferred OY alternative in 2007-08. The 2009-10 OY (2,433 mt in 2009 and 2,393 mt in 2010) is based on the sum of the 40-10 adjusted northern OY and 75 percent of the 40-10 adjusted southern OY. The southern OY has a 75 percent precautionary adjustment due to greater assessment uncertainty.

2.1.2.4 *Sablefish*

All 2009-10 sablefish (*Anoplopoma fimbria*) OY alternatives are based on a new assessment of the coastwide stock conducted in 2007 (Schirripa 2008). While the new assessment indicates stock status has improved since the last assessment in 2005, stock depletion was estimated to be at 38.3 percent of initial, unfished biomass and still in the precautionary zone. As has been standard practice, all alternatives apportion the coastwide OY north and south of 36° N latitude since all commercial allocations are currently based on the proportion of the harvestable surplus of sablefish north of 36° N latitude.

OY Alternative 1 (9,795 mt coastwide, 9,452 mt north of 36° N latitude, and 343 mt south of 36° N latitude in 2009; and 8,988 mt coastwide, 8,673 mt north of 36° N latitude, and 315 mt south of 36° N latitude in 2010) is based on the 40-10 adjusted yield projected from the base model in the new assessment. The coastwide OY was apportioned north and south of 36° N latitude using the status quo method of applying the average proportion of 2000-01 landings of sablefish north of 36° N latitude (96.5 percent) and south of 36° N latitude (3.5 percent).

The final preferred sablefish OY is OY Alternative 2 (8,423 mt coastwide, 7,052 mt north of 36° N latitude, and 1,371 mt south of 36° N latitude in 2009; and 7,729 mt coastwide, 6,471 mt north of 36° N latitude, and 1,258 mt south of 36° N latitude in 2010). OY Alternative 2 is developed starting with the 40-10 adjusted coastwide yield projected from the base model of the new assessment. The coastwide yield is then apportioned north and south of 36° N latitude using the average 2003-06 proportions of the swept-area biomass estimates of sablefish from the NWFSC shelf-slope trawl survey. The average proportions of sablefish biomass distribution are 72 percent north of 36° N latitude and 28 percent in the Conception area south of 36° N latitude. The Conception area OY is then adjusted by 50 percent to account for greater assessment and survey uncertainty south of 36° N latitude. The northern and southern OYs are then summed to derive the coastwide OY.

OY Alternative 3 (6,250 mt coastwide, 5,233 mt north of 36° N latitude, and 1,018 mt south of 36° N latitude in 2009; and 5,777 mt coastwide, 4,837 mt north of 36° N latitude, and 941 mt south of 36° N latitude in 2010) is based on the more conservative low abundance model in the new sablefish assessment with a 40-10 adjustment and the same area apportionment methodology used to derive OY Alternative 2 specifications.

2.1.3 Alternative Harvest Levels Analyzed for Healthy Groundfish Species

Healthy groundfish species are those with estimated spawning biomasses at or greater than the B_{MSY} proxy of 40 percent of initial, unfished biomass. Current National Standard 1 guidelines allow OYs to be set equal to ABCs for healthy stocks, although these guidelines may change in the near future. National Standard 1 guidelines are anticipated to change in response to the re-authorized Magnuson-Stevens Act mandate to end overfishing, which may prescribe a precautionary reduction of the OY from the ABC for healthy stocks to minimize the risk of overfishing. However, a proposed rule for new National Standard 1 guidelines has yet to be published. Given that regional management councils will have a year to amend FMPs after the final rule for new National Standard 1 guidelines is published, it is expected that these new guidelines will be used in setting 2011 and 2012 groundfish harvest specifications.

2.1.3.1 *Arrowtooth Flounder*

All arrowtooth flounder OY alternatives are based on a new arrowtooth flounder assessment conducted in 2007 (Kaplan and Helser 2008). The new assessment concluded the west coast arrowtooth flounder stock was healthy with a spawning biomass estimated at 79 percent of its initial, unfished biomass in 2007.

OY Alternative 1 (5,245 mt in 2009 and in 2010) for arrowtooth flounder is based on the estimated equilibrium MSY under the proxy SPR harvest rate of F40%.

The preferred OY Alternative is OY Alternative 2 (11,267 in 2009 and 10,112 mt in 2010), which is based on the estimated ABC for the stock. An OY equal to the ABC is allowed under the FMP for healthy stocks, such as arrowtooth flounder when the spawning biomass is equal to or greater than 40 percent of its initial, unfished level. The new assessment estimated that the spawning biomass of arrowtooth flounder at the beginning of 2007 was 79 percent of its initial, unfished level.

These alternative OYs can be compared to the status quo 2007-08 ABC/OY of 5,800 mt.

2.1.3.2 *Black Rockfish (in Waters off Oregon and California)*

All 2009-10 black rockfish (*Sebastes melanops*) harvest specifications are derived using new 2007 assessments. Assessments for the southern portion of the west coast black rockfish stock south of Cape Falcon, Oregon (Sampson 2008) and the northern portion of the west coast black rockfish stock north of Cape Falcon, Oregon (Wallace et al. 2008) were used to derive southern harvest specifications for fisheries off Oregon and California and northern harvest specifications for fisheries off Washington. Both assessments indicate a healthy west coast black rockfish resource with the portion of the stock south of Cape Falcon estimated to be at 70 percent of its initial, unfished biomass and the portion of the stock north of Cape Falcon estimated to be at 53.4 percent of its initial, unfished biomass. This section describes the OY alternatives for the portion of the stock occurring in waters off Oregon and California.

OY Alternative 1 (920 mt in 2009 and 831 mt in 2010) is based on results under the low productivity model in the southern assessment for the portion of the stock south of Cape Falcon. An additional yield for the portion of the stock occurring in Oregon waters north of Cape Falcon is added to the OY using 3 percent of the northern black rockfish OY from the base model of the northern assessment. The 3 percent apportionment is based on the estimated proportion of catch from waters off Oregon north of Cape Falcon relative to the entire area between Cape Falcon and the U.S.-Canada border.

The preferred OY alternative is OY Alternative 2 (1,000 mt in 2009 and 2010). Alternative projections using constant catch scenarios of 800 mt; 1,000 mt; and 1,200 mt were requested by the GMT to better inform a low OY alternative. Of these, the GMT recommended analysis of the 1,000 mt constant catch scenario since projected stock depletion under that scenario was intermediate to the low and base case OY alternatives in the assessment's decision table.

OY Alternative 3 (1,469 mt in 2009 and 1,317 mt in 2010) is based on the medium productivity base case model in the southern assessment with the same apportionment methodology to account for the portion of the stock in Oregon waters north of Cape Falcon as described under OY Alternative 1.

2.1.3.3 *Black Rockfish (in Waters off Washington)*

All 2009-10 black rockfish (*Sebastes melanops*) harvest specifications are derived using new 2007 assessments. Assessments for the southern portion of the west coast black rockfish stock south of Cape Falcon, Oregon (Sampson 2008) and the northern portion of the west coast black rockfish stock north of Cape Falcon, Oregon (Wallace, Cheng, and Tsou 2008) were used to derive southern harvest specifications for fisheries off Oregon and California and northern harvest specifications for fisheries off Washington. Both assessments indicate a healthy west coast black rockfish resource with the portion of the stock south of Cape Falcon estimated to be at 70 percent of its initial, unfished biomass and the portion of the stock north of Cape Falcon, Oregon estimated to be at 53.4 percent of its initial, unfished biomass. This section describes the OY alternatives for the portion of the stock occurring in waters off Washington.

Only one OY alternative is considered for the black rockfish stock occurring in waters off Washington; therefore, OY Alternative 1 (490 mt in 2009 and 464 mt in 2010) is the Council's preferred OY alternative. This OY is based on the base model from the northern assessment, which assumes medium productivity (natural mortality (M) for males = 0.16 and M for females = 0.24). The OY is reduced by 3 percent to account for the portion of the assessed northern stock occurring in waters of Oregon north of Cape Falcon. This alternative OY can be compared to status quo ABC/OY of 540 mt.

2.1.3.4 *California Scorpionfish*

All 2009-10 California scorpionfish (*Scorpaena guttata*) harvest specifications are based on the only assessment done for this stock in 2005 (Maunder et al. 2006). This assessment indicated the California scorpionfish stock was healthy with an estimated spawning stock biomass of 79.8 percent of its initial, unfished biomass in 2005.

The California scorpionfish assessment used a recreational catch data stream based upon Commercial Passenger Fishing Vessel (CPFV) logbook data expanded to total recreational catch using a proportion of CPFV to total recreational catch (based upon MRFSS catch history). The SSC approved this assessment with the caveat that the ABC/OY from this assessment could only be related to recreational catch calculated in the same manner as this catch stream. CPFV logbook data, while valuable for stock assessment analyses, are not collected in as timely a manner as needed for inseason monitoring. Consequently, a method was derived with the assistance of the primary stock assessment author to modify the ABC/OY from the assessment so that it could be tracked using CRFS catch estimates. This method takes the recreational portion of the stock assessment ABC/OY, multiplies it by the CPFV proportion calculated from the MRFSS data (53 percent), and then divides it using the proportion of CPFV catch observed in the 2004 CRFS data (88 percent). The stock was pulled from the southern minor nearshore rockfish complex and managed with its own ABC/OY beginning in 2007. Two 2009-10 OY alternatives using projections from the 2005 assessment for California scorpionfish were considered for analysis.

OY Alternative 1 (111 mt in 2009 and 99 mt in 2010) is based on projecting the results of the 2005 assessment modified to incorporate CRFS monitoring data for the CPFV component as described above.

The preferred OY alternative for California scorpionfish is OY Alternative 2 (175 mt in 2009 and 155 mt in 2010). This OY alternative is the status quo OY and is based on a yield between 137 mt (2007-08 OY as modified by the CPFV modification described above) and 219 mt (2007-08 OY from the base model without the CPFV modification). The 2009 OY under this alternative also equals the projected ABC from the base model in the 2005 assessment. The 2010 OY is limited to the projected 2010 ABC from the base model in the 2005 assessment.

2.1.3.5 *Chilipepper Rockfish*

All 2009-10 chilipepper rockfish (*Sebastes goodei*) OY alternatives are derived from a new assessment conducted in 2007 (Field 2008). The 2007 assessment indicated the stock was healthy with a spawning stock biomass estimated to be at 70 percent of its initial, unfished biomass in 2006.

OY Alternative 1 (2,000 mt in 2009 and 2010) is the status quo 2007-08 OY and was specifically set lower than the estimated ABC, even though the stock was considered healthy, as a precautionary mechanism to be reduce the bycatch of co-occurring bocaccio.

OY Alternative 2 (2,099 mt in 2009 and 2010) is based on the estimated long term equilibrium MSY at an F50% SPR harvest rate from the 2007 assessment.

OY Alternative 3 (3,037 mt in 2009 and 2,576 mt in 2010) is based on the ABC/OY projections from the base model in the 2007 assessment.

The final preferred OY Alternative (2,885 mt in 2009 and 2,447 mt in 2010) is based on the ABC/OY projections from the base model in the 2007 assessment with a 5 percent reduction to buffer the ABC and thereby reduce potential risk of overfishing.

2.1.3.6 *Dover Sole*

All 2009-10 Dover sole (*Microstomus pacificus*) harvest specifications are derived using projections from the most recent assessment conducted in 2005 (Sampson 2006). The 2005 assessment results indicated the coastwide Dover sole stock was healthy with an estimated spawning stock biomass at 63 percent of its initial, unfished biomass in 2005.

Only one OY alternative is considered for Dover sole; therefore, OY Alternative 1 (16,500 mt in 2009 and 2010) is the Council's preferred OY alternative. This OY is the status quo OY and is based on the estimated long term equilibrium MSY at an SPR harvest rate of F40% from the 2005 assessment.

2.1.3.7 *English Sole*

All 2009-10 English sole (*Parophrys vetulus*) harvest specifications are based on a new assessment in 2007 (Stewart 2008c), which was an update of the last full assessment in 2005 (Stewart 2006). The updated assessment results indicated the stock is healthy with an estimated spawning stock biomass estimated to be at 116 percent of its initial, unfished biomass in 2007.

Only one OY alternative is considered for English sole; therefore, OY Alternative 1 (14,326 mt in 2009 and 9,745 mt in 2010) is the Council's preferred OY alternative. This OY is based on the ABC/OY projected from the base model in the 2007 updated assessment.

2.1.3.8 *Lingcod*

All 2009-10 lingcod (*Ophiodon elongatus*) OY alternatives are derived from projections in the most recent assessment done in 2005 (Jagielo and Wallace 2006). The 2005 assessment results indicated the stock was healthy with an estimated coastwide spawning stock biomass estimated to be at 60 percent of its initial, unfished biomass in 2005.

OY Alternative 1 (5,205 mt in 2009 and 4,785 mt in 2010) is based on sum of the projected ABC/OY from the 2005 assessment for the northern substock (north of 43° N latitude; Columbia and U.S.-Vancouver INPFC areas) and the status quo OY for the southern substock (south of 43° N latitude; Conception, Monterey, and Eureka INPFC areas). The coastwide OY is apportioned north and south of the Oregon-California border at 42° N latitude (4,593 mt in 2009 and 4,173 mt in 2010 for north of 42° N latitude; and 612 mt in 2009 and 2010 for south of 42° N latitude) to derive recreational harvest guidelines in California where relatively lower spawning stock abundance is still a concern (estimated spawning biomass for the southern substock was 24 percent of its initial, unfished biomass in 2005). The apportionment was done using status quo methodology as follows: the percentage of the 2005-06 OY estimated for the area between 42° and 43° N latitude was derived using the proportional lingcod landings in this area relative to landings further south (107 mt/719 mt) and applied this proportion to the estimated OY south of 43° N latitude to determine an estimated OY for the area between 42° and 43° N latitude. This was added to the projected OY for north of 43° N latitude to determine an appropriate OY for north of 42° N latitude.

The final preferred OY is OY Alternative 2 (5,278 mt in 2009 and 4,829 mt in 2010). This OY alternative is based on the sum of the projected ABC/OY for the northern substock and the projected 40-10 adjusted OY for the southern substock. The 2009-10 coastwide OYs were apportioned north and south of the Oregon-California border using the same methodology described under OY Alternative 1 to derive northern and southern OY components (4,593 mt in 2009 and 4,173 mt in 2010 for north of 42° N latitude; and 685 mt in 2009 and 656 mt in 2010 for south of 42° N latitude).

2.1.3.9 *Longnose Skate*

All 2009-10 longnose skate (*Raja rhina*) OY alternatives are based on a new assessment conducted in 2007 (Gertseva and Schirripa 2008). The 2007 assessment, which is the first one done for this species on the west coast, indicated the stock is healthy with an estimated spawning stock biomass of 66 percent of its initial, unfished biomass in 2007. The Council decided in June 2008 to use the 2007 assessment results to establish separate species-specific specifications for longnose skate and adjust the Other Fish specifications accordingly.

OY Alternative 1 (901 mt in 2009 and 902 mt in 2010) is based on the projected OYs from the 2007 assessment using the current estimated exploitation rate.

The final preferred OY alternative for longnose skate is OY Alternative 2 (1,349 mt in 2009 and 2010). This OY alternative is based on a 50 percent increase in the average landings and discard mortality relative to the base model in the 2007 assessment. The Council elected to remove longnose skate from the Other Fish complex and manage the stock with ABCs of 3,428 mt and 3,269 mt in 2009 and 2010, respectively and OYs of 1,349 mt in both years.

OY Alternative 3 (3,428 mt in 2009 and 3,269 mt in 2010) is based on the ABC/OY projected from the 2007 assessment using the base model and the proxy SPR harvest rate of F45%.

2.1.3.10 *Longspine Thornyhead*

All 2009-10 longspine thornyhead (*Sebastolobus altivelis*) harvest specifications were derived from the most recent assessment done in 2005 (Fay 2006). The results of the 2005 coastwide assessment indicated the longspine thornyhead stock was healthy with an estimated spawning stock biomass at 71 percent of its initial, unfished biomass in 2005. The Council has managed longspine thornyhead with separate OYs north and south of Pt. Conception at 34°27' N latitude since 2007. The status quo 2007-08 specifications for longspine were an OY of 2,220 mt for north of Pt. Conception and an OY of 476 mt for south of Pt. Conception.

Only one OY alternative is considered for longspine thornyhead; therefore, OY Alternative 1 (north of Pt. Conception: 2,231 mt in 2009 and 2,175 mt in 2010; south of Pt. Conception: 395 mt in 2009 and 385 mt in 2010) is the Council's preferred OY alternative. This OY alternative is based on projected harvestable yields from the 2005 assessment using status quo methodology for apportioning the coastwide harvestable surplus north and south of Pt. Conception to specify area-specific OYs. The apportionment methodology assumed constant density throughout the Conception area and estimated 79 percent of the assessed coastwide biomass occurs north of Pt. Conception. The northern OY was then reduced by 25 percent to account for relatively high assessment uncertainty. The southern OY was reduced by 50 percent to account for relatively high assessment uncertainty and a paucity of survey data for the Conception area.

2.1.3.11 *Pacific Whiting*

Pacific whiting (*Merluccius productus*) are managed based on an annual assessment prepared jointly by U.S. and Canadian scientists. The most recent assessment, conducted in 2008 (Helser et al. 2008), estimated the stock's spawning biomass at 42.9 percent of its unfished spawning biomass at the beginning of 2008 and therefore healthy. Pacific whiting harvest specifications are based on these annual assessments and are only analyzed in this EIS to understand the potential bycatch implications of future whiting fisheries. The 2009 ABC and OY will presumably be considered and adopted by a new international Pacific whiting commission in accordance with the recently ratified Pacific Whiting treaty between the U.S. and Canada. The Council is still anticipated to set annual management measures for Pacific whiting fisheries. The analysis and discussion of the bycatch implications of future whiting fisheries in this EIS will serve to better understand effective management strategies to consider for future whiting fisheries (see section 2.2.3.2 for a description of whiting fishery management measure alternatives). These analyses will also aid the Council in deciding the yields of the most constraining species in whiting-directed fisheries to set-aside when deciding 2009-10 management measures for non-whiting fisheries, which collectively with 2009-10 whiting fisheries, must stay under the OY for these constraining species.

As placeholders, the Council specified a range of U.S. OY alternatives for analysis as follows: OY Alternative 1 (134,773 mt) is an OY half that specified in 2008, OY Alternative 2 (269,545 mt) is the status quo 2008 OY, and OY Alternative 3 (404,318 mt) is 150 percent of the status quo OY.

2.1.3.12 *Shortbelly Rockfish*

A new shortbelly rockfish (*Sebastes jordani*) stock assessment was done as an academic exercise in 2007 to understand the potential environmental determinants of fluctuations in the recruitment and abundance of an unexploited rockfish population in the California Current ecosystem (Field et al. 2008). While the 2007 assessment did not go through the Council's STAR process, it was peer reviewed in a similar process and reviewed by the SSC in 2007 at the request of the SWFSC. The SSC noted the assessment did not fully satisfy the Council terms of reference for groundfish stock assessments. However, they concluded the assessment represents improved knowledge about shortbelly rockfish and might be suitable for management purposes in place of inferences from the hydroacoustic surveys conducted during 1977 and 1980, which formed the basis of the status quo ABC/OY of 13,900 mt. Based on this advice, the Council decided to use the assessment to consider alternative 2009-10 harvest specifications for shortbelly rockfish. The 2007 assessment results indicated the shortbelly stock was healthy with an estimated spawning stock biomass at 67 percent of its initial, unfished biomass in 2005.

OY Alternative 1 (3,475 mt in 2009 and 2010) is 25 percent of the status quo ABC/OY. The assessment author advised the Council that the stock would be expected to increase in abundance under this harvest rate.

The final preferred OY alternative is OY Alternative 2 (6,950 mt in 2009 and 2010), which is 50 percent of the status quo ABC/OY. The assessment author advised the Council that the stock would be expected to remain in its current equilibrium under this harvest rate.

2.1.3.13 *Shortspine Thornyhead*

All 2009-10 shortspine thornyhead (*Sebastolobus alascanus*) harvest specifications were derived from the most recent assessment done in 2005 (Hamel 2006). The results of the 2005 coastwide assessment indicated the shortspine thornyhead stock was healthy with an estimated spawning stock biomass at 62.9 percent of its initial, unfished biomass in 2005. The Council has managed shortspine thornyhead with separate OYs north and south of Pt. Conception at 34°27' N latitude since 2007. The status quo 2007-08 specifications for shortspine were an OY of 1,634 mt for north of Pt. Conception and an OY of 421 mt for south of Pt. Conception.

Only one OY alternative is considered for shortspine thornyhead; therefore, OY Alternative 1 (north of Pt. Conception: 1,608 mt in 2009 and 1,591 mt in 2010; south of Pt. Conception: 414 mt in 2009 and 410 mt in 2010) is the Council's preferred OY alternative. This OY alternative is based on projected harvestable yields from the 2005 assessment using status quo methodology for apportioning the coastwide harvestable surplus north and south of Pt. Conception to specify area-specific OYs. The apportionment methodology assumed constant density throughout the Conception area and estimated 66 percent of the assessed coastwide biomass occurs north of Pt. Conception. The southern OY was reduced by 50 percent to account for relatively high assessment uncertainty due to a paucity of survey data for the Conception area.

2.1.3.14 *Splitnose Rockfish*

A 1994 splitnose rockfish (*Sebastes diploproa*) assessment (Rogers 1994) forms the basis for status quo and proposed 2009-10 harvest specifications for this stock. As in 2007-08, the ABC of 615 mt is reduced to an OY of 461 mt based on the Council's policy of making a 25 percent precautionary OY adjustment for species with less rigorous stock assessments. These harvest specifications are for south of 40°10' N latitude since splitnose rockfish are managed as part of the northern Minor Slope Rockfish complex north of 40°10' N latitude.

The Council chose the status quo harvest specifications of 615 mt and 461 mt as the preferred 2009-10 ABC and OY, respectively for splitnose rockfish south of 40°10' N latitude.

2.1.3.15 *Starry Flounder*

All 2009-10 starry flounder (*Platichthys stellatus*) harvest specifications were derived from the most recent assessment done in 2005 (Ralston 2006). The results of the 2005 coastwide assessment indicated the starry flounder stock was healthy with an estimated spawning stock biomass at 44 percent and 62 percent of its initial, unfished biomass in Washington-Oregon and California, respectively in 2005. The Council started managing starry flounder with its own ABC/OY separate from the Other Flatfish complex since 2007. The status quo 2007-08 OY for starry flounder was 890 mt.

Only one OY alternative is considered for starry flounder; therefore, OY Alternative 1 (1,004 mt in 2009 and 1,077 mt in 2010) is the Council's preferred OY alternative. These OYs were projected from the base model in the 2005 assessment with a 25 percent precautionary reduction since this was considered a data-poor assessment.

2.1.3.16 *Yellowtail Rockfish*

All 2009-10 yellowtail rockfish (*Sebastes flavidus*) harvest specifications were derived from the most recent updated assessment done in 2005 (Wallace and Lai 2006). The last full assessment of the northern stock areas was conducted in 2000 (Tagart et al. 2000), and it was then updated in 2003 (Lai et al. 2003). The results of the 2005 updated assessment indicated the yellowtail rockfish stock was healthy with an estimated spawning stock biomass at 55 percent of its initial, unfished biomass in 2005. The status quo 2007-08 ABC/OY for yellowtail rockfish was 4,548 mt.

Only one OY alternative is considered for yellowtail rockfish; therefore, OY Alternative 1 (4,562 mt in 2009 and 2010) is the Council's preferred OY alternative. This is the projected ABC/OY from the base model in the 2005 updated assessment.

2.1.4 Alternative Harvest Levels Analyzed for Unassessed Groundfish Species and Those Managed as Part of a Stock Complex

2.1.4.1 *Minor Rockfish South*

The minor rockfish south complex is comprised of three major assemblages of rockfish species: southern minor nearshore rockfish, southern minor shelf rockfish, and southern minor slope rockfish, all of which occur south of 40°10' N latitude. Harvest specifications for the minor rockfish south complex are the sum of those for the southern minor nearshore, shelf, and slope complexes. Alternative 2009-10 minor rockfish south specifications are affected by the new blue rockfish assessment, a component species in the status quo southern minor nearshore rockfish complex, and whether to continue to manage blue rockfish within the southern minor nearshore rockfish complex. The status quo 2007-08 ABC for the minor rockfish south complex is 3,403 mt, of which 232 mt is the blue rockfish contribution based on the average 1994-99 harvest south of 40°10' N latitude. The status quo 2007-08 OY for the minor rockfish south complex is 1,904 mt, of which 116 mt is the blue rockfish contribution based on 50 percent of the average 1994-99 harvest. The average 1994-99 harvest of blue rockfish in the southern California Bight south of Pt. Conception was 18 mt. The new blue rockfish assessment done in 2007 was for the portion of the stock in waters off California north of Pt. Conception.

OY Alternative 1 (1,970 mt in 2009 and 2010) contemplates continuing to manage blue rockfish stock within the southern minor nearshore rockfish complex. The ABC under this alternative is 3,384 mt in 2009 and 3,382 mt in 2010, which removes the old blue rockfish ABC contribution of 232 mt from the status quo ABC of 3,403 mt. Then the ABC contribution from the 2007 assessment (213 mt in 2009 and 211 mt in 2010) is added back in to derive the year-specific ABCs. The OY under this alternative is determined by first subtracting the status quo OY contribution of blue rockfish (116 mt) from the status quo OY of 1,904 mt. Then the OY contribution of blue rockfish from the new assessment (182 mt for the portion of the assessed stock south of 40°10' N latitude) is added back to derive the 1,970 mt OY. The blue rockfish OY contribution from the 2007 assessment is based on the OY projected using the base case, medium productivity model.

The final preferred OY alternative for the minor rockfish south complex is OY Alternative 2 (1,990 mt in 2009 and 2010), which contemplates continuing to manage blue rockfish within the southern minor nearshore rockfish complex. The ABC and OY adjustments for the complex are the same as described under OY Alternative 1, except the new blue rockfish OY contribution is 202 mt and is based on the projected OY from the high productivity model in the 2007 assessment as capped by the base model ABC.

OY Alternative 3 (1,788 mt in 2009 and 2010) contemplates removing blue rockfish from the southern minor nearshore rockfish complex and managing blue rockfish under its own harvest specifications. The ABC under this alternative is 3,171 mt, which removes the old blue rockfish ABC contribution of 232 mt from the status quo ABC of 3,403 mt. The OY under this alternative is derived by removing the old blue rockfish OY contribution of 116 mt from the status quo OY of 1,904 mt.

2.1.4.2 *Southern Minor Nearshore Rockfish Species*

The southern minor nearshore rockfish complex south of 40°10' N latitude is further subdivided into the following management categories: 1) shallow nearshore rockfish [comprised of black and yellow rockfish (*S. chrysomelas*); China rockfish (*S. nebulosus*); gopher rockfish (*S. carnatus*); grass rockfish (*S. rastrelliger*), and kelp rockfish (*S. atrovirens*)]; and 2) deeper nearshore rockfish: [comprised of black rockfish (*S. melanops*), blue rockfish (*S. mystinus*); brown rockfish (*S. auriculatus*); calico rockfish (*S. dalli*); copper rockfish (*S. caurinus*); olive rockfish (*S. serranoides*); quillback rockfish (*S. maliger*); and treefish (*S. serriceps*)].

As described above, 2009-10 harvest specifications for the southern minor nearshore rockfish complex are affected by the 2007 blue rockfish and a decision whether to continue to manage blue rockfish within this complex as is status quo. Accordingly, there are three OY alternatives for the southern minor nearshore rockfish complex derived using the same methods as described for the minor rockfish south complex above.

OY Alternative 1 (630 mt in 2009 and 2010) contemplates continuing to manage blue rockfish stock within the complex. The OY under this alternative is determined by first subtracting the status quo OY contribution of blue rockfish (116 mt) from the status quo OY of 564 mt. Then the OY contribution of blue rockfish from the new assessment (182 mt for the portion of the assessed stock south of 40°10' N latitude) is added back to derive the 630 mt OY. The blue rockfish OY contribution from the 2007 assessment is based on the OY projected using the base case, medium productivity model.

The final preferred OY alternative for the southern minor nearshore rockfish complex is OY Alternative 2 (650 mt in 2009 and 2010), which contemplates continuing to manage blue rockfish within the complex. The OY adjustment for the complex is the same as described under OY Alternative 1, except the new blue rockfish OY contribution is 202 mt and is based on the projected ABC from the base model in the 2007 assessment. The Council adopted the CDFG-recommended strategy to manage all California nearshore fisheries north and south of 40°10' N latitude with a 220 mt blue rockfish harvest guideline.

OY Alternative 3 (448 mt in 2009 and 2010) contemplates removing blue rockfish from the southern minor nearshore rockfish complex and managing blue rockfish under their own harvest specifications. The OY under this alternative is derived by removing the old blue rockfish OY contribution of 116 mt from the status quo OY of 564 mt.

2.1.4.3 *Southern Minor Shelf Rockfish Species*

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

The Council has identified the status quo OY of 714 mt as the only alternative to be analyzed for this complex during the 2009-10 management cycle (Tables 2-1a and 2-1b). This is therefore the OY for the complex under the preferred alternative.

2.1.4.4 *Southern Minor Slope Rockfish Species*

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

The Council chose the status quo harvest specifications of 626 mt as the preferred 2009-10 ABC OY..

2.1.4.5 *Minor Rockfish North*

The minor rockfish north complex is comprised of three major assemblages of rockfish species: northern minor nearshore rockfish, northern minor shelf rockfish, and northern minor slope rockfish, all of which occur north of 40°10' N latitude. Harvest specifications for the minor rockfish north complex are the sum of those for the northern minor nearshore, shelf, and slope complexes. Alternative 2009-10 minor rockfish north specifications are affected by the new blue rockfish assessment, a component species in the status quo northern minor nearshore rockfish complex, and whether to continue to manage blue rockfish within the northern minor nearshore rockfish complex. The status quo 2007-08 ABC for the minor rockfish north complex is 3,680 mt, of which 30 mt is the blue rockfish contribution based on the average 1994-99 harvest north of 40°10' N latitude. The status quo 2007-08 OY for the minor rockfish north complex is 2,270 mt, of which 15 mt is the blue rockfish contribution based on 50 percent of the average 1994-99 harvest. The new blue rockfish assessment done in 2007 was for the portion of the stock in waters off California north of Pt. Conception.

OY Alternative 1 (2,280 mt in 2009 and 2010) contemplates continuing to manage blue rockfish stock within the northern minor nearshore rockfish complex. The ABC under this alternative is 3,678 mt in 2009 and 2010, which removes the old blue rockfish ABC contribution of 30 mt from the status quo ABC of 3,680 mt. Then the ABC contribution from the 2007 assessment (28 mt in 2009 and 2010) is added back in to derive the 2009-10 ABC of 3,678 mt. The OY under this alternative is determined by first subtracting the status quo OY contribution of blue rockfish (15 mt) from the status quo OY of 2,270 mt. Then the OY contribution of blue rockfish from the new assessment (25 mt for the portion of the assessed stock north of 40°10' N latitude) is added back to derive the 2,280 mt OY. The blue rockfish OY contribution from the 2007 assessment is based on the OY projected using the base case, medium productivity model.

The final preferred OY alternative for the minor rockfish north complex is OY Alternative 2 (2,283 mt in 2009 and 2010), which contemplates continuing to manage blue rockfish within the northern minor nearshore rockfish complex. The ABC and OY adjustments for the complex are the same as described under OY Alternative 1, except the new blue rockfish OY contribution is 28 mt and is based on the projected OY from the high productivity model in the 2007 assessment as capped by the base model ABC.

OY Alternative 3 (2,255 mt in 2009 and 2010) contemplates removing blue rockfish from the northern minor nearshore rockfish complex and managing blue rockfish under its own harvest specifications. The ABC under this alternative is 3,650 mt, which removes the old blue rockfish ABC contribution of

30 mt from the status quo ABC of 3,680 mt. The OY under this alternative is derived by removing the old blue rockfish OY contribution of 15 mt from the status quo OY of 2,270 mt.

2.1.4.6 *Northern Minor Nearshore Rockfish Species*

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

As described above, 2009-10 harvest specifications for the northern minor nearshore rockfish complex are affected by the 2007 blue rockfish and a decision whether to continue to manage blue rockfish within this complex as is status quo. Accordingly, there are three OY alternatives for the northern minor nearshore rockfish complex derived using the same methods as described for the minor rockfish north complex above.

OY Alternative 1 (152 mt in 2009 and 2010) contemplates continuing to manage blue rockfish stock within the complex. The OY under this alternative is determined by first subtracting the status quo OY contribution of blue rockfish (15 mt) from the status quo OY of 142 mt. Then the OY contribution of blue rockfish from the new assessment (25 mt for the portion of the assessed stock north of 40°10' N latitude) is added back to derive the 152 mt OY. The blue rockfish OY contribution from the 2007 assessment is based on the OY projected using the base case, medium productivity model.

The final preferred OY alternative for the northern minor nearshore rockfish complex is OY Alternative 2 (155 mt in 2009 and 2010), which contemplates continuing to manage blue rockfish within the complex. The OY adjustment for the complex is the same as described under OY Alternative 1, except the new blue rockfish OY contribution is 28 mt and is based on the projected ABC from the base model in the 2007 assessment. The Council adopted the CDFG-recommended strategy to manage all California nearshore fisheries north and south of 40°10' N latitude with a 220 mt blue rockfish harvest guideline.

OY Alternative 3 (127 mt in 2009 and 2010) contemplates removing blue rockfish from the northern minor nearshore rockfish complex and managing blue rockfish under their own harvest specifications. The OY under this alternative is derived by removing the old blue rockfish OY contribution of 15 mt from the status quo OY of 142 mt.

2.1.4.7 *Northern Minor Shelf Rockfish Species*

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

No change from status quo was identified by the Council for analysis; therefore, the status quo alternative for the northern minor shelf rockfish complex, 968 mt, is recommended under the preferred alternative for 2009-10 (Tables 2-1a and 2-1b).

2.1.4.8 *Northern Minor Slope Rockfish Species*

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

No change from status quo is identified by the Council for analysis; therefore, the status quo alternative for the Minor Slope Rockfish North complex, 1,160 mt, is recommended under the preferred alternative for 2009-10 (Tables 2-1a and 2-1b).

2.1.4.9 *Other Unassessed Species*

Pacific Cod

The west coast population of Pacific cod (*Gadus macrocephalus*) has never been formally assessed. Therefore, as in 2007-08, the Pacific cod ABC of 3,200 mt is based on historic landings, with the 1,600 mt OY representing the Council's precautionary 50 percent adjustment for unassessed species (Tables 2-1a and 2-1b).

With no new information available regarding the status of Pacific cod, the Council recommends the status quo ABC and OY of 3,200 mt and 1,600 mt, respectively under the preferred alternative for 2009-10.

Other Flatfish

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

No change from status quo is identified by the Council for analysis; therefore, the status quo harvest specifications for the Other Flatfish complex (ABC = 6,731 mt and OY = 4,884 mt) are recommended under the preliminary preferred alternative for 2009-10 (Tables 2-1a and 2-1b).

Other Fish

The Other Fish stock complex contains all the unassessed Groundfish FMP species that are neither rockfish (family *Scorpaenidae*) nor flatfish. These species include big skate (*Raja binoculata*), California skate (*Raja inornata*), leopard shark (*Triakis semifasciata*), soupfin shark (*Galeorhinus zyopterus*), spiny dogfish (*Squalus acanthias*), finescale codling (*Antimora microlepis*), Pacific rattail (*Coryphaenoides acrolepis*), ratfish (*Hydrolagus colliei*), cabezon (*Scorpaenichthys marmoratus*) (north of the California-Oregon border at 42° N latitude), kelp greenling (*Hexagrammos decagrammus*), and, prior to 2007, longnose skate (*Raja rhina*).

The 2009-10 harvest specifications for the Other Fish complex depend on the choice of a longnose skate OY and whether to continue to manage longnose skate within the complex given the new 2007 stock assessment (see section 2.1.3.9). The Council decided at their June 2008 meeting to manage longnose skate with species-specific harvest specifications and to use OY Alternative 2 for longnose skate to adjust the 2009-10 harvest specifications for the Other Fish complex. The Other Fish complex specifications were revised by removing 3,400 mt from the complex ABC of 14,600 mt to derive a 2009-10 ABC of 11,200 mt. The Other Fish OY was set at 5,600 mt, which comports to the 50 percent precautionary reduction called for in the Groundfish FMP for unassessed stocks. See section 4.3.4 for analysis and discussion of alternative Other Fish harvest specifications.

2.1.5 Alternative Harvest Levels Considered, But Eliminated From Detailed Study

The range of depleted species OYs recommended by the GMT for analysis in November 2007 was much broader than that formally adopted for analysis in November 2007. The GMT recommended OYs up to those predicted to have a 50 percent probability of rebuilding in the maximum time allowable under current National Standard 1 guidelines. The upper end of the 2009 OY range for depleted species that were originally recommended by the GMT for analysis were 468 mt for bocaccio, 637 mt for canary rockfish, 8 mt for cowcod, 385 mt for darkblotched rockfish, 971 mt for POP, and 4,338 mt for widow rockfish. These higher OYs were considered, but eliminated from further analysis by the Council at their November 2007 meeting.

Two additional yelloweye rockfish ramp-down strategies were considered for analysis by the Council in April 2008, but ultimately eliminated from further detailed study. These alternative ramp-down strategies contemplated a 20 mt OY in 2009 and a 17 mt OY or a 16 mt OY in 2010, before assuming a constant harvest rate strategy in 2011.

The status quo shortbelly rockfish harvest specifications (ABC and OY of 13,900 mt) were considered for analysis, but eliminated from further detailed study. Status quo specifications were originally considered because the new assessment did not go through the formal Council assessment review process. However, the Council’s SSC recommended the new assessment represented “improved” knowledge of stock status and might be suitable for management use. The Council therefore adopted new harvest specifications for shortbelly rockfish based on results from the new assessment and eliminated the status quo specifications from detailed study.

2.2 Alternative Management Measures

2.2.1 Yield Set-Asides

Yield set-asides for overfished species need to be considered when considering new management measures. These set-asides are deducted from overvished species’ OYs for the projected harvestable yields of these species, which limit fishing opportunities differentially by sector. Yield set-asides are considered “unchangeables” in the analysis of alternative management measures in this EIS and include projected 2009-10 research catches, total catches in tribal and non-groundfish fisheries, and yields reserved for possible 2009-10 exempted fishing permit (EFP) activities. Table 2-6 provides a summary of the yield set-asides for the depleted groundfish species projected by the GMT and used in EIS analyses.

Table 2-6. Summary of the 2009-10 yield set-asides of constraining depleted groundfish species projected by the GMT and used in EIS analyses.

Species	Yield Set-Asides (mt)					
	Tribal Catches		Inc. OA	Research	EFPs	Total
	Whiting	Non-Whiting				
Bocaccio	0.0	0.0	1.3	2.0	13.7	17.0
Canary	2.1	5.2	0.9	8.0	2.7	18.9
Cowcod	0.0	0.0	0.0	0.2	0.3	0.5
Darkblotched	0.0	0.0	0.0	2.0	1.3	3.4
POP	1.1	3.7	0.0	2.0	0.6	7.4
Widow	5.5	40.0	0.4	1.1	5.3	52.3
Yelloweye	0.0	2.3	0.3	2.8	0.3	5.7

2.2.1.1 *Tribal Catches*

Description of Tribal Groundfish Fisheries

West coast treaty tribes have formal allocations or set-asides for sablefish, black rockfish, and Pacific whiting. The tribes also have a harvest guideline for Pacific cod beginning in 2006 (450 mt/year) and a harvest guideline for lingcod beginning in 2008 (250 mt/year). 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 recommend trip limits for these species to the Council, which tries 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.

Thirteen western Washington tribes possess and exercise treaty fishing rights to halibut, including the four tribes that possess treaty fishing rights to ground fish in the EEZ. Tribal halibut allocations are divided into a tribal commercial component and the year-round ceremonial and subsistence component.

Approximately one-third of the tribal sablefish allocation is taken during an open competition fishery, in which vessels from the tribes that fish sablefish 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 and 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 (IPHC). By agreement the tribes also use snap gear for equity reasons in the fully competitive sablefish fishery (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 2005 and 2006, tribal sablefish fisheries were allocated 10% of the total catch OY north of 36° N latitude which was discounted by 2.3% for discard mortality for landed catch allocations of 731.4 mt and 719.4 mt respectively. In 2007 and 2008 the tribes were allocated 10% of the OY north of 36° N latitude discounted by 1.9% estimated discard mortality. This resulted in a landed catch allocation of 561.4 mt for both years. For the commercial harvest of black rockfish off Washington state, the treaty tribes have area-specific harvest guidelines of: 20,000 pounds (9,072 kg) north of Cape Alava (48°09'30" N latitude), 10,000 pounds (4,536 kg) between Destruction Island (47°40'00" N latitude) and Leadbetter Point (46°38'10" N latitude), and no tribal harvest restrictions between Cape Alava and Destruction Island.

Makah vessels using mid-water trawl gear have been targeting yellowtail rockfish in recent years. Tribal regulations specify the monthly limit of yellowtail, based on the number of vessels participating, as well as limits for widow rockfish (not to exceed 10% of yellowtail landings in a given period), canary rockfish (300 pounds per trip), and minor nearshore, shelf, and slope rockfish (300 pounds per trip combined). This fishery is managed by both time and area to stay within projected impacts on overfished rockfish, primarily widow and canary, taken incidentally with yellowtail. Short test tows are taken in areas previously identified as having low bycatch rates before that area is open to fishing. If vessels in the fishery approach the limits established by tribal regulation, the area is closed to further fishing until it can be shown to have reduced bycatch rates. An observer program is in place to verify bycatch levels in the fishery, and assigned vessels must carry an observer to participate.

Beginning in 2008 the Makah Tribe is proposing a targeted fishery for spiny dogfish using longline gear in addition to continued landings with bottom trawl. This fishery would be restricted by time and area to minimize interactions with overfished rockfishes, particularly yelloweye, such that projected impacts would not increase. The Makah Tribe is also proposing an increase in the targeting of arrowtooth flounder (and possibly other flatfish species) with bottom trawl for 2009 and 2010 pending the results of a test fishery that may be conducted as early as 2008. The test fishery will examine bycatch rates of standard small-footrope gear compared to selective flatfish trawls both with and without Pacific halibut excluders. Halibut excluders will be designed to take advantage of dimensional size differences, behavior, or both in minimizing their bycatch.

The Makah Tribe annually harvests a whiting allocation using midwater 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 non-tribal 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 conducted a whiting fishery; however, in 2009 both the Makah and Quileute Tribes are planning to participate in the fishery. In 2010 the Quinault Tribe plans to enter the fishery.

In 2000, 32,500 mt of whiting was set aside for treaty Indian tribes on the coast of Washington State, as a result of the commercial OY of 199,500 mt. 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. In 2003, the landed catch OY of 148,000 mt resulted in a tribal allocation of 25,000 mt. In 2004, the landed catch OY was 250,000 mt with a tribal allocation of 32,500 mt. In 2005 and again in 2007, the U.S. landed catch OY of 269,069 had a corresponding tribal allocation of 35,000 mt. In 2006, the U.S. OY of 242,591 mt resulted in a tribal allocation of 32,500 mt.

For 2009, the Makah Tribe proposed a total treaty allocation of 20.5 percent of the OY, with 17.5 percent of the OY to meet the needs of the Makah Tribe and 3 percent to accommodate the Quileute fishery. The Quileute Tribe stated its intent to harvest approximately 4,000 to 8,000 metric tons. The basis for no longer using the sliding scale approach was outlined by the Makah Tribe, including the following points: 20.5 percent of the OY is clearly within the treaty right; 17.5 percent for the Makah Tribe would better meet the needs of the Tribe; and the Makah Tribe's fishery has developed and matured since the Makah Tribe proposed the sliding scale allocation table ten years ago.

The GMT discussed the proposal by the Quileute Tribe to enter the fishery in 2009 and their estimated Pacific whiting catch of up to 8,000 mt (equal to approximately 3 percent of the 2008 U.S. OY) as well as the Makah proposal to manage their fisheries to 17.5 percent of the U.S. OY. The Council requested that the GMT examine estimated depleted species impacts compared across whiting sectors based on treaty tribal allocations of 17.5 percent and 20.5 percent of the U.S. whiting OY.

Given concerns that the inexperience of new entrants to the fishery may result in higher encounters of bycatch species, a precautionary approach to estimating bycatch was sought to minimize impacts to other sectors inseason. The GMT proposed to triple the estimated impacts derived from the weighted average of Makah's bycatch applied to the 8,000 mt of whiting estimated to be taken by Quileute. The remaining amount was calculated with the same (i.e., unadjusted) weighted average approach that has been applied to Makah's fishery in recent years. The tables below (Tables 2-7a to 2-7c) show this approach under three scenarios: 2-7a) with a 17.5 percent treaty tribal allocation should the Quileute Tribe be unable to prosecute their new fishery in 2009, 2-7b) with a 17.5 percent tribal allocation and full prosecution of the Quileute's estimated take of whiting, and 2-7c) a 20.5 percent tribal allocation with both tribes taking their maximum estimate.

Table 2-7a. Estimated impacts in metric tons of depleted species in each whiting sector based on the weighted average bycatch applied to the Makah fishery alone with a treaty tribal allocation of 17.5 percent.

Sector	Canary	Darkblotched	POP	Widow
Tribal	**1.42**	**0.01**	**0.73**	**3.62**
Mothership	2.02	5.95	1.07	116.15
CP	0.25	5.85	1.10	142.11
Shoreside	1.54	2.77	0.33	147.83
Total	5.23	14.58	3.23	409.70

Table 2-7b. Estimated impacts in metric tons of depleted species in each whiting sector based on tripling the weighted average bycatch applied to a fully prosecuted Quileute fishery and a treaty tribal allocation of 17.5 percent.

Sector	Canary	Darkblotched	POP	Widow
Tribal	**1.90**	**0.01**	**0.98**	**4.84**
Mothership	2.02	5.95	1.07	116.15
CP	0.25	5.85	1.10	142.11
Shoreside	1.54	2.77	0.33	147.83
Total	5.71	14.58	3.48	410.93

Table 2-7c. Estimated impacts in metric tons of depleted species in each whiting sector based on tripling the weighted average bycatch applied to a fully prosecuted Quileute fishery and unadjusted weighted average bycatch applied to a fully prosecuted Makah fishery with a treaty tribal allocation of 20.5 percent.

Sector	Canary	Darkblotched	POP	Widow
Tribal	**2.14**	**0.01**	**1.11**	**5.46**
Mothership	1.94	5.73	1.03	111.89
CP	0.24	5.63	1.06	136.89
Shoreside	1.48	2.67	0.32	142.40
Total	5.81	14.05	3.52	396.65

The GMT recognized that the Makah have years of experience avoiding bycatch, and that direct application of the rates from their fishery are likely not appropriate for other fisheries. While this approach for estimating impacts to depleted species for the proposed Quileute fishery may not insure against a "disaster tow", it allows for decreased risk to other fisheries should bycatch prove to be considerably higher due to unquantifiable differences in bycatch rates based on vessel, gear, or skipper effects for a new participant. However, the GMT also noted that these impacts likely represent an upper-bound estimate as the Quileute Tribe has indicated that they intend to manage their fishery inseason to avoid bycatch and remain well below the estimates provided here. The GMT conducted impact analyses assuming the highest tribal set-asides in Table 2-7c for precautionary reasons.

The Council recommended for 2009 only, a tribal set-aside of Pacific whiting of 50,000 mt., with the Makah tribe to manage 42,000 mt. of the set-aside, including the bycatch amounts associated with this portion of the set-aside as identified by the GMT, and the Quileute Tribe to manage 8,000 mt. of the set-aside, including the bycatch amounts associated with this portion of the set-aside. The Council also requested NMFS to convene the co-managers, including the states of Oregon and Washington and the Washington coastal treaty tribes, in government-to-government discussions to develop a proposal for 2010 and subsequent years for tribal set-asides of Pacific whiting.

2.2.1.2 *Research Catches*

The GMT considered catches of depleted species in recent years and ongoing projects that are planned to continue into 2009 and 2010 to determine appropriate amounts to set aside in 2009 and 2010 for scientific research. Based on direction from the Council, the GMT also examined amounts of anticipated yelloweye impacts that can be attributed to state-sponsored research initiatives.

The International Pacific Halibut Commission (IPHC) survey component took 1.1 mt of yelloweye when using 8 skates of longline gear in 2003 in conjunction with a PIT tagging experiment. For 2008, and possibly in 2009 and 2010, they have reduced the number of skates to 5, which is estimated to result in a proportional decrease to approximately 0.7 mt. Both WDFW and ODFW have proposed yelloweye longline surveys that will be conducted in conjunction with the IPHC survey. These projects have voluntarily capped their yearly catches for 2009 and 2010 at 0.9 mt for ODFW and 1.0 mt for WDFW. An additional 0.2 mt is expected from a combination of other research activities. The total estimate of yelloweye projected to be taken in research activities is 2.8 mt.

2.2.1.3 *Incidental Open Access Catches*

The GMT's best projection of depleted species impacts in 2009-10 incidental open access fisheries is provided in Table 2-6. These set-asides are based on estimated historical catches for non-groundfish fisheries conducted on the west coast.

2.2.1.4 *Exempted Fishing Permit Catches*

The Council decided the yield set-asides to accommodate 2009-10 exempted fishing permit (EFP) activities as shown in Table 2-6 at their June 2008 meeting.

2.2.2 Catch Sharing Agreements

The Council decided final 2009-10 catch share agreements for analysis between sectors and states for canary and yelloweye rockfish at the June 2008 meeting. The Council also decided a catch sharing agreement between Oregon and California for black rockfish.

2.2.2.1 *Canary Rockfish and Yelloweye Rockfish*

At their April 2008 meeting, the Council directed the GMT to use the initial 2005 and 2007 bycatch scorecards to apportion the available yields of canary and yelloweye rockfish between directed groundfish sectors and state recreational fisheries in their initial analyses of 2009-10 fishing impacts associated with alternative management measures (Table 2-8). These catch shares were determined as a percentage of the total directed harvest in 2005 and 2007.

Table 2-8. Catch shares of canary and yelloweye rockfish between groundfish sectors and state recreational fisheries based on the initial 2005 and 2007 bycatch scorecard percentages of the total directed harvest used by the GMT in their initial analyses of 2009-10 groundfish management measure alternatives.

Groundfish Sector	Catch Shares by Sector			
	Canary		Yelloweye	
	2005%	2007%	2005%	2007%
LE Non-Whiting Trawl	22.9%	24.1%	2.8%	0.7%
LE Whiting Trawl	20.9%	14.3%	2.8%	0.0%
LE Fixed Gear	2.6%	2.7%	17.5%	16.8%
Directed OA	2.9%	6.4%	4.2%	17.5%
WA Rec	5.7%	5.2%	24.5%	25.5%
OR Rec	18.6%	19.8%	22.4%	24.1%
CA Rec	26.6%	27.4%	25.9%	15.3%

The GMT deducted the yield set-asides for canary and yelloweye in Table 2-6 from the alternative canary and yelloweye OYs in Tables 2-1a and 2-1b and then applied the catch shares in Table 2-8 to determine the alternative yield amounts of these constraining species available to groundfish sectors in 2009-10. Tables 2-9 and 2-10 depict the 2009-10 projected available yields by groundfish sector and OY alternative of canary and yelloweye rockfish, respectively. These yield amounts served as sector limits in analyzing sector impacts associated with alternative management measures.

Table 2-9. Yield amounts (mt) of canary rockfish available to groundfish sectors in 2009-10 after deducting projected set-asides by OY alternative.

Groundfish Sector	Catch Sharing Basis	OY Alt. 2 35 mt	OY Alt. 3 44 mt	OY Alt. 4 85 mt	OY Alt. 5 105 mt	OY Alt. 6 155 mt
LE Non-Whiting Trawl	2005%	3.7	5.7	15.1	19.7	31.1
	2007%	3.9	6.0	15.9	20.7	32.8
LE Whiting Trawl	2005%	3.4	5.2	13.8	18.0	28.4
	2007%	2.3	3.6	9.5	12.3	19.5
LE Fixed Gear	2005%	0.4	0.6	1.7	2.2	3.5
	2007%	0.4	0.7	1.8	2.4	3.7
Directed OA	2005%	0.5	0.7	1.9	2.5	3.9
	2007%	1.0	1.6	4.2	5.5	8.7
WA Rec	2005%	0.9	1.4	3.8	4.9	7.8
	2007%	0.8	1.3	3.4	4.5	7.1
OR Rec	2005%	3.0	4.7	12.3	16.0	25.3
	2007%	3.2	5.0	13.1	17.1	27.0
CA Rec	2005%	4.3	6.7	17.6	22.9	36.2
	2007%	4.4	6.9	18.1	23.6	37.3

Table 2-10. Yield amounts (mt) of yelloweye rockfish available to groundfish sectors in 2009-10 after deducting projected set-asides by OY alternative.

Groundfish Sector	Catch Sharing Basis	OY Alt. 2		OY Alt. 3		OY Alt. 4		OY Alt. 5	
		2009 13 mt	2010 14 mt	2009 17 mt	2010 14 mt	2009 15 mt	2010 15 mt	2009 17 mt	2010 17 mt
LE Non-Whiting Trawl	2005%	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3
	2007%	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
LE Whiting Trawl	2005%	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3
	2007%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LE Fixed Gear	2005%	1.3	1.5	2.0	1.5	1.6	1.6	2.0	2.0
	2007%	1.2	1.4	1.9	1.4	1.6	1.6	1.9	1.9
Directed OA	2005%	0.3	0.3	0.5	0.3	0.4	0.4	0.5	0.5
	2007%	1.3	1.5	2.0	1.5	1.6	1.6	2.0	2.0
WA Rec	2005%	1.8	2.0	2.8	2.0	2.3	2.3	2.8	2.8
	2007%	1.9	2.1	2.9	2.1	2.4	2.4	2.9	2.9
OR Rec	2005%	1.6	1.9	2.5	1.9	2.1	2.1	2.5	2.5
	2007%	1.8	2.0	2.7	2.0	2.2	2.2	2.7	2.7
CA Rec	2005%	1.9	2.1	2.9	2.1	2.4	2.4	2.9	2.9
	2007%	1.1	1.3	1.7	1.3	1.4	1.4	1.7	1.7

Under the Council's final preferred alternative, sector shares of the preferred canary rockfish OY alternative of 105 mt would be based on the initial 2005 scorecard (Table 2-9). There would be some flexibility for some sectors to use higher yields of canary rockfish given the projected residual yields of canary rockfish in 2009 and 2010.

The Council's final preferred alternative catch sharing of yelloweye rockfish is shown in Table 2-11.

Table 2-11. The preferred yelloweye rockfish sector catch sharing scenario for 2009-10 fisheries.

Groundfish Sector	Yelloweye Catch Shares (mt)
LE Non-Whiting Trawl	0.6
LE Whiting Trawl	0.0
LE Fixed Gear	1.4
Directed OA	1.1
WA Rec	2.7
OR Rec	2.5
CA Rec	2.8
Directed Total	11.1
Set-Asides (including EFPs)	5.7
Total Impact	16.8

2.2.2.2 *Black Rockfish*

Under the Council's preferred alternative, the black rockfish catch sharing framework for 2009-10 carries forward the status quo proportions of 58 percent of the southern OY to Oregon and 42 percent to California. Those values would be recorded as harvest guidelines in the Federal regulations for the respective states upon approval of the EIS. These percentages result in an Oregon harvest guideline of 580 mt and a California harvest guideline of 420 mt under the preliminary preferred OY alternative for the southern black rockfish stock. Washington fisheries will manage to the preferred northern black rockfish OY of 490 mt in 2009 and 464 mt in 2010.

2.2.3 New Management Lines

2.2.3.1 *Addition of a 25 fm Management Line in Washington Marine Area 2*

The Washington Department of Fish and Wildlife proposes a new 25 fm management line in Washington Marine Area 2 (South Coast), as defined by the following waypoints:

47°31.70 N lat	124°34.660 W long;
47°25.67 N lat	124°32.775 W long;
47°12.82 N lat	124°26.000 W long;
46°52.94 N lat	124°18.940 W long;
46°44.18 N lat	124°14.890 W long;
46°38.17 N lat	124°13.700 W long.

The WDFW proposes to use this line to potentially restrict Marine Area 2, by expanding the recreational RCA and encouraging recreational groundfish fisheries to move to shallower waters during March 15-June 15 in 2009 or 2010, as an inseason adjustment if needed to reduce impacts on canary or yelloweye rockfish.

2.2.3.2 *Modification of the 100 fm Management Line in Washington Marine Area 4*

Washington proposed and the Council adopted a modification of the 100 fm management line used to describe the rockfish conservation area off the northern Washington coast (Figure 2-4). The modification is a minor adjustment to the coordinates currently in place as a possible measure to provide additional protection to yelloweye rockfish. While the projected impacts to yelloweye rockfish are not necessarily quantifiable it is assumed that this modification will provide reduced harvest impacts and additional protection of the yelloweye rockfish resource off Washington.

The coordinates for the modified 100 fm line are as follows:

48°02.35' N lat	125°17.30' W long;
48°02.35' N lat	125°18.07' W long;
48°00.00' N lat	125°19.30' W long;
47°59.50' N lat	125°18.88' W long.

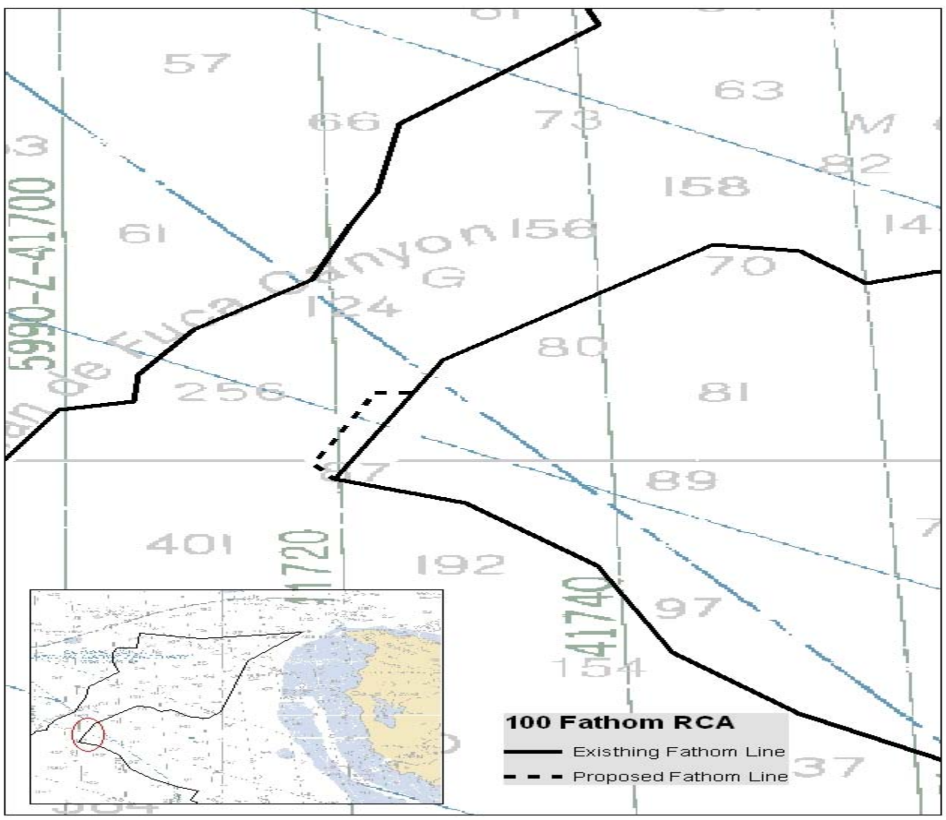


Figure 2-4. The modified 100 fm management line adopted for 2009-10 to reduce yelloweye rockfish impacts.

2.2.3.3 *Proposed Changes to Rockfish Conservation Area Management Lines in Waters off California*

Adjustments to RCA management lines in waters off California were proposed by industry and CDFG. Industry requests were made to better approximate depth contours, allowing access to valuable fishing grounds that otherwise would not be available under status quo. CDFG requests include error corrections as well as changes to depth contours affected by industry requests. All proposed changes were reviewed by CDFG Enforcement and verified that they do not conflict with Essential Fish Habitat Areas or Marine Protected Areas. Adjustments are necessary because substantial discrepancies exist between current and proposed depth contours, resulting in lost fishing grounds, lost revenue, and differences in actual versus predicted bycatch. Two changes to trawl RCAs were proposed; thirteen changes to non-trawl RCAS were also proposed. The Council adopted all the proposed changes as their preferred alternative.

The RCA waypoints in the area adjacent to Lopez Point were revised due to an error in the original waypoint specifications, such as crossovers of adjacent management lines (Table 2-12).

Table 2-12. CDFG-proposed changes to RCA management lines adjacent to Lopez Point, California.

Fathom Line	Proposed Coordinates					Action	Long Change	Original Coordinates Published in the Federal Register			
	Point	Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
50-fm	120	36	10.41	121	42.88	crossover	seaward	36	10.41	121	42.92
60-fm	137	36	0	121	35.34	revision	seaward	36	0	121	35.15
75-fm	183	36	0	121	35.4	revision	seaward	36	0	121	35.15

Revisions were also made to management lines in the Tolo Bank area (Table 2-13, Figure 2-5), the Westport area (Table 2-14, Figure 2-6), Bodega Canyon (Table 2-15, Figure 2-7), Pioneer Canyon (Table 2-16, Figure 2-8), the Morro Bay area (Table 2-17, Figure 2-9), the North Point Conception area (Table 2-18, Figure 2-10), the North Channel Island area (Table 2-19, Figure 2-11), the east end area of Santa Rosa Island (Table 2-20, Figure 2-12), the Sandstone Point area of Santa Cruz Island (Table 2-21, Figure 2-13), the Palos Verdes area (Table 2-22, Figure 2-14), the west end area of Catalina Island (Table 2-23, Figure 2-15), the west end area of San Clemente Island (Table 2-24, Figure 2-16), the Dana Point area (Table 2-25, Figure 2-17), and the San Diego area (Table 2-26, Figure 2-18).

Table 2-13. CDFG-proposed changes to RCA management lines in the Tolo Bank area.

Fathom Line	Proposed Coordinates					Action	Long Change	Original Coordinates Published in the Federal Register			
	Point	Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
250-fm		39	56.44	124	12.52	add	shoreward				
250-fm		39	54.98	124	8.71	add	shoreward				
250-fm	119	39	52.6	124	10.01	revision	shoreward	39	51.85	124	10.33
250-fm	120	39	37.37	124	0.58	revision	shoreward	39	36.9	124	0.63

Table 2-14. CDFG-proposed changes to RCA management lines in the Westport area.

Fathom Line	Point	Proposed Coordinates				Action	Long Change	Original Coordinates Published in the Federal Register			
		Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
150-fm		39	39.82	123	59.98	add	shoreward				
150-fm	187	39	34.59	123	58.08	revision	shoreward	39	34.75	123	58.5

Table 2-15. CDFG-proposed changes to RCA management lines in Bodega Canyon.

Fathom Line	Point	Proposed Coordinates				Action	Long Change	Original Coordinates Published in the Federal Register			
		Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
150-fm	200	38	18.75	123	31.21	revision	shoreward	38	19.88	123	32.54
150-fm	205	38	6.15	123	30	revision	shoreward	38	6.42	123	30.18

Table 2-16. CDFG-proposed changes to RCA management lines in Pioneer Canyon.

Fathom Line	Point	Proposed Coordinates				Action	Long Change	Original Coordinates Published in the Federal Register			
		Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
75-fm		37	28.2	122	54.92	add	shoreward				
75-fm		37	27.34	122	52.91	add	shoreward				
75-fm		37	26.45	122	52.95	add	shoreward				
75-fm	144	37	26.06	122	51.17	revision	shoreward	37	24.16	122	51.96
75-fm	145	37	23.07	122	51.34	revision	shoreward	37	23.32	122	52.38
100-fm		37	26.81	122	55.57	add	shoreward				
100-fm		37	26.78	122	53.91	add	shoreward				
100-fm		37	25.74	122	54.13	add	shoreward				
100-fm		37	25.33	122	53.59	add	shoreward				
100-fm		37	25.29	122	52.57	add	shoreward				
100-fm		37	24.5	122	52.09	add	shoreward				
100-fm		37	23.25	122	53.12	add	shoreward				
150-fm		37	26.1	122	57.07	add	shoreward				
150-fm		37	26.51	122	54.23	add	shoreward				
150-fm		37	25.05	122	55.64	add	shoreward				
150-fm		37	24.42	122	54.94	add	shoreward				
150-fm		37	25.16	122	52.73	add	shoreward				
150-fm		37	24.55	122	52.48	add	shoreward				
150-fm		37	22.81	122	54.36	add	shoreward				
150-fm		37	19.87	122	53.98	add	shoreward				

Table 2-17. CDFG-proposed changes to RCA management lines in the Morro Bay area.

Fathom Line	Point	Proposed Coordinates				Action	Long Change	Original Coordinates Published in the Federal Register			
		Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
50-fm	126	35	27.74	121	4.69	revision	shoreward	35	24.35	121	2.53
60-fm	140	35	26.31	121	3.73	revision	shoreward	35	24.35	121	2.53
75-fm	186	35	25.09	121	3.02	revision	shoreward	35	24.33	121	2.53
100-fm	251	36	0	121	35.41	revision	seaward	36	0	121	35.15
100-fm	252	35	57.84	121	32.81	revision	shoreward	35	57.84	121	33.1

Table 2-18. CDFG-proposed changes to RCA management lines in the North Point Conception area.

Fathom Line	Point	Proposed Coordinates				Action	Long Change	Original Coordinates Published in the Federal Register			
		Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
50-fm	128	34	37.98	120	46.48	revision	shoreward	34	39.52	120	48.72
50-fm	129	34	32.98	120	43.34	revision	shoreward	34	31.26	120	44.12

Table 2-19. CDFG-proposed changes to RCA management lines in the North Channel Island area.

Fathom Line	Point	Proposed Coordinates				Action	Long Change	Original Coordinates Published in the Federal Register			
		Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
60-fm	1	34	9.83	120	25.61	revision	seaward	34	9.16	120	26.31
60-fm	2	34	7.03	120	10.55	revision	seaward	34	6.69	120	16.43
60-fm	23	33	52.95	120	10	revision	seaward	33	51.93	120	6.5
60-fm	24	33	54.36	120	13.06	delete		33	54.36	120	13.06
60-fm	25	33	56	120	17	revision	seaward	33	58.53	120	20.46
60-fm	27	34	8.23	120	36.25	revision	seaward	34	8.09	120	35.85
60-fm	29	34	9.83	120	25.61	revision	seaward	34	9.16	120	26.31
75-fm	1	34	10.82	120	33.26	revision	seaward	34	9.12	120	35.03
75-fm	2	34	11.78	120	28.12	revision	seaward	34	9.99	120	27.85
75-fm	3	34	8.65	120	18.46	revision	seaward	34	7.19	120	16.28
75-fm		34	7.01	120	10.46	add	seaward				
75-fm	29	33	52.99	120	10.01	delete		33	52.99	120	10.01
75-fm	30	33	56.64	120	18.88	delete		33	56.64	120	18.88
75-fm	31	33	58.02	120	21.41	delete		33	58.02	120	21.41
75-fm	32	33	58.11	120	25.59	revision	seaward	33	58.73	120	25.22
75-fm	33	33	59.08	120	26.58	delete		33	59.08	120	26.58
75-fm	34	33	59.95	120	28.21	delete		33	59.95	120	28.21
75-fm	35	34	2.15	120	32.7	revision	seaward	34	3.54	120	32.23
75-fm	36	34	5.57	120	34.23	delete		34	5.57	120	34.23
75-fm	37	34	8.86	120	37.12	revision	seaward	34	8.13	120	36.05
75-fm	38	34	10.82	120	33.26	revision	seaward	34	9.12	120	35.03

Table 2-20. CDFG-proposed changes to RCA management lines in the east end area of Santa Rosa Island.

Fathom Line	Point	Proposed Coordinates				Action	Long Change	Original Coordinates Published in the Federal Register			
		Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
60-fm	4	34	7.9	119	55.12	revision	seaward	34	7.36	119	52.06
60-fm	17	33	59.32	119	55.65	revision	seaward	33	59.32	119	55.59
60-fm	18	33	57.73	119	55.06	revision	seaward	33	57.52	119	55.19
60-fm	19	33	56.48	119	53.8	revision	seaward	33	56.1	119	54.25
60-fm	20	33	49.29	119	55.76	revision	seaward	33	50.28	119	56.02
60-fm	21	33	48.11	119	59.72	revision	seaward	33	48.51	119	59.67
75-fm	5	34	8.11	119	55.01	revision	seaward	34	7.27	119	57.76
75-fm	6	34	7.48	119	52.08	delete		34	7.48	119	52.08
75-fm	18	33	56.91	119	52.04	revision	seaward	33	57.78	119	53.04
75-fm	20	33	57.82	119	54.99	revision	seaward	33	57.57	119	54.93
75-fm	21	33	56.58	119	53.75	revision	seaward	33	56.35	119	53.91
75-fm	28	33	52	120	8.15	revision	seaward	33	51.41	120	6.49

Table 2-21. CDFG-proposed changes to RCA management lines in the Sandstone Point area of Santa Cruz Island.

Fathom Line	Point	Proposed Coordinates				Action	Long Change	Original Coordinates Published in the Federal Register			
		Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
60-fm	5	34	5.07	119	37.33	revision	seaward	34	4.84	119	36.94
60-fm	6	34	4.84	119	35.5	delete		34	4.84	119	35.5
60-fm	9	34	2.8	119	21.4	delete		34	2.8	119	21.4
60-fm	10	34	2.27	119	18.73	revision	seaward	34	2.36	119	18.97
60-fm	11	34	0.98	119	19.1	revision	seaward	34	0.65	119	19.42
60-fm	12	33	59.44	119	21.89	revision	seaward	33	59.45	119	22.38
60-fm	13	33	58.7	119	32.22	revision	seaward	33	58.68	119	32.36
60-fm		33	57.81	119	33.72	add	seaward				
60-fm		33	57.65	119	35.94	add	seaward				
75-fm	11	34	3	119	21.36	delete		34	3	119	21.36
75-fm	13	34	0.95	119	18.95	revision	seaward	34	0.65	119	19.42
75-fm	14	33	59.4	119	21.74	revision	seaward	33	59.45	119	22.38
75-fm	15	33	58.7	119	32.21	revision	seaward	33	58.68	119	32.36
75-fm		33	57.67	119	33.72	add	seaward				
75-fm		33	57.54	119	36.32	add	seaward				
75-fm	5	33	26.33	118	25.37	revision	seaward	33	26.31	118	25.14
75-fm	12	33	20.07	118	32.35	revision	seaward	33	20.07	118	32.12
75-fm	13	33	21.82	118	32.09	revision	seaward	33	21.77	118	31.85
75-fm	17	33	27.57	118	37.9	revision	seaward	33	27.8	118	37.9

Table 2-22. CDFG-proposed changes to RCA management lines in the Palos Verdes area.

Fathom Line	Point	Proposed Coordinates				Action	Long Change	Original Coordinates Published in the Federal Register			
		Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
60-fm	160	33	58.86	118	36.24	revision	seaward	33	59.06	118	36.3
60-fm	162	33	53.63	118	37.88	revision	seaward	33	53.56	118	37.73
60-fm	169	33	50.06	118	24.79	revision	seaward	33	49.87	118	24.37
60-fm		33	48.48	118	26.86	add	shoreward				
60-fm	170	33	47.75	118	30.21	revision	seaward	33	47.54	118	29.65
75-fm	206	33	59.56	119	3.36	revision	seaward	33	59.6	119	3.16
75-fm	207	33	59.35	119	0.92	revision	seaward	33	59.46	119	0.88
75-fm	213	33	51.19	118	36.5	revision	seaward	33	51.22	118	36.17
75-fm	216	33	49.77	118	26.34	revision	seaward	33	49.95	118	26.38
75-fm	218	33	49.92	118	25.05	revision	seaward	33	49.84	118	24.78
75-fm		33	48.7	118	26.7	add	shoreward				
75-fm	219	33	47.72	118	30.48	revision	seaward	33	47.53	118	30.12
75-fm	221	33	41.62	118	20.31	revision	seaward	33	41.77	118	20.32
75-fm	222	33	38.15	118	15.85	revision	seaward	33	38.17	118	15.7

Table 2-23. CDFG-proposed changes to RCA management lines in the west end area of Catalina Island.

Fathom Line	Point	Proposed Coordinates				Action	Long Change	Original Coordinates Published in the Federal Register			
		Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
60-fm	1	33	28.15	118	38.17	revision	seaward	33	28.15	118	37.85
60-fm	14	33	24.99	118	32.25	revision	seaward	33	25.13	118	32.16
60-fm	16	33	28.15	118	38.17	revision	seaward	33	28.15	118	37.85
60-fm		33	26.3	118	25.38	add	seaward				
60-fm	9	33	16.65	118	17.71	revision	seaward	33	16.72	118	18.07
60-fm	11	33	20.07	118	32.34	revision	seaward	33	20.03	118	32.04
60-fm	12	33	21.82	118	32.08	revision	seaward	33	21.86	118	31.72

Table 2-24. CDFG-proposed changes to RCA management lines in the west end area of San Clemente Island.

Fathom Line	Point	Proposed Coordinates				Action	Long Change	Original Coordinates Published in the Federal Register			
		Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
60-fm	1	33	4.44	118	37.61	revision	seaward	33	4.06	118	37.32
60-fm	13	33	3.49	118	38.81	revision	seaward	33	3.31	118	38.74
60-fm	14	33	4.44	118	37.61	revision	seaward	33	4.06	118	37.32

Table 2-25. CDFG-proposed changes to RCA management lines in the Dana Point area.

Fathom Line	Point	Proposed Coordinates				Action	Long Change	Original Coordinates Published in the Federal Register			
		Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
50-fm	170	33	35.53	118	6.66	revision	seaward	33	35.85	118	7
50-fm	171	33	35.93	118	4.78	revision	seaward	33	36.12	118	4.15
50-fm	173	33	33.84	117	59.77	revision	seaward	33	34	117	59.53
50-fm	174	33	35.33	117	55.89	revision	seaward	33	35.44	117	55.67
50-fm	175	33	35.05	117	53.72	revision	seaward	33	35.15	117	53.55
50-fm	176	33	31.32	117	48.01	revision	seaward	33	31.12	117	47.4
50-fm	178	33	26.93	117	44.24	revision	seaward	33	26.93	117	43.98
50-fm	179	33	25.46	117	42.06	revision	seaward	33	25.44	117	41.63
50-fm	180	33	18.45	117	35.73	revision	seaward	33	19.5	117	36.08
50-fm	181	33	12.74	117	28.53	delete		33	12.74	117	28.53
50-fm	183	33	7.47	117	21.62	revision	seaward	33	7.5	117	21.52
50-fm		33	4.47	117	21.24	add	seaward				
60-fm	175	33	35.8	118	16.65	revision	seaward	33	35.98	118	16.54
60-fm	176	33	33.92	118	11.36	revision	seaward	33	34.15	118	11.22
60-fm	180	33	35.25	117	55.89	revision	seaward	33	35.44	117	55.65
60-fm	181	33	35.03	117	53.8	revision	seaward	33	35.15	117	53.54
60-fm	182	33	31.37	117	48.15	revision	seaward	33	31.12	117	47.39
60-fm	184	33	16.63	117	34.01	revision	seaward	33	16.42	117	32.92
60-fm	185	33	7.21	117	21.96	revision	seaward	33	6.66	117	21.59
60-fm		33	3.35	117	21.22	add	seaward				
60-fm		33	2.14	117	20.26	add	seaward				
75-fm	223	33	37.53	118	16.82	revision	seaward	33	37.48	118	16.73
75-fm	224	33	35.76	118	16.75	revision	seaward	33	36.01	118	16.55
75-fm	228	33	33.67	117	59.98	revision	seaward	33	33.75	117	59.82
75-fm	229	33	34.98	117	55.66	revision	seaward	33	35.1	117	55.68
75-fm	230	33	34.84	117	53.83	revision	seaward	33	34.91	117	53.76
75-fm	231	33	31.43	117	48.76	revision	seaward	33	30.77	117	47.56
75-fm	232	33	27.5	117	44.87	delete		33	27.5	117	44.87
75-fm	233	33	16.61	117	34.49	revision	seaward	33	16.89	117	34.37
75-fm	234	33	7.43	117	22.4	revision	seaward	33	6.66	117	21.59
75-fm	235	33	2.93	117	21.12	revision	seaward	33	3.35	117	20.92
75-fm		33	2.09	117	20.28	add	seaward				

Table 2-26. CDFG-proposed changes to RCA management lines in the San Diego area.

Fathom Line	Point	Proposed Coordinates				Action	Long Change	Original Coordinates Published in the Federal Register			
		Lat		Long				Lat		Long	
		Deg	Min	Deg	Min			Deg	Min	Deg	Min
50-fm	184	32	59.89	117	19.11	revision	seaward	32	59.77	117	18.83
50-fm		32	57.41	117	18.64	add	seaward				
50-fm	185	32	55.71	117	18.99	revision	seaward	32	56.1	117	18.37
50-fm	187	32	52.34	117	16.73	revision	seaward	32	51.89	117	16.42
50-fm		32	52.64	117	17.76	add	seaward				
50-fm	190	32	45.09	117	20.68	delete		32	45.09	117	20.68
50-fm	191	32	41.93	117	19.68	revision	seaward	32	43.62	117	18.68
50-fm	192	32	33.59	117	17.89	revision	seaward	32	33.43	117	17
60-fm	186	32	59.87	117	19.16	revision	seaward	33	0.08	117	19.02
60-fm		32	57.39	117	18.72	add	seaward				
60-fm	187	32	55.87	117	19.17	revision	seaward	32	56.11	117	18.41
60-fm		32	55.31	117	18.8	add	seaward				
60-fm	188	32	54.38	117	17.09	revision	seaward	32	54.43	117	16.93
60-fm	189	32	52.81	117	16.94	revision	seaward	32	51.89	117	16.42
60-fm	190	32	52.56	117	19.3	revision	seaward	32	52.61	117	19.5
60-fm		32	50.86	117	20.98	add	seaward				
60-fm		32	45.58	117	22.38	add	seaward				
60-fm	193	32	43.6	117	20.72	revision	seaward	32	43.52	117	19.32
60-fm		32	41.52	117	20.12	add	seaward				
60-fm		32	37	117	20.1	add	seaward				
60-fm		32	34.76	117	18.77	add	seaward				
60-fm	194	32	33.7	117	18.46	revision	seaward	32	33.56	117	17.72
75-fm	236	32	59.91	117	19.28	revision	seaward	33	0.07	117	19.02
75-fm		32	57.27	117	18.82	add	seaward				
75-fm	237	32	56.17	117	19.43	revision	seaward	32	55.99	117	18.6
75-fm		32	55.22	117	19.09	add	seaward				
75-fm	238	32	54.3	117	17.13	revision	seaward	32	54.43	117	16.93
75-fm	239	32	52.89	117	17.03	revision	seaward	32	52.13	117	16.55
75-fm		32	50.85	117	21.14	add	seaward				
75-fm	241	32	47.11	117	22.95	revision	seaward	32	46.95	117	22.81
75-fm	242	32	45.66	117	22.6	revision	seaward	32	45.01	117	22.07
75-fm	243	32	42.99	117	20.7	revision	seaward	32	43.4	117	19.8
75-fm		32	40.72	117	20.23	add	seaward				
75-fm		32	38.11	117	20.59	add	seaward				
75-fm	244	32	33.83	117	19.18	revision	seaward	32	33.74	117	18.67
100-fm	294	32	53.36	117	19.97	revision	seaward	32	53.34	117	19.13

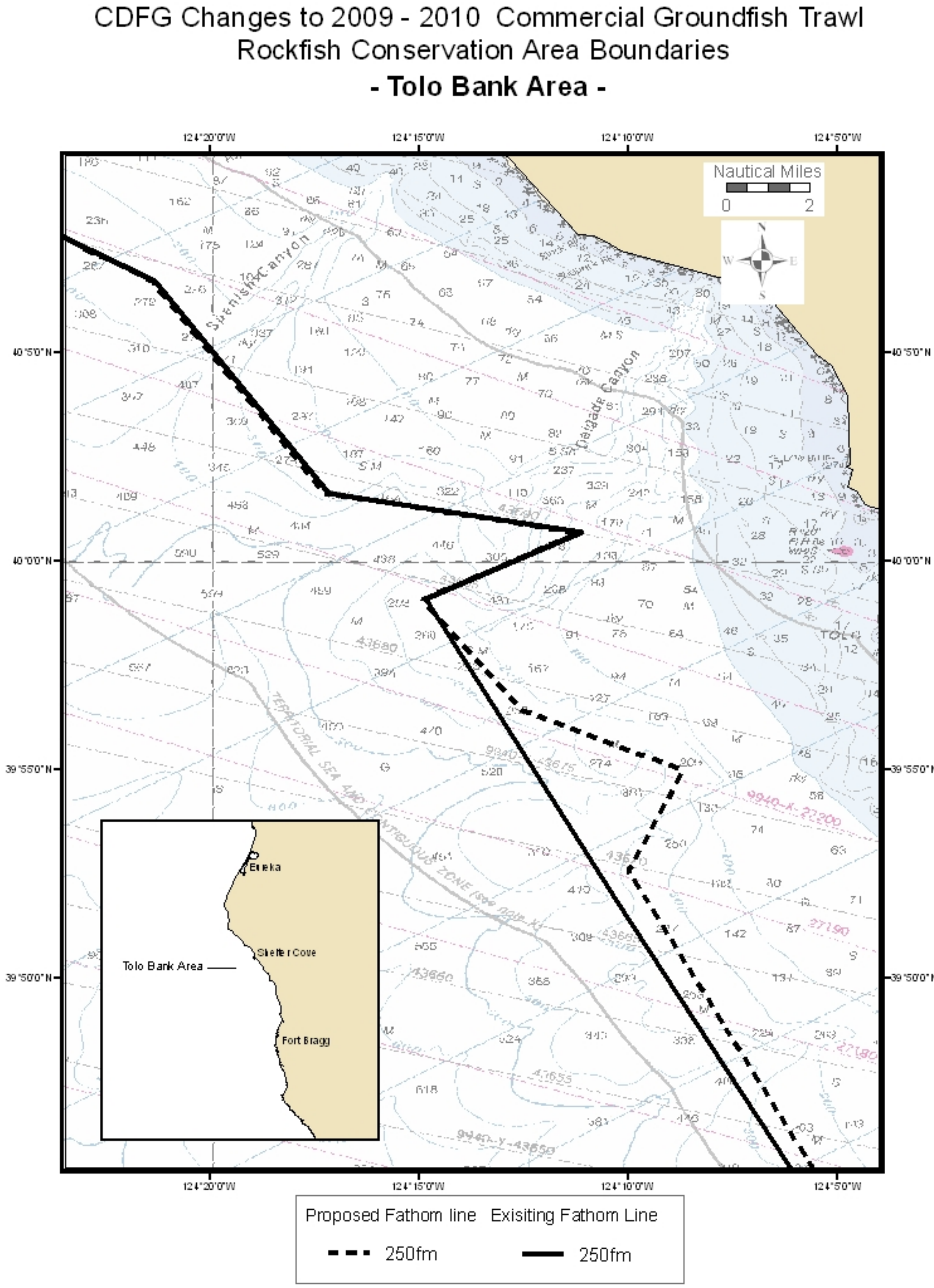


Figure 2-5. CDFG-proposed changes to RCA management lines in the Tolo Bank area.

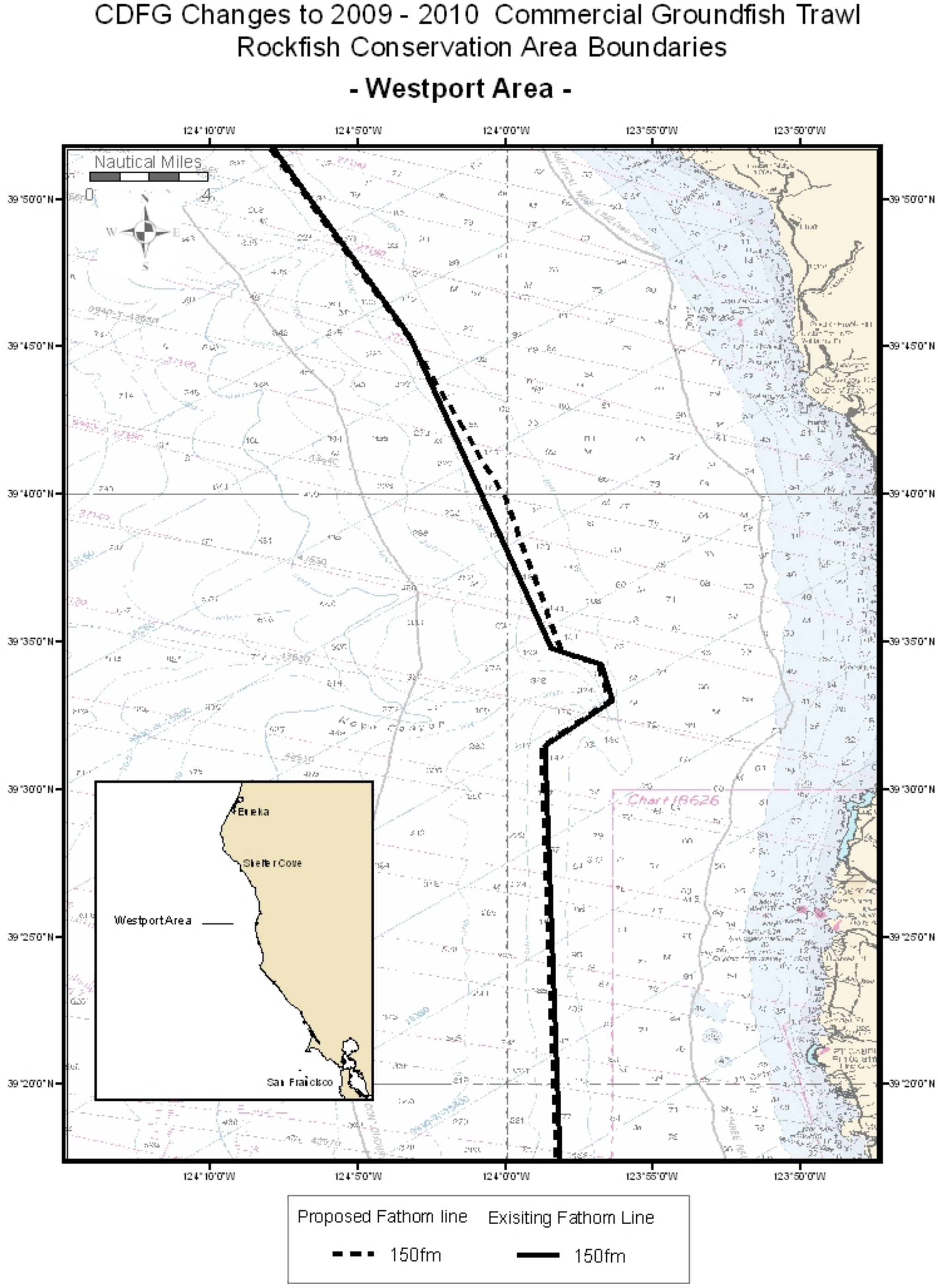


Figure 2-6. CDFG-proposed changes to RCA management lines in the Westport area.

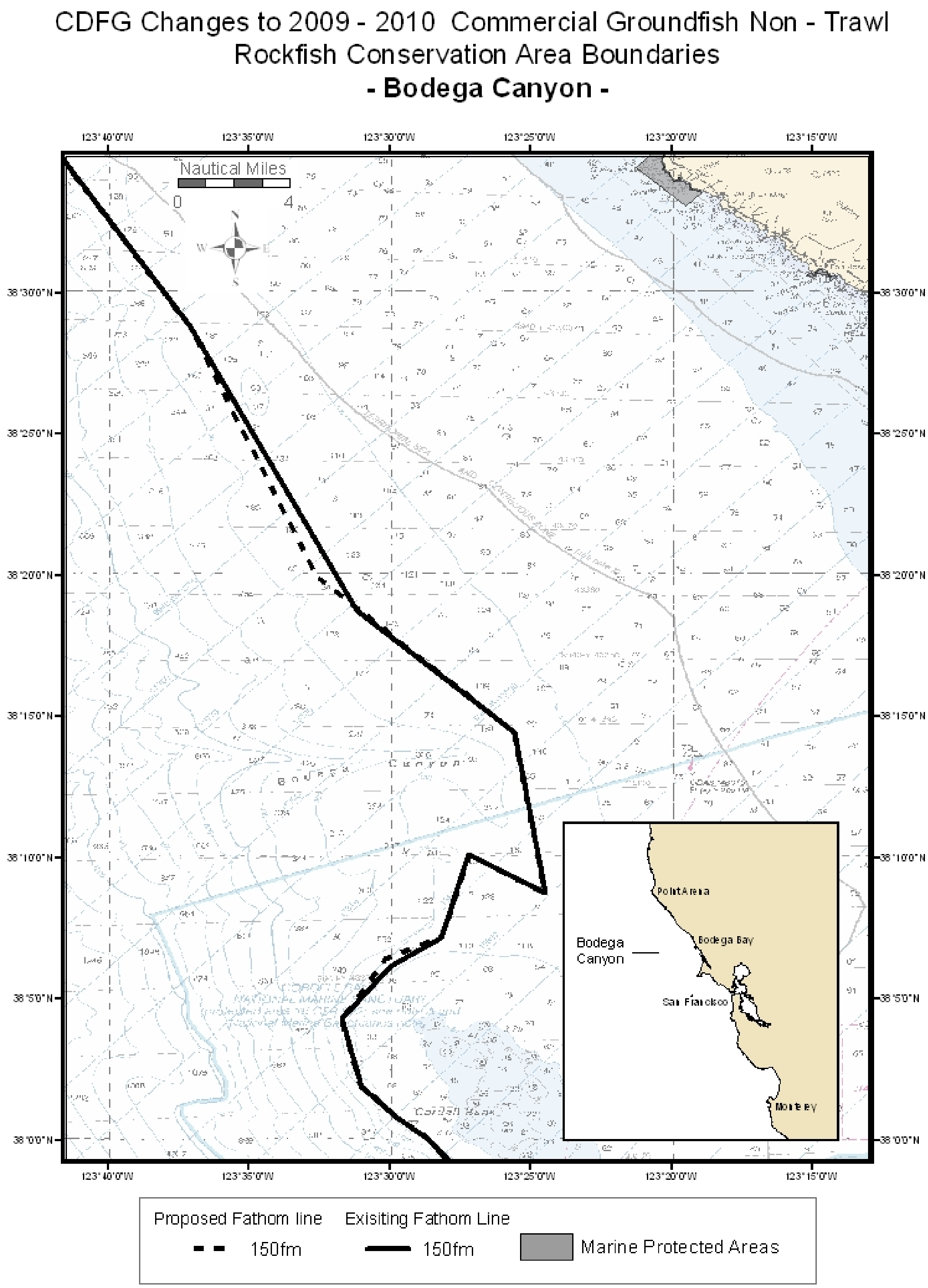


Figure 2-7. CDFG-proposed changes to RCA management lines in Bodega Canyon.

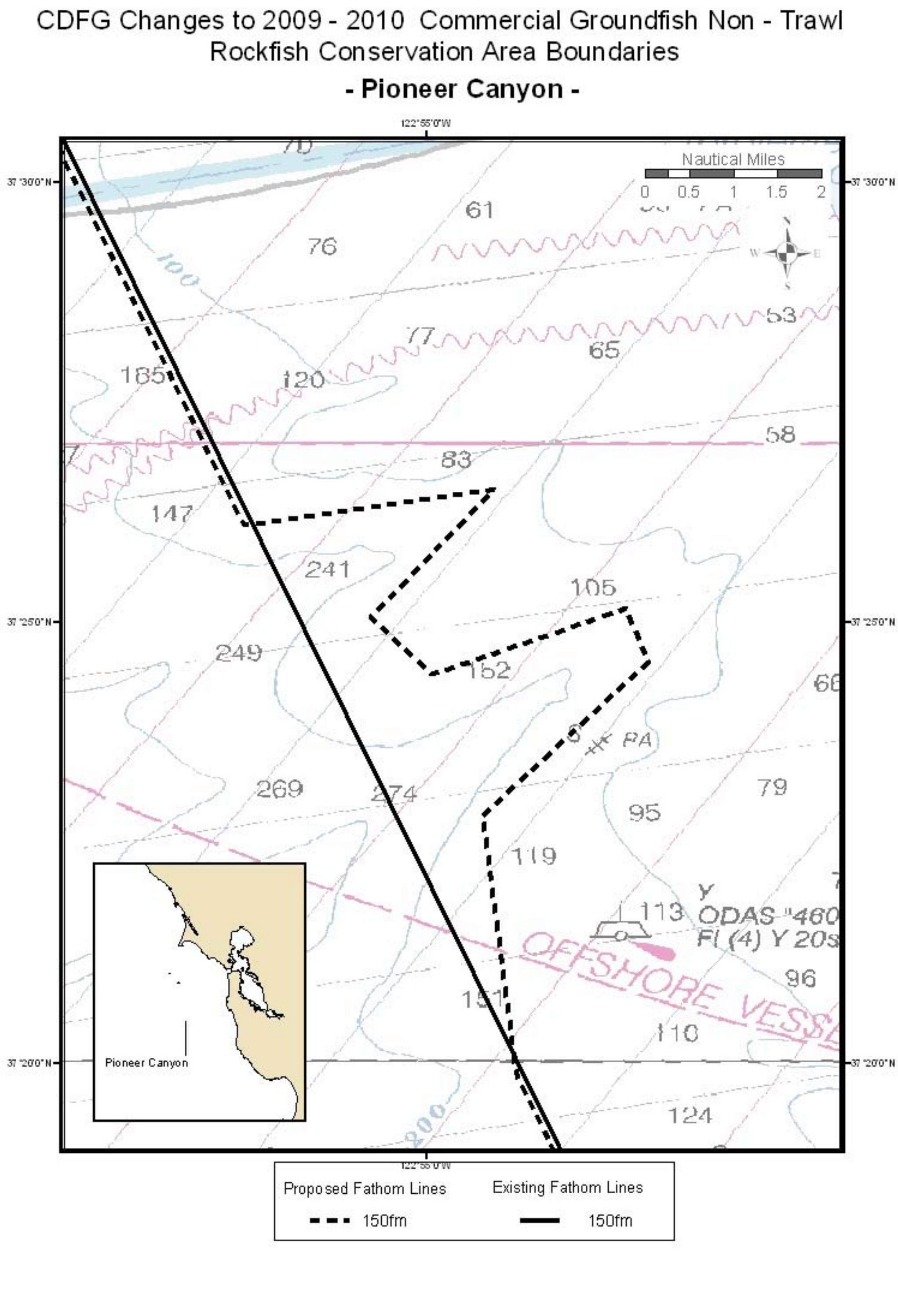


Figure 2-8. CDFG-proposed changes to RCA management lines in Pioneer Canyon.

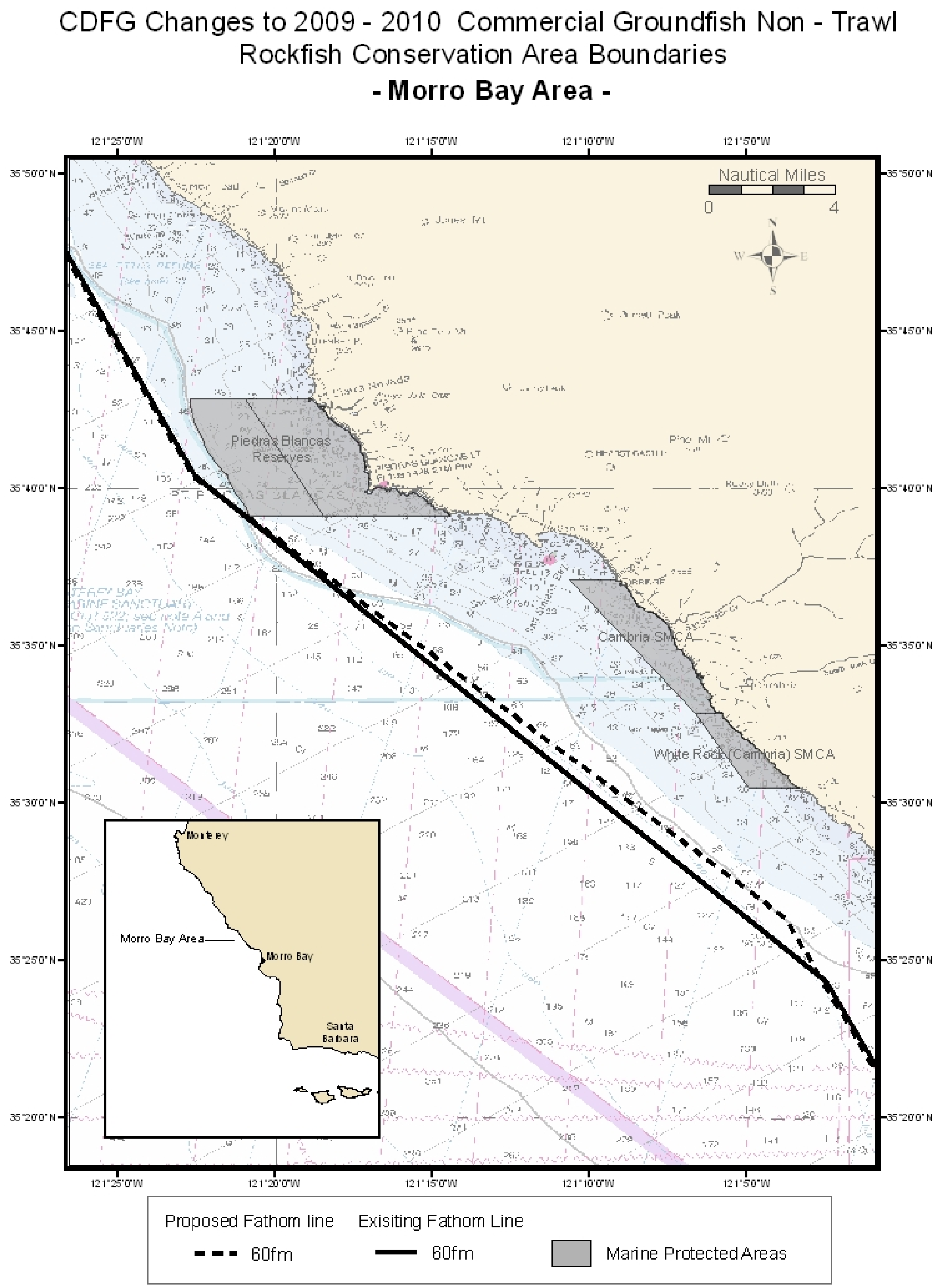


Figure 2-9. CDFG-proposed changes to RCA management lines in the Morro Bay area.

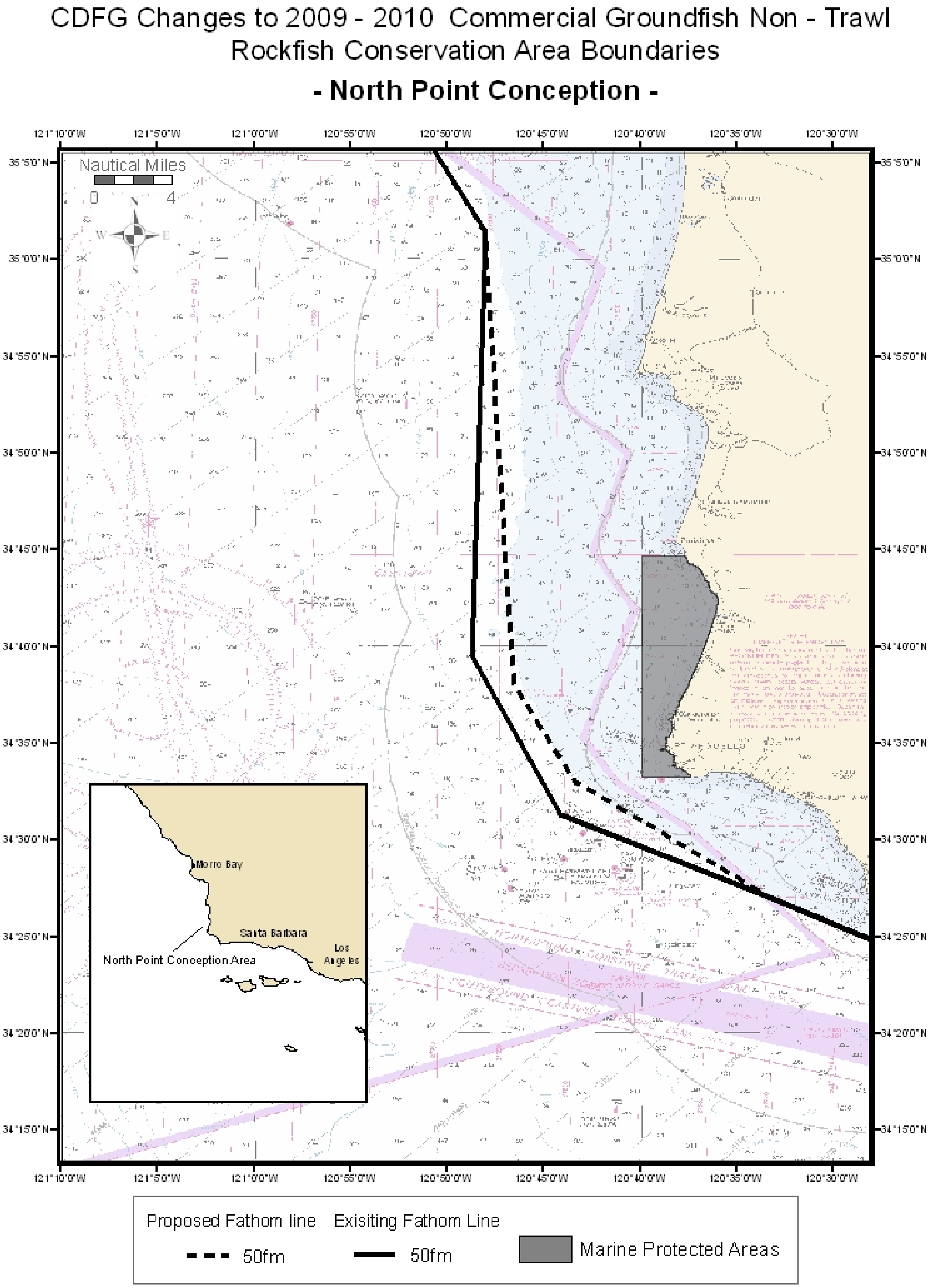


Figure 2-10. CDFG-proposed changes to RCA management lines in the North Point Conception area.

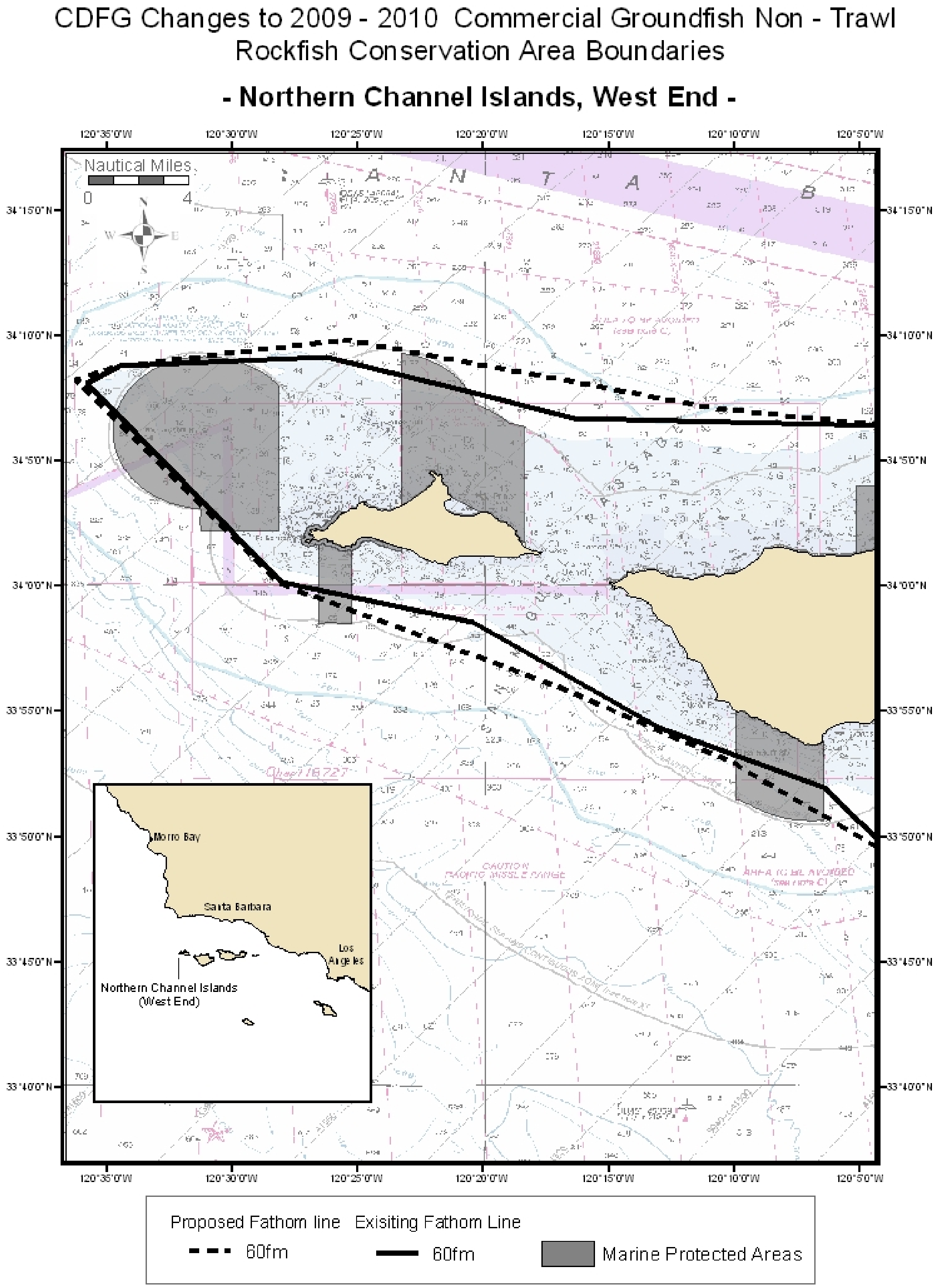


Figure 2-11. CDFG-proposed changes to RCA management lines in the North Channel Island area.

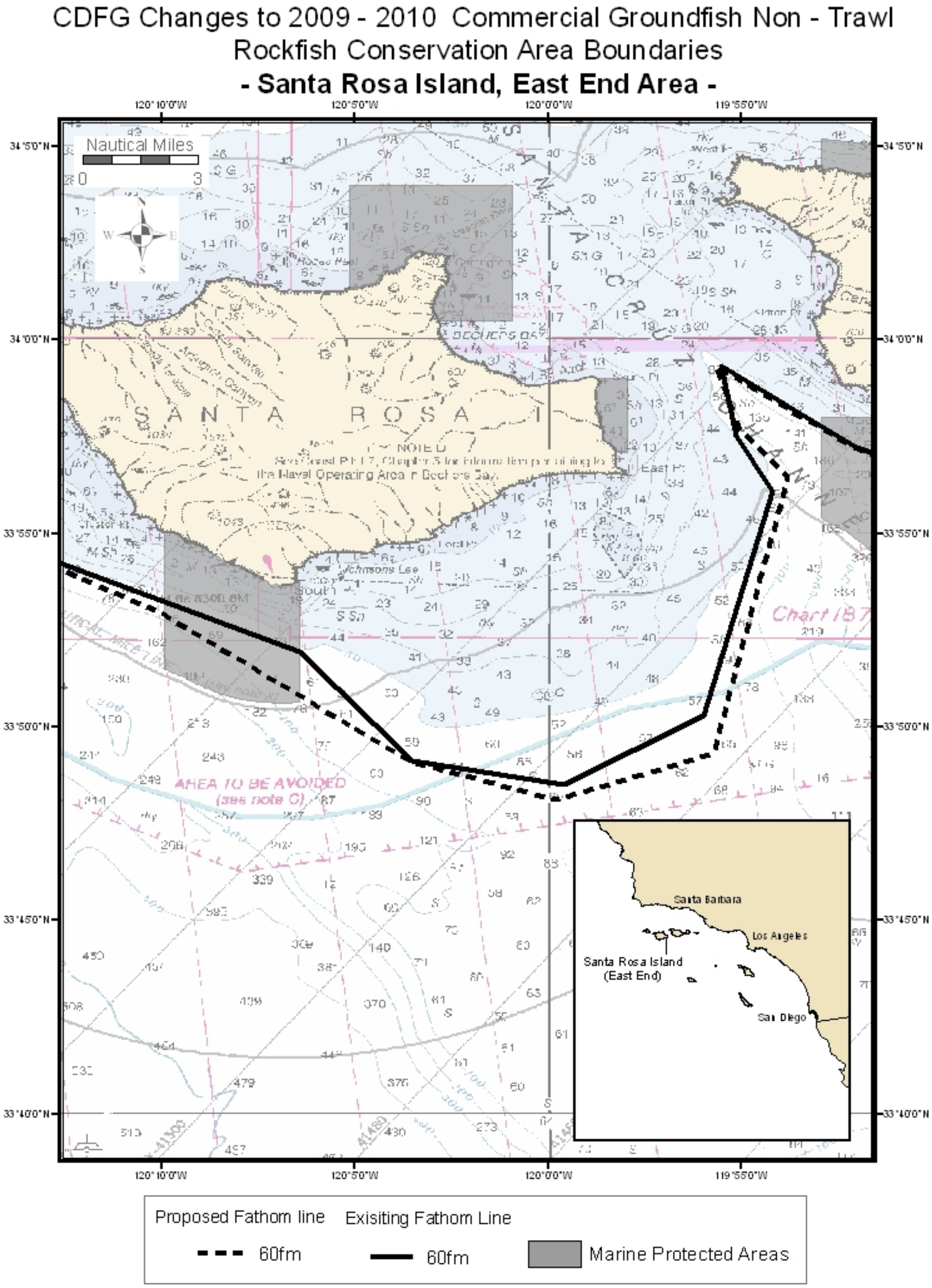


Figure 2-12. CDFG-proposed changes to RCA management lines in the east end area of Santa Rosa Island.

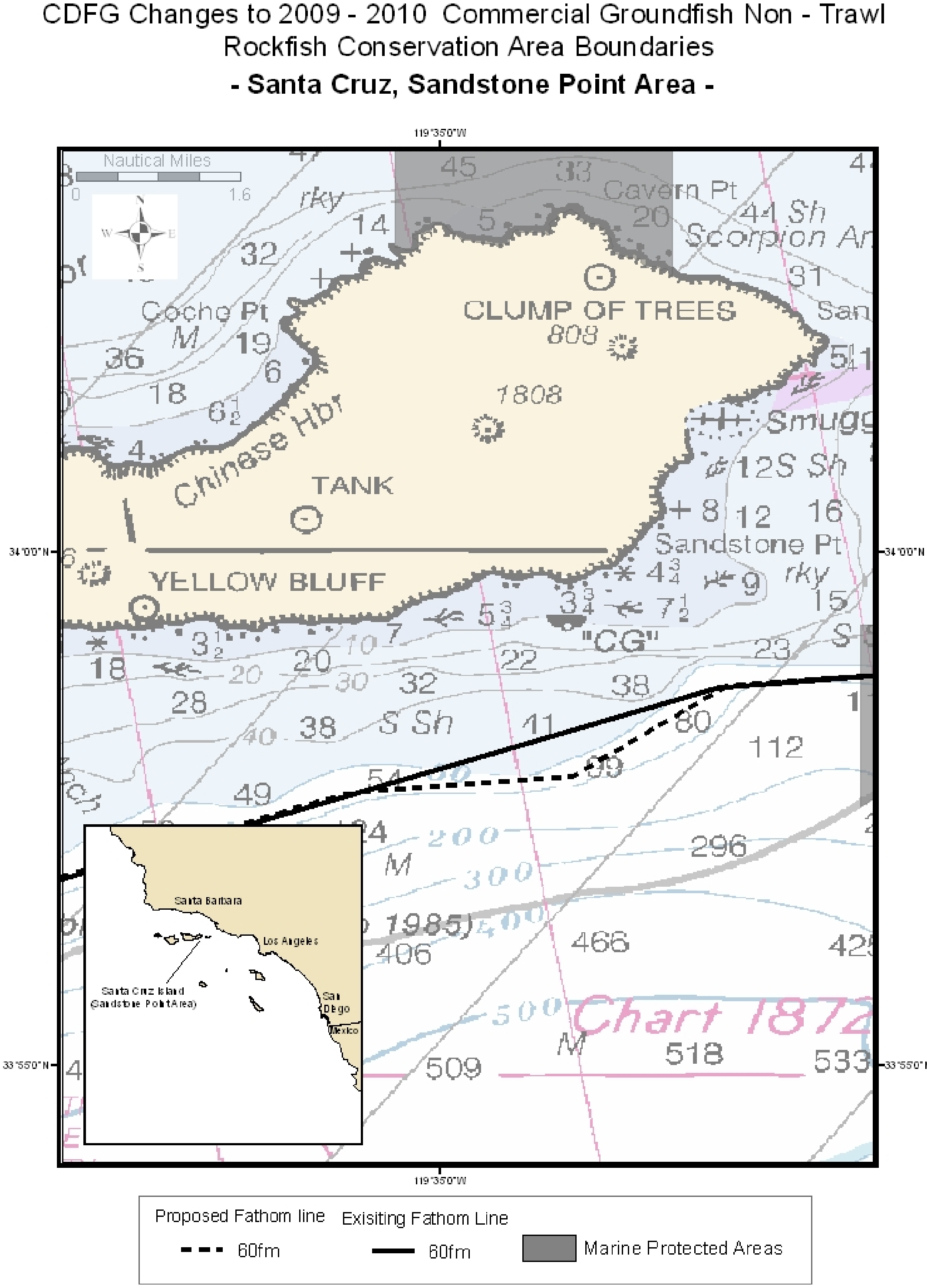


Figure 2-13. CDFG-proposed changes to RCA management lines in the Sandstone Point area of Santa Cruz Island.

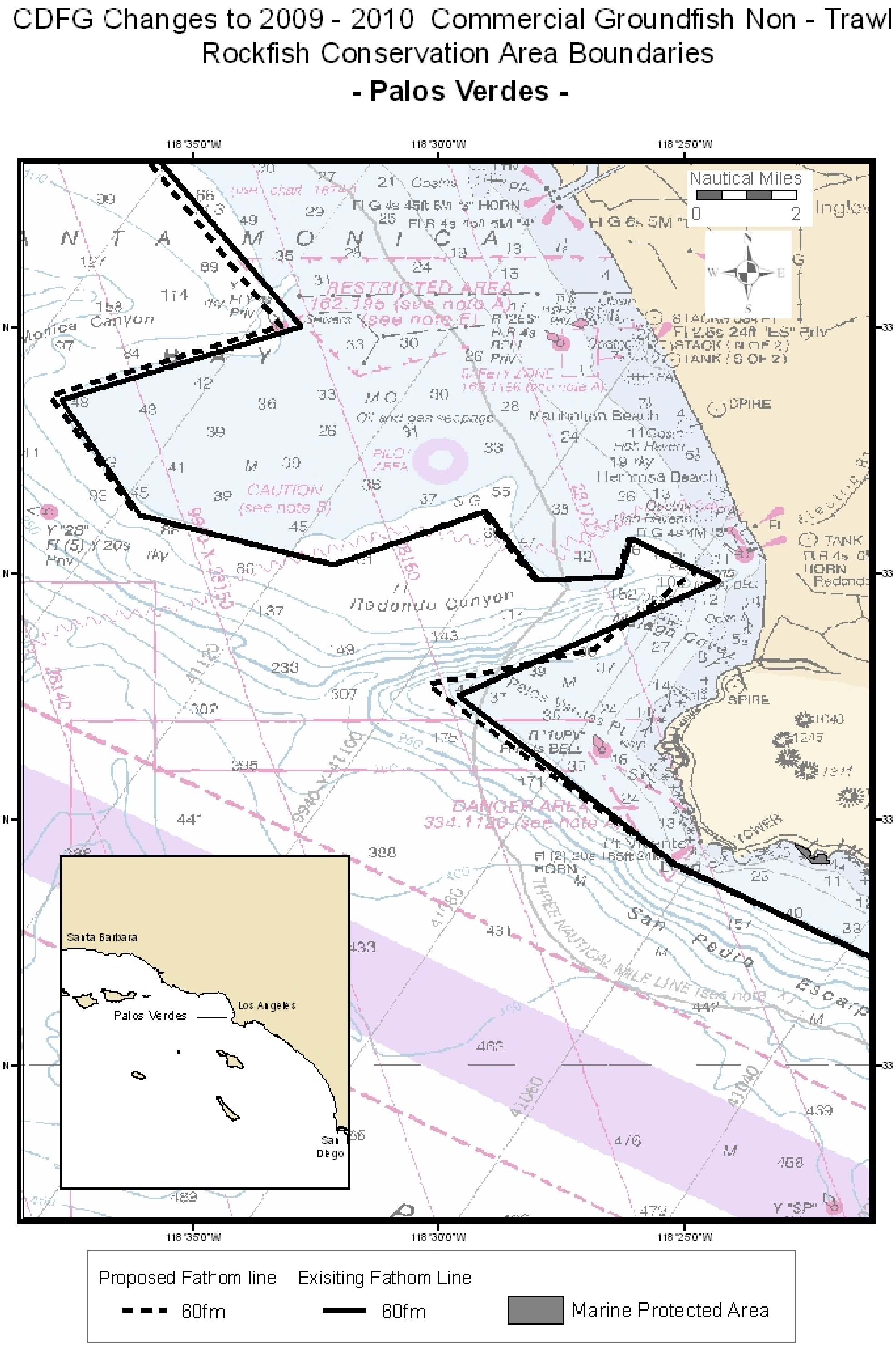


Figure 2-14. CDFG-proposed changes to RCA management lines in the Palos Verdes area.

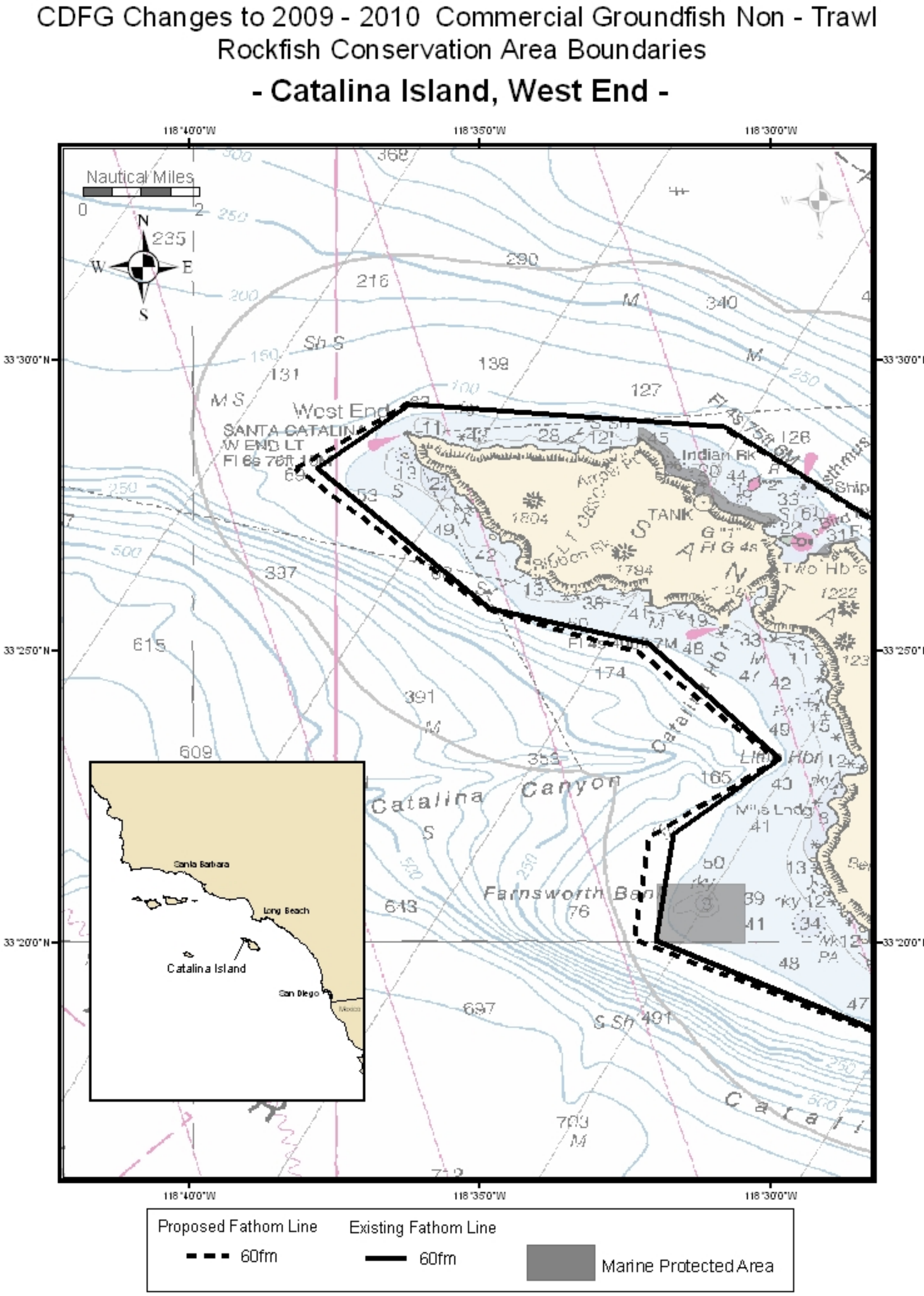


Figure 2-15. CDFG-proposed changes to RCA management lines in the west end area of Catalina Island.

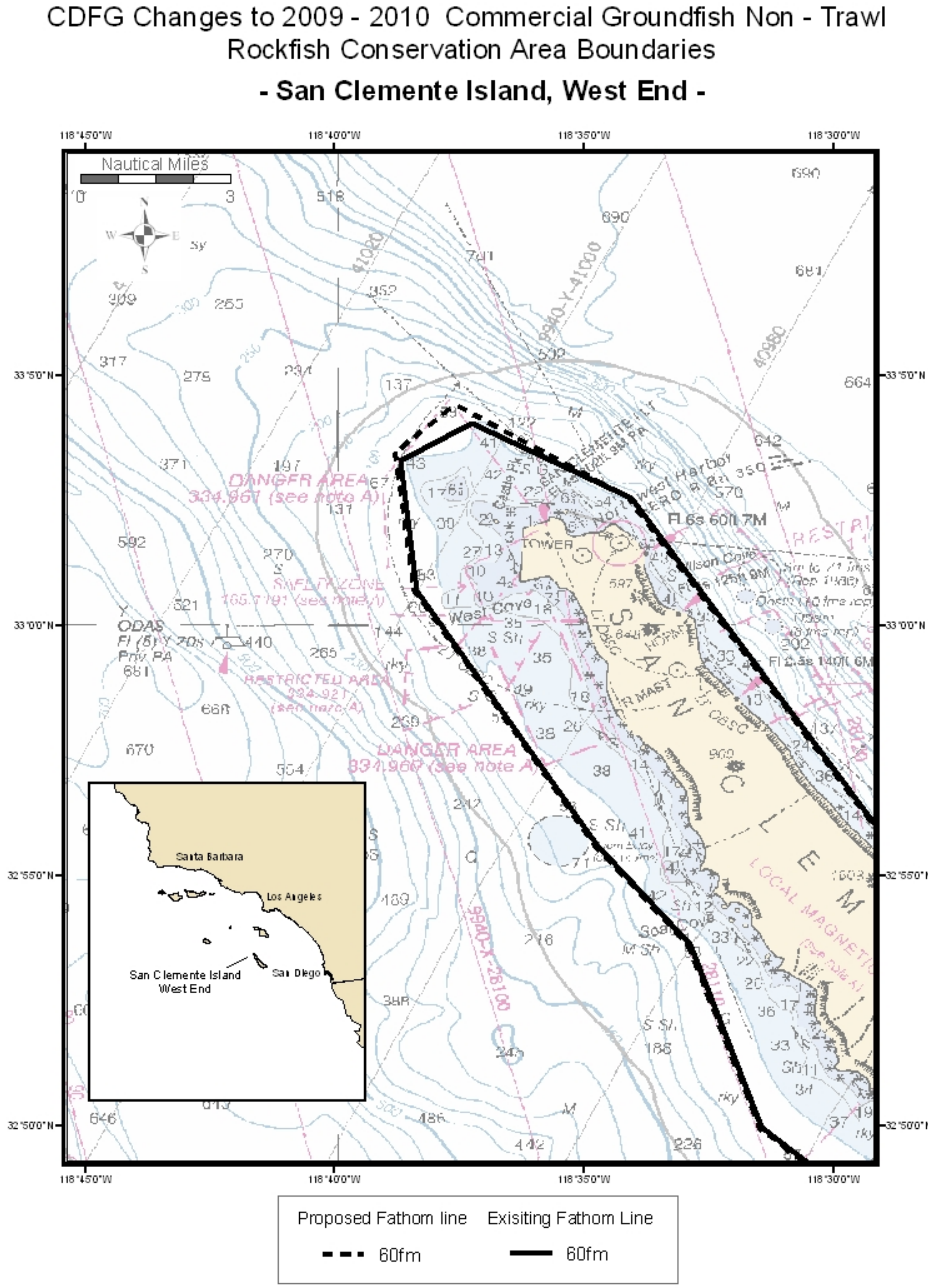


Figure 2-16. CDFG-proposed changes to RCA management lines in the west end area of San Clemente Island.

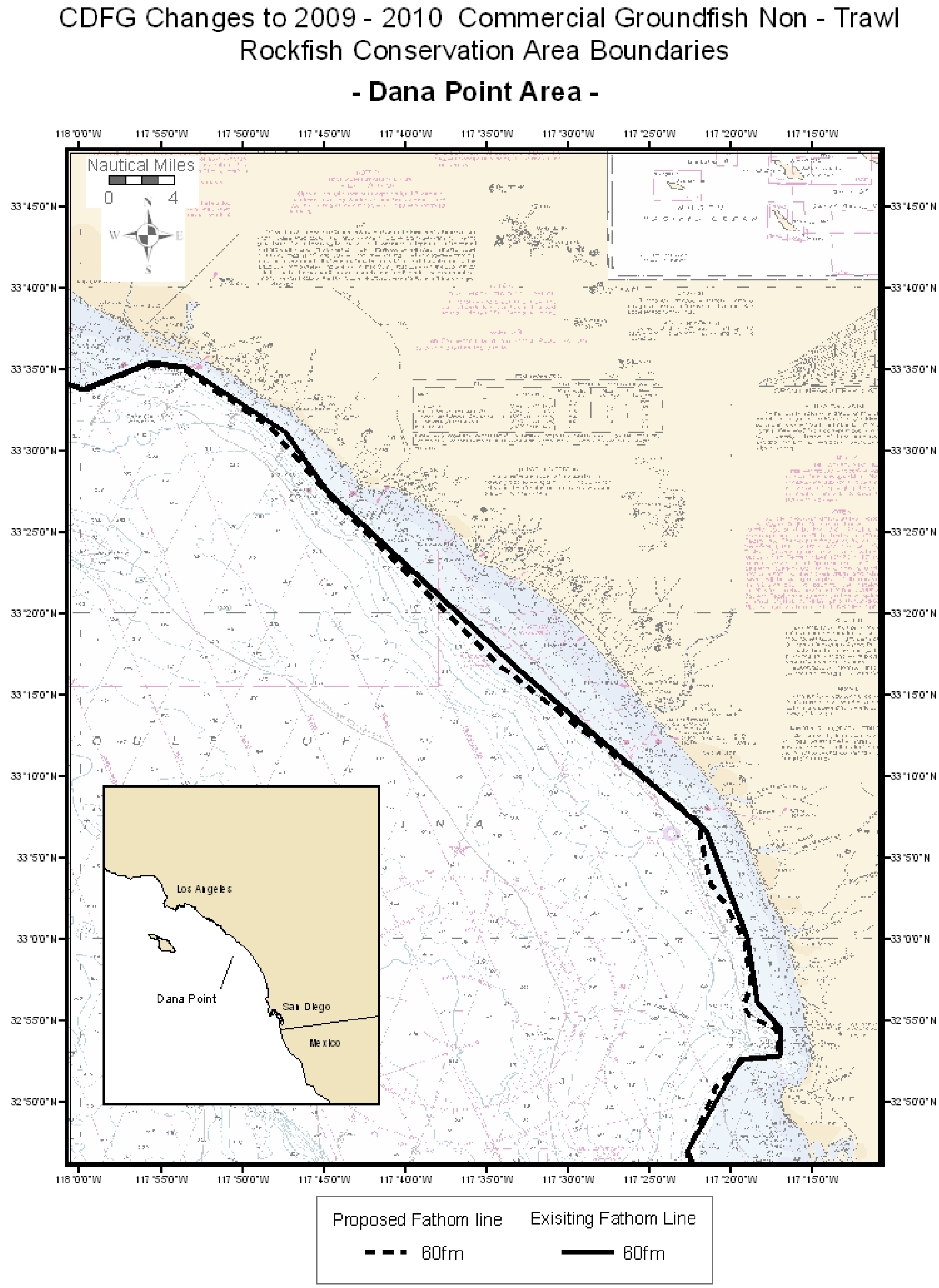


Figure 2-17. CDFG-proposed changes to RCA management lines in the Dana Point area.

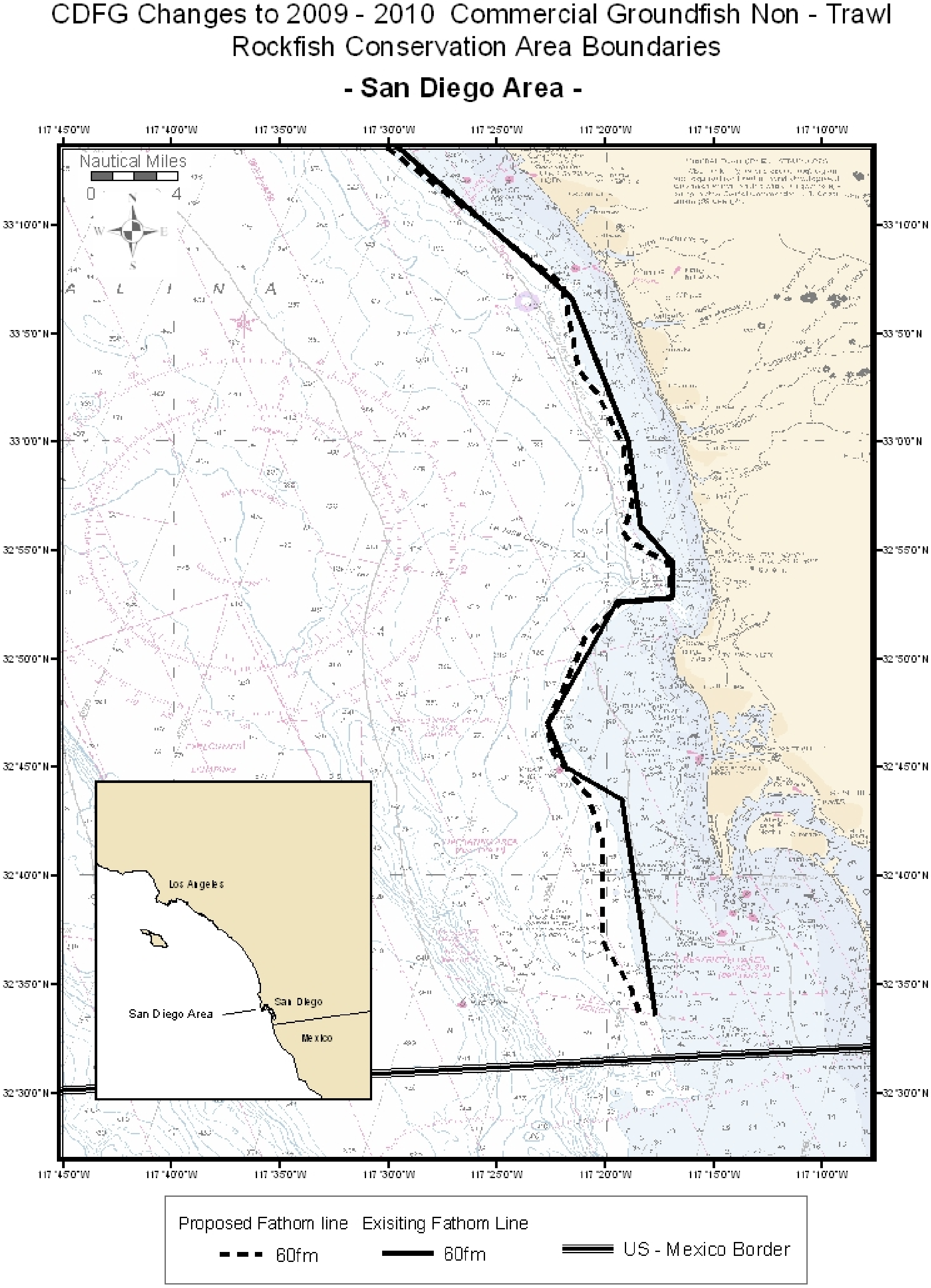


Figure 2-18. CDFG-proposed changes to RCA management lines in the San Diego area.

2.2.4 Description of the Management Measure Alternatives

The No Action Alternative is described by the 2007 and 2008 management measures specified in Federal and state regulations. All of the action alternatives described in this chapter will be compared to the No Action Alternative. Some of these management measures were changed beginning in 2008 in reaction to problems that arose in managing the 2007 fishery. While 2007 management measures, including inseason adjustments, are described in detail, the 2008 management measures and projected impacts are the central focus when comparing all action alternatives to the No Action Alternative. Projected impacts of depleted groundfish species under the No Action Alternative are depicted in Table 2-27.

2.2.4.1 *The No Action Alternative*

The projected impacts on depleted species for 2007 and 2008 by fishing sector are provided in Tables 4-3 and 2-27, respectively. A description of the management measures by fishing sector under the No Action Alternative follows.

Table 2-27. Projected impacts of depleted groundfish species by west coast fishing sector in 2008.

Fishery	Bocaccio b/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting	**11.7**	**9.1**	**0.0**	**258.6**	**81.5**	**7.1**	**0.6**
Limited Entry Trawl- Whiting							
At-sea whiting motherships a/					1.9		0.0
At-sea whiting cat-proc a/		**4.7**		**40.0**		**275-295.6**	0.0
Shoreside whiting a/					0.0		0.0
Tribal whiting		0.7		0.0	0.6	6.1	0.0
Tribal							
Midwater Trawl		1.8		0.0	0.0	40.0	0.0
Bottom Trawl		0.8		0.0	3.7	0.0	0.0
Troll		0.5		0.0	0.0		0.0
Fixed gear		0.3		0.0	0.0	0.0	2.3
Limited Entry Fixed Gear		1.1					1.5
Sablefish	13.4		0.0	0.6	0.3	0.9	
Non-Sablefish			0.1	0.4		0.5	
Open Access: Directed Groundfish		1.0					
Sablefish DTL	0.0	0.2		0.2	0.1	0.0	0.3
Nearshore (North of 40°10' N. lat.)	0.0	2.6	0.1	0.0	0.0	0.5	1.6
Nearshore (South of 40°10' N. lat.)	0.1			0.0	0.0		
Other	10.6			0.0	0.0	0.0	0.1
Open Access: Incidental Groundfish							
CA Halibut	0.1	0.0		0.0	0.0		
CA Gillnet c/	0.5			0.0	0.0	0.0	
CA Sheephead c/				0.0	0.0	0.0	0.0
CPS- wetfish c/	0.3						
CPS- squid d/							
Dungeness crab c/	0.0		0.0	0.0	0.0		

Table 2-27. Projected impacts of depleted groundfish species by west coast fishing sector in 2008 (continued).

<table>
<tr><th>Fishery</th><th>Bocaccio b/</th><th>Canary</th><th>Cowcod</th><th>Dkbl</th><th>POP</th><th>Widow</th><th>Yelloweye</th></tr>
<tr><td>HMS b/</td><td></td><td>0.0</td><td>0.0</td><td>0.0</td><td></td><td></td><td></td></tr>
<tr><td>Pacific Halibut c/</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td></tr>
<tr><td>Pink shrimp</td><td>0.1</td><td>0.1</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.1</td><td>0.1</td></tr>
<tr><td>Ridgeback prawn</td><td>0.1</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td></tr>
<tr><td>Salmon troll</td><td>0.2</td><td>0.8</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.3</td><td>0.2</td></tr>
<tr><td>Sea Cucumber</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td></tr>
<tr><td>Spot Prawn (trap)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Recreational Groundfish e/</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>WA</td><td></td><td rowspan="2">5.7</td><td></td><td></td><td></td><td></td><td rowspan="2">6.2</td></tr>
<tr><td>OR</td><td></td><td></td><td></td><td></td><td>1.4</td></tr>
<tr><td>CA</td><td>49.5</td><td>9.0</td><td>0.3</td><td></td><td></td><td>6.1</td><td>2.1</td></tr>
<tr><td>EFPs</td><td>11.0</td><td>0.1</td><td>0.2</td><td>1.0</td><td></td><td>3.4</td><td>0.1</td></tr>
<tr><td colspan="8">Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs. f/</td></tr>
<tr><td></td><td>2.0</td><td>5.5</td><td>0.2</td><td>2.0</td><td>2.0</td><td>1.1</td><td>3.0</td></tr>
<tr><td>TOTAL</td><td>99.6</td><td>44.0</td><td>0.9</td><td>302.9</td><td>90.1</td><td>342.5-363.5</td><td>18.9</td></tr>
<tr><td>2008 OY</td><td>218</td><td>44.0</td><td>4.0</td><td>330</td><td>150</td><td>368</td><td>20</td></tr>
<tr><td>Difference</td><td>118.4</td><td>0.0</td><td>3.1</td><td>27.1</td><td>59.9</td><td>4.5-25.5</td><td>1.1</td></tr>
<tr><td>Percent of OY</td><td>45.7%</td><td>100.0%</td><td>22.5%</td><td>91.8%</td><td>60.1%</td><td>-</td><td>94.3%</td></tr>
<tr><td>Key</td><td></td><td colspan="6">= either not applicable; trace amount (<0.01 mt); or not reported in available data sources.</td></tr>
<tr><td colspan="8">a/ Non-tribal whiting numbers reflect bycatch limits for the non-tribal whiting sectors.
b/ South of 40°10' N. lat.
c/ Mortality estimates are not hard numbers; based on the GMT's best professional judgment.
d/ Bycatch amounts by species unavailable, but bocaccio occurred in 0.1% of all port samples and other rockfish in another 0.1% of all port samples (and squid fisheries usually land their whole catch).
e/ Values in scorecard represent projected impacts for WA and OR. However, harvest guidelines for 2008 are as follows: canary in WA and OR combined = 8.2 mt; yelloweye in WA and OR combined = 6.8 mt. For California, harvest guidelines are represented.
f/ Research projections updated November 2007.</td></tr>
</table>

Limited Entry Non-Whiting Trawl

The 2008 trawl trip limits and seasonal RCA configurations (as of May 2008) describe the No Action Alternative and are shown in Tables 2-28 (north of 40°10' N latitude) and 2-29 (south of 40°10' N latitude).

Selective flatfish trawls have been mandated for the limited entry trawl fishery operating shoreward of the trawl RCA north of 40°10' N latitude since 2005. The selective flatfish trawl, configured with a cut-back headrope, a low rise, and a small (≤ 8 in. diameter) footrope, is designed to reduce rockfish bycatch while efficiently catching flatfish. The selective flatfish trawl works by allowing rockfish to escape by swimming upward when they encounter the trawl. Flatfish tend to dive down when disturbed, which accounts for the differential selectivity of these trawls to rockfish and flatfish.

Minimizing the trawl bycatch of canary rockfish north of 40°10' N latitude has driven much of the management decision-making in 2007-08. The area north of Cape Alava at 48°10' N latitude shoreward of the trawl RCA was closed to the shoreline for much of 2007 and through 2008 (as of May 2008) because new WCGOP data indicated a higher than expected canary bycatch rate (Table 2-28). Likewise, the area shoreward of the trawl RCA between Cape Arago, Oregon at 43°20.83' N latitude and Humbug Mountain, Oregon at 42°40.50' N latitude was closed to the shoreline in 2008 for the same reason. Trip limits for Dover sole, thornyheads, and sablefish (DTS species), which are found in deep water seaward of the trawl RCA, were increased as an incentive for more trawl fishermen to fish deeper in the north to avoid canary.

Scottish seine gear is exempted from trawl RCA closures in the area between 38° N latitude and 36° N latitude, where low bycatch rates of overfished species were previously demonstrated through an EFP. The exemption is also limited to depths less than 100 fm. This encompasses the primary flatfish target areas but reduces risk associated with the exemption. VMS must be used and the operator is required to adhere to declaration requirements to provide for enforcement of this exemption. The gear remained within the WCGOP pool, enabling monitoring of bycatch rates.

One yelloweye RCA off the Washington coast, South Coast Area B (Figure 2-19) was a voluntary "area to be avoided" for commercial groundfish fisheries.

Though not much bottom trawling is done south of Pt. Conception at 34°27' N latitude in the Southern California Bight, bottom trawling and other bottom fishing activities are prohibited in two discrete areas called the Cowcod Conservation Areas (Figure 2-20).

Coordinates defining these YRCAs are provided in Federal regulations at 50 CFR 660.390.

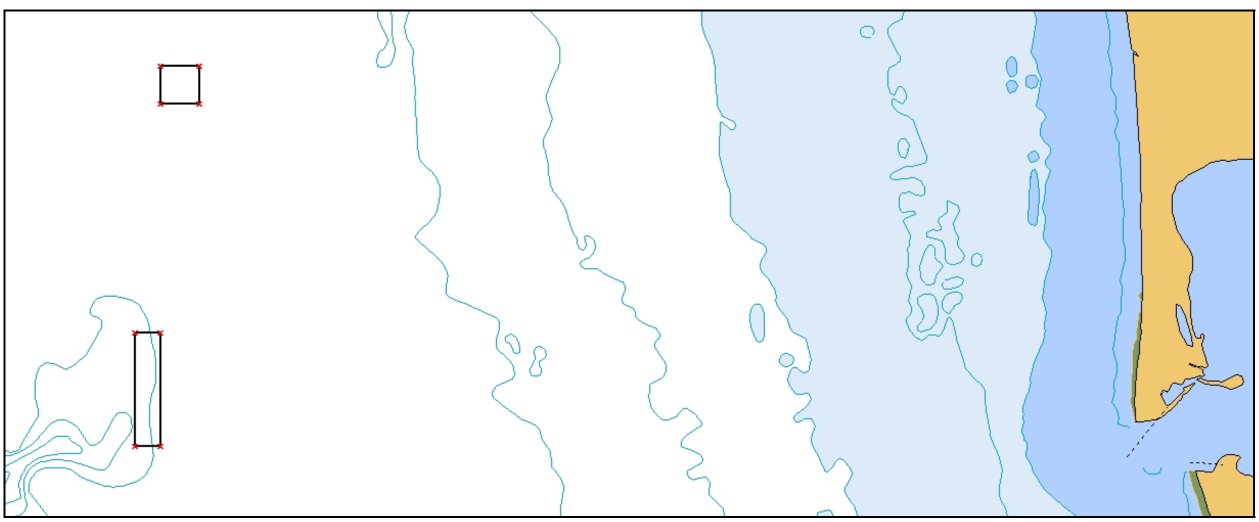


Figure 2-19. Two proposed Yelloweye Rockfish Conservation Areas (WA South Coast A and B) in waters off the Washington south coast where all fishing would be prohibited in 2007-08. Only WA South Coast B, the southernmost YRCA in the figure, was adopted in Federal regulations for 2007-08 as a mandatory closed area for recreational groundfish and Pacific halibut fisheries and a voluntary area to be avoided in 2007-08 commercial fisheries.

Table 2-28. The status quo limited entry trawl trip limits and RCA restrictions north of 40°10' N latitude as of May 2008.

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[6/]:						
1	North of 48°10.00' N. lat.	shore - modified 200 fm [7/]	shore - 200 fm	shore - 150 fm			shore - modified 200 fm [7/]
2	48°10.00' N. lat. - 46°38.17' N. lat.	75 fm - modified 200 fm [7/]	60 fm - 200 fm	60 fm - 150 fm			75 fm - modified 200 fm [7/]
3	46°38.17' N. lat. - 46°16.00 N. lat.		60 fm - 200 fm		60 fm - 150 fm		
4	46°16.00 N. lat. - 45°46.00' N. lat.		75 fm - 200 fm	75 fm - 150 fm		75 fm - 200 fm	
5	45°46.00' N. lat. - 43°20.83' N. lat.		75 fm - 200 fm				
6	43°20.83' N. lat. - 42°40.50' N. lat.	shore - modified 200 fm [7/]	shore - 200fm				shore - modified 200 fm [7/]
7	42°40.50' N. lat. -40°10.00' N. lat.	75 fm - modified 200 fm [7/]	75 fm - 200 fm	60 fm - 200 fm			75 fm - modified 200 fm [7/]
	Selective flatfish trawl gear is required shoreward of the RCA; all trawl gear (large footrope, selective flatfish trawl, and small footrope trawl gear) is permitted seaward of the RCA. Large footrope trawl gear is prohibited shoreward of the RCA. Midwater trawl gear is permitted only for vessels participating in the primary whiting season.						
	See § 660.370 and § 660.381 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 and §§ 660.396-660.399 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, Cordell Banks, and EFHCAs).						
	State trip limits and seasons may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
8	**Minor slope rockfish[2/] & Darkblotched rockfish**	1,500 lb/ 2 months					
9	**Pacific ocean perch**	1,500 lb/ 2 months					
10	**DTS complex**						
11	Sablefish						
12	large & small footrope gear	14,000 lb/ 2 months		19,000 lb/ 2 months			14,000 lb/ 2 months
13	selective flatfish trawl gear	5,000 lb/ 2 months					
14	multiple bottom trawl gear [8/]	5,000 lb/ 2 months					
15	Longspine thornyhead						
16	large & small footrope gear	25,000 lb/ 2 months					
17	selective flatfish trawl gear	3,000 lb/ 2 months					
18	multiple bottom trawl gear [8/]	3,000 lb/ 2 months					
19	Shortspine thornyhead						
20	large & small footrope gear	12,000 lb/ 2 months		25,000 lb/ 2 months			
21	selective flatfish trawl gear	3,000 lb/ 2 months					
22	multiple bottom trawl gear [8/]	3,000 lb/ 2 months					
23	Dover sole						
24	large & small footrope gear	80,000 lb/ 2 months					
25	selective flatfish trawl gear	40,000 lb/ 2 months	50,000 lb/ 2 months	40,000 lb/ 2 months			
26	multiple bottom trawl gear [8/]	40,000 lb/ 2 months	50,000 lb/ 2 months	40,000 lb/ 2 months			

Table 2-28. The status quo limited entry trawl trip limits and RCA restrictions north of 40°10' N latitude as of May 2008 (continued).

27	**Whiting**				
28	midwater trawl	Before the primary whiting season: CLOSED. -- During the primary season: mid-water trawl permitted in the RCA. See §660.373 for season and trip limit details. -- After the primary whiting season: CLOSED.			
29	large & small footrope gear	Before the primary whiting season: 20,000 lb/trip. -- During the primary season: 10,000 lb/trip. -- After the primary whiting season: 10,000 lb/trip.			
30	**Flatfish** (except Dover sole)				
31	Arrowtooth flounder				
32	large & small footrope gear	150,000 lb/ 2 months			
33	selective flatfish trawl gear	10,000 lb/ 2 months			
34	multiple bottom trawl gear [8/]	10,000 lb/ 2 months			
35	Other flatfish [3/], English sole, starry flounder, & Petrale sole				
36	large & small footrope gear for Other flatfish[3/], English sole, & starry flounder	110,000 lb/ 2 months	110,000 lb/ 2 months, no more than 30,000 lb/ 2 months of which may be petrale sole.	110,000 lb/ 2 months, no more than 20,000 lb/ 2 months of which may be petrale sole.	110,000 lb/ 2 months
37	large & small footrope gear for Petrale sole	40,000 lb/ 2 months			40,000 lb/ 2 months
38	selective flatfish trawl gear for Other flatfish[3/], English sole, & starry flounder	70,000 lb/ 2 months, no more than 10,000 lb/ 2 months of which may be petrale sole.	70,000 lb/ 2 months, no more than 18,000 lb/ 2 months of which may be petrale sole.	50,000 lb/ 2 months, no more than 18,000 lb/ 2 months of which may be petrale sole.	50,000 lb/ 2 months, no more than 10,000 lb/ 2 months of which may be petrale sole.
39	selective flatfish trawl gear for Petrale sole				
40	multiple bottom trawl gear [8/]	70,000 lb/ 2 months, no more than 10,000 lb/ 2 months of which may be petrale sole.	70,000 lb/ 2 months, no more than 18,000 lb/ 2 months of which may be petrale sole.	50,000 lb/ 2 months, no more than 18,000 lb/ 2 months of which may be petrale sole.	50,000 lb/ 2 months, no more than 10,000 lb/ 2 months of which may be petrale sole.
41	**Minor shelf rockfish[1/], Shortbelly, Widow & Yelloweye rockfish**				
42	midwater trawl for Widow rockfish	Before the primary whiting season: CLOSED. -- During primary whiting season: In trips of at least 10,000 lb of whiting, combined widow and yellowtail limit of 500 lb/ trip, cumulative widow limit of 1,500 lb/ month. Mid-water trawl permitted in the RCA. See §660.373 for primary whiting season and trip limit details. -- After the primary whiting season: CLOSED.			
43	large & small footrope gear	300 lb/ 2 months			
44	selective flatfish trawl gear	300 lb/ month		1,000 lb/ month, no more than 200 lb/ month of which may be yelloweye rockfish	300 lb/ month
45	multiple bottom trawl gear [8/]	300 lb/ month		300 lb/ 2 months, no more than 200 lb/ month of which may be yelloweye rockfish	300 lb/ month

Table 2-28. The status quo limited entry trawl trip limits and RCA restrictions north of 40°10' N latitude as of May 2008 (continued).

46	**Canary rockfish**					
47	large & small footrope gear	CLOSED				
48	selective flatfish trawl gear	100 lb/ month	300 lb/ month		100 lb/ month	
49	multiple bottom trawl gear 8/	CLOSED				
50	**Yellowtail**					
51	midwater trawl	Before the primary whiting season: CLOSED. -- During primary whiting season: In trips of at least 10,000 lb of whiting: combined widow and yellowtail limit of 500 lb/ trip, cumulative yellowtail limit of 2,000 lb/ month. Mid-water trawl permitted in the RCA. See §660.373 for primary whiting season and trip limit details. -- After the primary whiting season: CLOSED.				
52	large & small footrope gear	300 lb/ 2 months				
53	selective flatfish trawl gear	2,000 lb/ 2 months				
54	multiple bottom trawl gear 8/	300 lb/ 2 months				
55	**Minor nearshore rockfish & Black rockfish**					
56	large & small footrope gear	CLOSED				
57	selective flatfish trawl gear	300 lb/ month				
58	multiple bottom trawl gear 8/	CLOSED				
59	**Lingcod** 4/					
60	large & small footrope gear	1,200 lb/ 2 months	4,000 lb/ 2 months			
61	selective flatfish trawl gear		1,200 lb/2 months			
62	multiple bottom trawl gear 8/					
63	**Pacific cod**	30,000 lb/ 2 months	70,000 lb/ 2 months			30,000 lb/ 2 months
64	**Spiny dogfish**	200,000 lb/ 2 months	150,000 lb/ 2 months	100,000 lb/ 2 months		
65	**Other Fish** 5/	Not limited				

1/ Bocaccio, chilipepper and cowcod are included in the trip limits for minor shelf rockfish.
2/ Splitnose rockfish is included in the trip limits for minor slope rockfish.
3/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, and sand sole.
4/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
5/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling. Cabezon is included in the trip limits for "other fish."
6/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at §§ 660.391-660.394.
7/ The "modified 200 fm" line is modified to exclude certain petrale sole areas from the RCA.
8/ If a vessel has both selective flatfish gear and large or small footrope gear on board during a cumulative limit period (either simultaneously or successively), the most restrictive cumulative limit for any gear on board during the cumulative limit period applies for the entire cumulative limit period.

To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

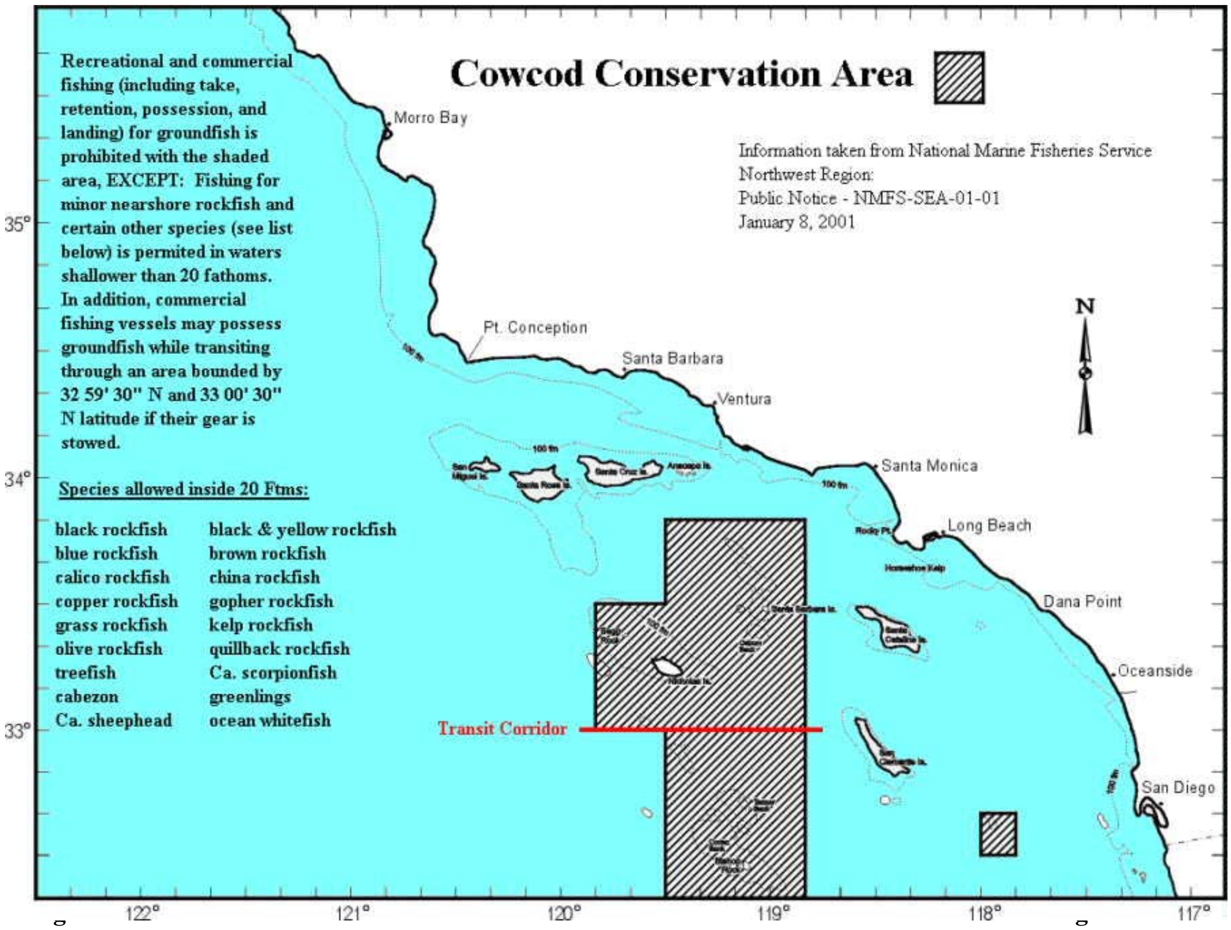
Table 2-29. The status quo limited entry trawl trip limits and RCA restrictions south of 40°10' N latitude as of May 2008.

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[6/]:						
1	South of 40°10' N. lat.	100 fm - 150 fm[7/]					
	All trawl gear (large footrope, selective flatfish trawl, and small footrope trawl gear) is permitted seaward of the RCA. Large footrope trawl gear is prohibited shoreward of the RCA. Midwater trawl gear is permitted only for vessels participating in the primary whiting season.						
	See § 660.370 and § 660.381 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 and §§ 660.396-660.399 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, Cordell Banks, and EFHCAs).						
	State trip limits and seasons may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
2	**Minor slope rockfish[2/] & Darkblotched rockfish**						
3	40°10' - 38° N. lat.	15,000 lb/ 2 months					
4	South of 38° N. lat.	55,000 lb/ 2 months					
5	**Splitnose**						
6	40°10' - 38° N. lat.	15,000 lb/ 2 months			10,000 lb/ 2 months		15,000 lb/ 2 months
7	South of 38° N. lat.	40,000 lb/ 2 months					
8	**DTS complex**						
9	Sablefish	14,000 lb/ 2 months		19,000 lb/ 2 months			14,000 lb/ 2 months
10	Longspine thornyhead	25,000 lb/ 2 months					
11	Shortspine thornyhead	12,000 lb/ 2 months		25,000 lb/ 2 months			
12	Dover sole	80,000 lb/ 2 months					
13	**Flatfish** (except Dover sole)						
14	Other flatfish[3/], English sole, & starry flounder	110,000 lb/ 2 months	110,000 lb/ 2 months, no more than 30,000 lb/ 2 months of which may be petrale sole.				110,000 lb/ 2 months
15	Petrale sole	50,000 lb/ 2 months					50,000 lb/ 2 months
16	Arrowtooth flounder	10,000 lb/ 2 months					
17	**Whiting**						
18	midwater trawl	Before the primary whiting season: CLOSED. -- During the primary season: mid-water trawl permitted in the RCA. See §660.373 for season and trip limit details. -- After the primary whiting season: CLOSED.					
19	large & small footrope gear	Before the primary whiting season: 20,000 lb/trip. -- During the primary season: 10,000 lb/trip. -- After the primary whiting season: 10,000 lb/trip.					

Table 2-29. The status quo limited entry trawl trip limits and RCA restrictions south of 40°10' N latitude as of May 2008 (continued).

<table>
<tr><td>20</td><td>Minor shelf rockfish[1/], Chilipepper, Shortbelly, Widow, & Yelloweye rockfish</td><td colspan="6"></td></tr>
<tr><td>21</td><td>large footrope or midwater trawl for Minor shelf rockfish & Shortbelly</td><td colspan="6">300 lb/ month</td></tr>
<tr><td>22</td><td>large footrope or midwater trawl for Chilipepper</td><td colspan="2">2,000 lb/ 2 months</td><td colspan="2">12,000 lb/ 2 months</td><td colspan="2">8,000 lb/ 2 months</td></tr>
<tr><td>23</td><td>large footrope or midwater trawl for Widow & Yelloweye</td><td colspan="6">CLOSED</td></tr>
<tr><td>24</td><td>small footrope trawl for Minor Shelf, Shortbelly, Widow & Yelloweye</td><td colspan="6">300 lb/ month</td></tr>
<tr><td>25</td><td>small footrope trawl for Chilipepper</td><td colspan="6">2,000 lb/ 2 months</td></tr>
<tr><td>26</td><td>Bocaccio</td><td colspan="6"></td></tr>
<tr><td>27</td><td>large footrope or midwater trawl</td><td colspan="6">300 lb/ 2 months</td></tr>
<tr><td>28</td><td>small footrope trawl</td><td colspan="6">CLOSED</td></tr>
<tr><td>29</td><td>Canary rockfish</td><td colspan="6"></td></tr>
<tr><td>30</td><td>large footrope or midwater trawl</td><td colspan="6">CLOSED</td></tr>
<tr><td>31</td><td>small footrope trawl</td><td colspan="2">100 lb/ month</td><td colspan="2">300 lb/ month</td><td colspan="2">100 lb/ month</td></tr>
<tr><td>32</td><td>Cowcod</td><td colspan="6">CLOSED</td></tr>
<tr><td>33</td><td>Minor nearshore rockfish & Black rockfish</td><td colspan="6"></td></tr>
<tr><td>34</td><td>large footrope or midwater trawl</td><td colspan="6">CLOSED</td></tr>
<tr><td>35</td><td>small footrope trawl</td><td colspan="6">300 lb/ month</td></tr>
<tr><td>36</td><td>Lingcod[4/]</td><td colspan="6"></td></tr>
<tr><td>37</td><td>large footrope or midwater trawl</td><td colspan="2" rowspan="2">1,200 lb/ 2 months</td><td colspan="4">4,000 lb/ 2 months</td></tr>
<tr><td>38</td><td>small footrope trawl</td><td colspan="4">1,200 lb/ 2 months</td></tr>
<tr><td>39</td><td>Pacific cod</td><td colspan="2">30,000 lb/ 2 months</td><td colspan="3">70,000 lb/ 2 months</td><td>30,000 lb/ 2 months</td></tr>
<tr><td>40</td><td>Spiny dogfish</td><td colspan="2">200,000 lb/ 2 months</td><td>150,000 lb/ 2 months</td><td colspan="3">100,000 lb/ 2 months</td></tr>
<tr><td>41</td><td>Other Fish[5/] & Cabezon</td><td colspan="6">Not limited</td></tr>
</table>

1/ Yellowtail is included in the trip limits for minor shelf rockfish.
2/ POP is included in the trip limits for minor slope rockfish
3/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, and sand sole.
4/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
5/ Other fish are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling.
6/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at §§ 660.391-660.394.
7/ South of 34°27' N. lat., the RCA is 100 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands.
To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.



Limited Entry Whiting

A Pacific whiting OY of 269,545 mt was used to manage 2008 west coast whiting fisheries and forms the basis for the No Action Alternative. The 2008 tribal allocation was set at 35,000 mt, based on the sliding scale allocation formula shown in Table 2-30. An additional 2,000 mt of whiting was set aside from the U.S. OY to accommodate research catch and incidental bycatch in non-whiting fisheries. This left approximately 232,545 mt for the non-tribal whiting fleets. Under the fixed allocations for these fleets specified in the FMP and in Federal regulations, the 2008 whiting quotas were 97,669 mt (42 percent) for the shoreside whiting sector, 55,811 mt (24 percent) for the at-sea mothership sector, and 79,065 mt (34 percent) for the at-sea catcher-processor sector.

The Council also adopted total catch bycatch limits for the non-tribal sectors of the whiting fishery of 4.7 mt of canary rockfish, 275 mt of widow rockfish, and 40 mt of darkblotched rockfish. If any of these total catch limits are attained inseason, the fishery closes for the non-tribal whiting fleets even if whiting quotas have not been attained. The total catch limit of darkblotched was higher than that specified in 2007 to provide an incentive for the whiting fleets to fish deeper to avoid canary and widow rockfish.

Table 2-30. The status quo tribal whiting allocation based on a sliding scale of the U.S. OY.

Whiting OY Range		Tribal Share
More Than	**Less Than**	
0 mt	145,000 mt	15% of the commercial OY
145,000 mt	175,000 mt	25,000 mt
175,000 mt	200,000 mt	27,500 mt
200,000 mt	225,000 mt	30,000 mt
225,000 mt	250,000 mt	32,500 mt
250,000 mt	-	35,000 mt

The 2007 and 2008 shoreside whiting fishery operated under an EFP, which allowed full retention in the fishery among other exemptions from Federal limited entry trawl regulations. Final rulemaking for FMP Amendment 10, which will implement maximized retention regulations and a monitoring program for the shoreside whiting fishery, is anticipated in 2009 before the start of the shoreside whiting fishery on June 15. Amendment 10 rules may also address maximized retention rules for catcher vessels delivering to motherships and a rule allowing NMFS to close the non-tribal whiting fisheries if a bycatch limit is projected to be attained inseason. These two issues are also addressed in 2009-10 specifications and management measures in the event that final Amendment 10 rules do not address these issues (see section 2.2.4.2 for more details).

In 2007, the Council and NMFS implemented the Ocean Salmon Conservation Zone and rules that gave NMFS the authority to implement a nearshore closure (seaward of the 100 fm management line) for all non-tribal sectors of the whiting fishery if Chinook take exceeds acceptable levels. The incidental take level for Chinook salmon can change through the Endangered Species Act consultation process if needed.

Limited Entry Fixed Gear

Limited entry fixed gear trip limits and the non-trawl RCA configuration as of May 2008 describe the No Action Alternative and are shown in Tables 2-31 (north of 40°10' N latitude) and 2-32 (south of 40°10' N latitude). Under the No Action Alternative, the non-trawl 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 in waters off Washington. The non-trawl RCA south of 40°10' N latitude and north of Point Conception at 34°27' N latitude under the No Action Alternative is defined by management lines specified with waypoints at roughly 30 fm to 150 fm. 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 non-trawl RCA south of Point 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. Canary and yelloweye rockfish are not allowed to be landed in the limited entry fixed gear fishery under the No Action Alternative.

The primary sablefish fishery, open to limited entry fixed gear permit holders that have a sablefish endorsement, runs from April 1 through October 31. Permit stacking is allowed in this fishery, where more than one and up to three permits may be used on a single vessel during the primary sablefish season. Limited entry permits with sablefish endorsements are assigned to one of three different cumulative trip limit tiers, based on the qualifying catch history of the permit. The 2008 sablefish tier limits are as follows: tier 1 = 48,500 lb, tier 2 = 22,000 lb, and tier 3 = 12,500 lb.

A new YRCA in the Washington North Coast area, labeled North Coast Area B (Figure 2-21), was implemented in 2007. Limited entry fixed gear fishermen were prohibited from fishing in the North Coast B YRCA in 2007-08. The South Coast B YRCA (Figure 2-19) and the "C-shaped" YRCA in waters off northern Washington (Figure 2-22) were voluntary “areas to be avoided” for commercial limited entry fixed gear fishermen. Limited entry fixed gears were not allowed to be fished in the Cowcod Conservation Areas (CCAs) (Figure 2-20) under the No Action Alternative, except for some nearshore commercial fishing opportunities described in the next section.

Coordinates defining these YRCAs are provided in Federal regulations at 50 CFR 660.390.

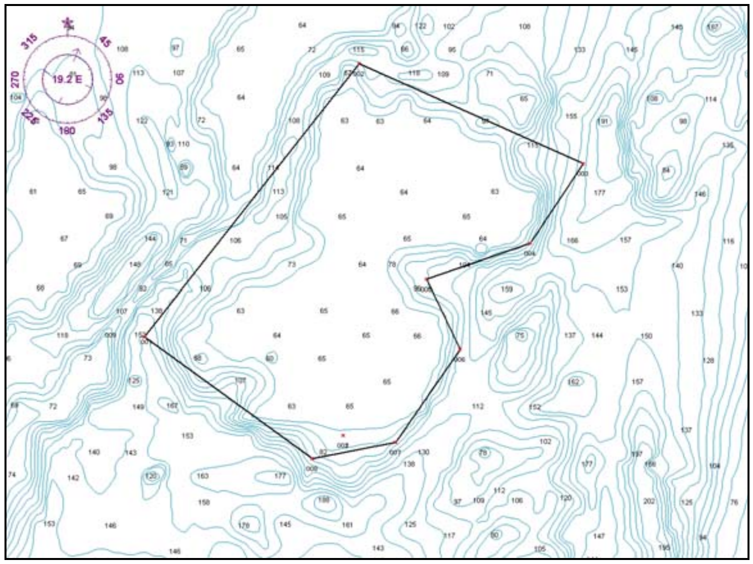


Figure 2-21. A Yelloweye Rockfish Conservation Area (North Coast B) in waters off the Washington north coast where limited entry and open access fixed gear fishing was prohibited in 2007-08.

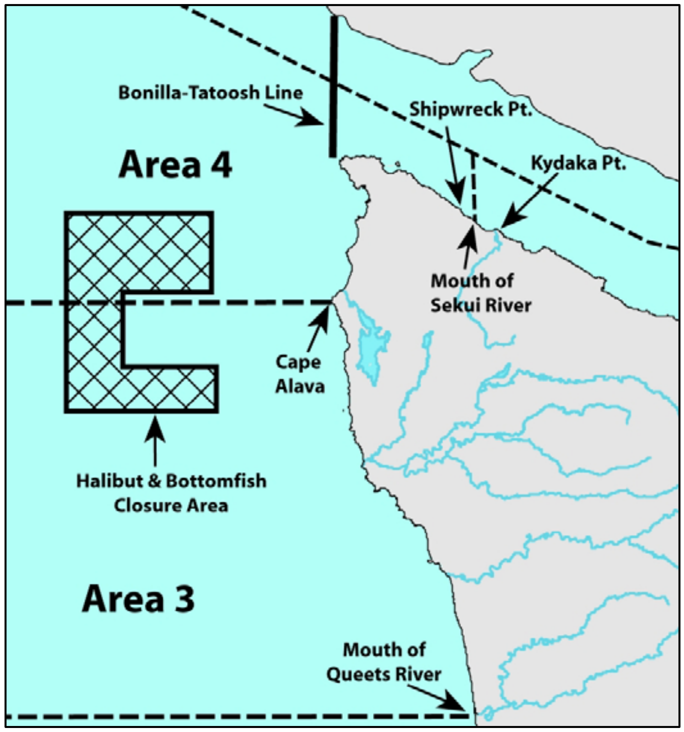


Figure 2-22. The current "C-shaped" Yelloweye Rockfish Conservation Area in waters off northern Washington where recreational groundfish and Pacific halibut fishing was prohibited in 2007-08. Commercial limited entry and open access fixed gear fleets were asked to voluntarily avoid fishing in this YRCA in 2007-08.

Table 2-31. The status quo limited entry fixed gear trip limits and RCA restrictions north of 40°10' N latitude as of May 2008.

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[6/]:						
1	North of 46°16' N. lat.	shoreline - 100 fm					
2	46°16' N. lat. - 40°10' N. lat.	30 fm - 100 fm					
	See § 660.370 and § 660.382 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 and §§ 660.396-660.399 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, Cordell Banks, and EFHCAs).						
	State trip limits and seasons may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
3	**Minor slope rockfish[2/] & Darkblotched rockfish**	4,000 lb/ 2 months					
4	**Pacific ocean perch**	1,800 lb/ 2 months					
5	**Sablefish**	300 lb/ day, or 1 landing per week of up to 1,000 lb, not to exceed 5,000 lb/ 2 months					
6	**Longspine thornyhead**	10,000 lb/ 2 months					
7	**Shortspine thornyhead**	2,000 lb/ 2 months					
8	**Dover sole**	5,000 lb/ month South of 42° N. lat., when fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to two 1 lb (0.45 kg) weights per line are not subject to the RCAs.					
9	**Arrowtooth flounder**						
10	**Petrale sole**						
11	**English sole**						
12	**Starry flounder**						
13	**Other flatfish[1/]**						
14	**Whiting**	10,000 lb/ trip					
15	**Minor shelf rockfish[2/], Shortbelly, Widow, & Yellowtail rockfish**	200 lb/ month					
16	**Canary rockfish**	CLOSED					
17	**Yelloweye rockfish**	CLOSED					
18	**Minor nearshore rockfish & Black rockfish**						
19	North of 42° N. lat.	5,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [3/]					
20	42° - 40°10' N. lat.	6,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [3/]					
21	**Lingcod[4/]**	CLOSED		800 lb/ 2 months			400 lb/ month CLOSED
22	**Pacific cod**	1,000 lb/ 2 months					
23	**Spiny dogfish**	200,000 lb/ 2 months		150,000 lb/ 2 months	100,000 lb/ 2 months		
24	**Other fish[5/]**	Not limited					

1/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, and sand sole.
2/ Bocaccio, chilipepper and cowcod are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.
3/ For black rockfish north of Cape Alava (48°09.50' N. lat.), and between Destruction Is. (47°40' N. lat.) and Leadbetter Pnt. (46°38.17' N. lat.), there is an additional limit of 100 lb or 30 percent by weight of all fish on board, whichever is greater, per vessel, per fishing trip.
4/ The minimum size limit for lingcod is 22 inches (56 cm) total length North of 42° N. lat. and 24 inches (61 cm) total length south of 42° N. lat.
5/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling. Cabezon is included in the trip limits for "other fish."
6/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at §§ 660.391-660.394.
To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

Table 2-32. The status quo limited entry fixed gear trip limits and RCA restrictions south of 40°10' N latitude as of May 2008.

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[5/]:						
1	40°10' - 34°27' N. lat.	30 fm - 150 fm					
2	South of 34°27' N. lat.	60 fm - 150 fm (also applies around islands)					
	See § 660.370 and § 660.382 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 and §§ 660.396-660.399 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, Cordell Banks, and EFHCAs).						
	State trip limits and seasons may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
3	**Minor slope rockfish[2/] & Darkblotched rockfish**	40,000 lb/ 2 months					
4	**Splitnose**	40,000 lb/ 2 months					
5	**Sablefish**						
6	40°10' - 36° N. lat.	300 lb/ day, or 1 landing per week of up to 1,000 lb, not to exceed 5,000 lb/ 2 months					
7	South of 36° N. lat.	350 lb/ day, or 1 landing per week of up to 1,050 lb					
8	**Longspine thornyhead**	10,000 lb / 2 months					
9	**Shortspine thornyhead**						
10	40°10' - 34°27' N. lat.	2,000 lb/ 2 months					
11	South of 34°27' N. lat.	3,000 lb/ 2 months					
12	**Dover sole**	5,000 lb/ month South of 42° N. lat., when fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to two 1 lb (0.45 kg) weights per line are not subject to the RCAs.					
13	**Arrowtooth flounder**						
14	**Petrale sole**						
15	**English sole**						
16	**Starry flounder**						
17	**Other flatfish[1/]**						
18	**Whiting**	10,000 lb/ trip					
19	**Minor shelf rockfish[2/], Shortbelly, Widow rockfish, and Bocaccio (including Chilipepper between 40°10' - 34°27' N. lat.)**						
20	40°10' - 34°27' N. lat.	Minor shelf rockfish, shortbelly, widow rockfish, bocaccio & chilipepper: 2,500 lb/ 2 months, of which no more than 500 lb/ 2 months may be any species other than chilipepper.					
21	South of 34°27' N. lat.	3,000 lb/ 2 months	CLOSED	3,000 lb/ 2 months			
22	**Chilipepper rockfish**						
23	40°10' - 34°27' N. lat.	Chilipepper included under minor shelf rockfish, shortbelly, widow and bocaccio limits - - See above					
24	South of 34°27' N. lat.	2,000 lb/ 2 months, this opportunity only available seaward of the nontrawl RCA					
25	**Canary rockfish**	CLOSED					
26	**Yelloweye rockfish**	CLOSED					
27	**Cowcod**	CLOSED					
28	**Bocaccio**						
29	40°10' - 34°27' N. lat.	Bocaccio included under Minor shelf rockfish, shortbelly, widow & chilipepper limits -- See above					
30	South of 34°27' N. lat.	300 lb/ 2 months	CLOSED	300 lb/ 2 months			

Table 2-32. The status quo limited entry fixed gear trip limits and RCA restrictions south of 40°10' N latitude as of May 2008 (continued).

31	**Minor nearshore rockfish & Black rockfish**						
32	Shallow nearshore	600 lb/ 2 months	CLOSED	800 lb/ 2 months	900 lb/ 2 months	800 lb/ 2 months	600 lb/ 2 months
33	Deeper nearshore						
34	40°10' - 34°27' N. lat.	700 lb/ 2 months	CLOSED	700 lb/ 2 months		600 lb/ 2 months	700 lb/ 2 months
35	South of 34°27' N. lat.	500 lb/ 2 months		600 lb/ 2 months			
36	California scorpionfish	600 lb/ 2 months	CLOSED	600 lb/ 2 months	800 lb/ 2 months		600 lb/ 2 months
37	**Lingcod**[3/]	CLOSED		800 lb/ 2 months			400 lb/ month; CLOSED
38	**Pacific cod**	1,000 lb/ 2 months					
39	**Spiny dogfish**	200,000 lb/ 2 months		150,000 lb/ 2 months	100,000 lb/ 2 months		
40	**Other fish**[4/] **& Cabezon**	Not limited					

1/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, and sand sole.
2/ POP is included in the trip limits for minor slope rockfish. Yellowtail is included in the trip limits for minor shelf rockfish.
3/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
4/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling.
5/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at §§ 660.391-660.394, except that the 20-fm depth contour off California is defined by the depth contour and not coordinates.
To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

Directed Open Access

Directed open access fisheries are those west coast commercial fisheries comprised of vessels without a Federal limited entry permit (trawl or fixed gear) that target groundfish. Open access gears that fish the bottom and any of the gears used in the directed groundfish fisheries are not allowed to be fished in the CCAs (Figure 2-20) under the No Action Alternative, except for some nearshore commercial fishing opportunities described below.

There are directed groundfish fisheries that target nearshore species and those operating on the shelf and slope primarily targeting sablefish (daily-trip-limit or DTL fishery), shortspine thornyhead, and slope rockfish species.

Open access trip limits and estimated impacts of 2008 management measures as of May 2008 describe the No Action Alternative and are shown in Tables 2-33 (north of 40°10' N latitude) and 2-34 (south of 40°10' N latitude). The same non-trawl RCA described for limited entry fixed gears under the No Action Alternative above would also apply for those open access fisheries not exempt from the RCA restrictions.

The majority of vessels participating in nearshore commercial fisheries do not hold Federal limited entry permits, and the most common gear used is jig gear. However, some vessels use longline gear to target nearshore species and, in rare instances, pots or traps are used in the nearshore fishery. California and Oregon limit entry to the nearshore groundfish fishery by requiring a state limited entry permit to take commercial quantities of nearshore groundfish species. Washington does not allow a nearshore commercial fishery. More conservative state harvest targets or guidelines than those specified in Federal regulations exist for most nearshore species and state trip limits supersede Federal limits in these cases. State trip limits are designed to stay within nearshore species harvest caps while providing a year-round opportunity, if possible. Federal management measures for west coast nearshore commercial groundfish fisheries are typically stratified north and south of 40°10' N latitude.

Under the No Action Alternative, the non-trawl 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 in waters off Washington. In Oregon, those limited entry permit holders may land commercial quantities of black and blue rockfish under state trip limits, with an additional 15 lbs per day of other nearshore groundfish species. Vessels that also have a nearshore endorsement, in addition to the black/blue limited entry permit may land commercial quantities of other nearshore rockfish (which includes two rockfish with a Federal designation as shelf rockfish - tiger and vermilion rockfish), cabezon, and greenling under state trip limits. For vessels that do not hold a state permit or endorsement, an incidental landing limit of no more than 15 pounds per day of any combination of black rockfish, blue rockfish, and/or other nearshore fish is allowed, with a few exceptions. Salmon trollers with a valid troll permit may land 100 pounds of black rockfish, blue rockfish, or a combination thereof in the same landing in which a salmon is landed. These rockfish may only be landed dead. If the cumulative landing of black and blue rockfish combined in the salmon troll fishery reaches 3,000 pounds in any calendar year, then each salmon troll vessel is limited to 15 pounds of black rockfish, blue rockfish, or a combination thereof per troll landing for the remaining calendar year. Trawlers may land up to 1,000 pounds of black rockfish, blue rockfish, or a combination thereof per calendar year and these fish must be 25 percent or less of the total poundage of each landing and must be landed dead.

In California, those limited entry permit holders who also have either a shallow nearshore fishery or deeper nearshore fishery permit administered by CDFG may 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.

Under the No Action Alternative, the non-trawl RCA south of 40°10' N latitude and north of Point Conception at 34°27' N latitude is defined by management lines specified with waypoints at roughly 30 fm to 150 fm. 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 non-trawl RCA south of Point 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. Canary and yelloweye rockfish are not allowed to be landed in the fixed gear fisheries, including those targeting nearshore groundfish species, under the No Action Alternative.

A new YRCA in the Washington North Coast area, labeled North Coast Area B (Figure 2-21), was implemented in 2007. Open access fixed gear fishermen were prohibited from fishing in the North Coast B YRCA in 2007-08. The South Coast B YRCA (Figure 2-19) and the “C-shaped” YRCA in waters off northern Washington (Figure 2-22) were voluntary “areas to be avoided” for commercial open access fixed gear fishermen.

There is some nearshore commercial fishing allowed in the CCAs (Figure 2-20) in depths shallower than 20 fm under the No Action Alternative. Only southern minor nearshore rockfish, (both shallow and deeper nearshore rockfish), California scorpionfish, cabezon, greenlings, California sheephead, and ocean whitefish are allowed to be retained in depths <20 fm in the CCAs.

Coordinates defining these YRCAs are provided in Federal regulations at 50 CFR 660.390.

Table 2-33. The status quo open access trip limits and RCA restrictions north of 40°10' N latitude as of May 2008.

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[6/]:						
1	North of 46°16' N. lat.	shoreline - 100 fm					
2	46°16' N. lat. - 40°10' N. lat.	30 fm - 100 fm					
	See § 660.370 and § 660.383 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 and §§ 660.396-660.399 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, Cordell Banks, and EFHCAs).						
	State trip limits and seasons may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
3	**Minor slope rockfish[1/] & Darkblotched rockfish**	Per trip, no more than 25% of weight of the sablefish landed					
4	**Pacific ocean perch**	100 lb/ month					
5	**Sablefish**	300 lb/ day, or 1 landing per week of up to 800 lb, not to exceed 2,400 lb/ 2 months		300 lb/ day, or 1 landing per week of up to 800 lb, not to exceed 2,200 lb/ 2 months			
6	**Thornyheads**	CLOSED					
7	**Dover sole**	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs. South of 42° N. lat., when fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to two 1 lb (0.45 kg) weights per line are not subject to the RCAs.					
8	**Arrowtooth flounder**						
9	**Petrale sole**						
10	**English sole**						
11	**Starry flounder**						
12	**Other flatfish[2/]**						
13	**Whiting**	300 lb/ month					
14	**Minor shelf rockfish[1/], Shortbelly, Widow, & Yellowtail rockfish**	200 lb/ month					
15	**Canary rockfish**	CLOSED					
16	**Yelloweye rockfish**	CLOSED					
17	**Minor nearshore rockfish & Black rockfish**						
18	North of 42° N. lat.	5,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [3/]					
19	42° - 40°10' N. lat.	6,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [3/]					
20	**Lingcod[4/]**	CLOSED		400 lb/ month			CLOSED
21	**Pacific cod**	1,000 lb/ 2 months					
22	**Spiny dogfish**	200,000 lb/ 2 months		150,000 lb/ 2 months	100,000 lb/ 2 months		
23	**Other Fish[5/]**	Not limited					

Table 2-33. The status quo open access trip limits and RCA restrictions north of 40°10' N latitude as of May 2008 (continued).

24	**PINK SHRIMP NON-GROUNDFISH TRAWL** *(not subject to RCAs)*	
25	North	**Effective April 1 - October 31:** Groundfish: 500 lb/day, multiplied by the number of days of the trip, not to exceed 1,500 lb/trip. The following sublimits also apply and are counted toward the overall 500 lb/day and 1,500 lb/trip groundfish limits: lingcod 300 lb/month (minimum 24 inch size limit); sablefish 2,000 lb/month; canary, thornyheads and yelloweye rockfish are PROHIBITED. All other groundfish species taken are managed under the overall 500 lb/day and 1,500 lb/trip groundfish limits. Landings of these species count toward the per day and per trip groundfish limits and do not have species-specific limits. The amount of groundfish landed may not exceed the amount of pink shrimp landed.
26	**SALMON TROLL**	
27	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.

1/ Bocaccio, chilipepper and cowcod rockfishes are included in the trip limits for minor shelf rockfish.
Splitnose rockfish is included in the trip limits for minor slope rockfish.

2/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, and sand sole.

3/ For black rockfish north of Cape Alava (48°09.50' N. lat.), and between Destruction Is. (47°40' N. lat.) and Leadbetter Pnt. (46°38.17' N. lat.), there is an additional limit of 100 lbs or 30 percent by weight of all fish on board, whichever is greater, per vessel, per fishing trip.

4/ The minimum size limit for lingcod is 22 inches (56 cm) total length North of 42° N. lat. and 24 inches (61 cm) total length south of 42° N. lat.

5/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling.
Cabezon is included in the trip limits for "other fish."

6/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at §§ 660.391-660.394.

To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

Table 2-34. The status quo open access trip limits and RCA restrictions south of 40°10' N latitude as of May 2008.

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[5/]:						
1	40°10' - 34°27' N. lat.	30 fm - 150 fm					
2	South of 34°27' N. lat.	60 fm - 150 fm (also applies around islands)					
	See § 660.370 and § 660.383 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 and §§ 660.396-660.399 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, Cordell Banks, and EFHCAs).						
	State trip limits and seasons may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
3	**Minor slope rockfish[1/] & Darkblotched rockfish**						
4	40°10' - 38° N. lat.	Per trip, no more than 25% of weight of the sablefish landed					
5	South of 38° N. lat.	10,000 lb/ 2 months					
6	**Splitnose**	200 lb/ month					
7	**Sablefish**						
8	40°10' - 36° N. lat.	300 lb/ day, or 1 landing per week of up to 800 lb, not to exceed 2,400 lb/ 2 months		300 lb/ day, or 1 landing per week of up to 800 lb, not to exceed 2,200 lb/ 2 months			
9	South of 36° N. lat.	300 lb/ day, or 1 landing per week of up to 700 lb					
10	**Thornyheads**						
11	40°10' - 34°27' N. lat.	CLOSED					
12	South of 34°27' N. lat.	50 lb/ day, no more than 1,000 lb/ 2 months					
13	**Dover sole**	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs. South of 42° N. lat., when fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to two 1 lb (0.45 kg) weights per line are not subject to the RCAs.					
14	**Arrowtooth flounder**						
15	**Petrale sole**						
16	**English sole**						
17	**Starry flounder**						
18	**Other flatfish[2/]**						
19	**Whiting**	300 lb/ month					
20	**Minor shelf rockfish[1/], Shortbelly, Widow & Chilipepper rockfish**						
21	40°10' - 34°27' N. lat.	300 lb/ 2 months	CLOSED	200 lb/ 2 months		300 lb/ 2 months	
22	South of 34°27' N. lat.	750 lb/ 2 months		750 lb/ 2 months			
23	**Canary rockfish**	CLOSED					
24	**Yelloweye rockfish**	CLOSED					
25	**Cowcod**	CLOSED					
26	**Bocaccio**						
27	40°10' - 34°27' N. lat.	200 lb/ 2 months	CLOSED	100 lb/ 2 months		200 lb/ 2 months	
28	South of 34°27' N. lat.	100 lb/ 2 months		100 lb/ 2 months			

Table 2-34. The status quo open access trip limits and RCA restrictions south of 40°10' N latitude as of May 2008 (continued).

29	**Minor nearshore rockfish & Black rockfish**						
30	Shallow nearshore	600 lb/ 2 months	CLOSED	800 lb/ 2 months	900 lb/ 2 months	800 lb/ 2 months	600 lb/ 2 months
31	Deeper nearshore						
32	40°10' - 34°27' N. lat.	700 lb/ 2 months	CLOSED	700 lb/ 2 months		600 lb/ 2 months	700 lb/ 2 months
33	South of 34°27' N. lat.	500 lb/ 2 months		600 lb/ 2 months			
34	California scorpionfish	600 lb/ 2 months	CLOSED	600 lb/ 2 months	800 lb/ 2 months		600 lb/ 2 months
35	**Lingcod**[3/]	CLOSED		400 lb/ month			CLOSED
36	**Pacific cod**	1,000 lb/ 2 months					
37	**Spiny dogfish**	200,000 lb/ 2 months		150,000 lb/ 2 months	100,000 lb/ 2 months		
38	**Other Fish**[4/] **& Cabezon**	Not limited					
39	**RIDGEBACK PRAWN AND, SOUTH OF 38°57.50' N. LAT., CA HALIBUT AND SEA CUCUMBER NON-GROUNDFISH TRAWL**						
40	**NON-GROUNDFISH TRAWL Rockfish Conservation Area (RCA) for CA Halibut, Sea Cucumber & Ridgeback Prawn:**						
41	40°10' - 38° N. lat.	100 fm - modified 200 fm [6/]	100 fm - 150 fm				100 fm - modified 200 fm [6/]
42	38° - 34°27' N. lat.	100 fm - 150 fm					
43	South of 34°27' N. lat.	100 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands					
44		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°57.50' N. lat. are allowed to (1) land up to 100 lb/day of groundfish without the ratio requirement, provided that at least one California halibut is landed and (2) land up to 3,000 lb/month of flatfish, no more than 300 lb of which may be species other than Pacific sanddabs, sand sole, starry flounder, rock sole, curlfin sole, or California scorpionfish (California scorpionfish is also subject to the trip limits and closures in line 31).					
45	**PINK SHRIMP NON-GROUNDFISH TRAWL GEAR** *(not subject to RCAs)*						
46	South	**Effective April 1 - October 31:** Groundfish: 500 lb/day, multiplied by the number of days of the trip, not to exceed 1,500 lb/trip. The following sublimits also apply and are counted toward the overall 500 lb/day and 1,500 lb/trip groundfish limits: lingcod 300 lb/ month (minimum 24 inch size limit); sablefish 2,000 lb/ month; canary, thornyheads and yelloweye rockfish are PROHIBITED. All other groundfish species taken are managed under the overall 500 lb/day and 1,500 lb/trip groundfish limits. Landings of these species count toward the per day and per trip groundfish limits and do not have species-specific limits. The amount of groundfish landed may not exceed the amount of pink shrimp landed.					

1/ Yellowtail rockfish is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.
2/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, and sand sole.
3/ The size limit for lingcod is 24 inches (61 cm) total length.
4/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling.
5/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at §§ 660.391-660.394, except that the 20-fm depth contour off California is defined by the depth contour and not coordinates.
6/ The "modified 200 fm" line is modified to exclude certain petrale sole areas from the RCA.
To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

Incidental Open Access

West coast commercial fishing vessels targeting non-groundfish species, but landing groundfish under open access limits are included in the category of incidental open access fisheries. In some cases, such as the ridgeback prawn trawl fishery south of 34°27' N latitude, the northern pink shrimp fishery, and the salmon troll fishery, there are specific exemptions from non-trawl RCA restrictions while landing some groundfish species.

Under the No Action Alternative, the ridgeback prawn trawl fishery south of 34°27' N latitude is allowed to operate out to the 100 fm line regardless of the non-trawl RCA configuration south of Pt. Conception. This exemption is allowed because ridgeback prawn trawling occurs over soft mud substrates where depleted rockfish species do not occur and ridgeback prawns are found largely adjacent to the 100 fm isobath in this area. The pink shrimp trawl fishery is not restricted by an RCA, but approved bycatch reduction devices or fish excluders in shrimp trawls are mandated to minimize incidental groundfish bycatch. The salmon troll fishery is exempted from RCA restrictions, but groundfish species, including lingcod, are not allowed to be retained while fishing in the non-trawl RCA. The only exemption to this regulation under the No Action Alternative is an incidental landing allowance of up to 1 lb of yellowtail rockfish per 2 lbs of salmon landed with a cumulative monthly landing limit of 200 lbs of yellowtail rockfish, both within and outside the RCA. Otherwise, non-trawl RCA restrictions apply to incidental groundfish fisheries if groundfish are to be legally retained and landed under the open access limits.

Commercial salmon trolling was prohibited in a new YRCA in waters off northern Washington in 2007-08 (Figure 2-23).

Coordinates defining this YRCA is provided in Federal regulations at 50 CFR 660.390.

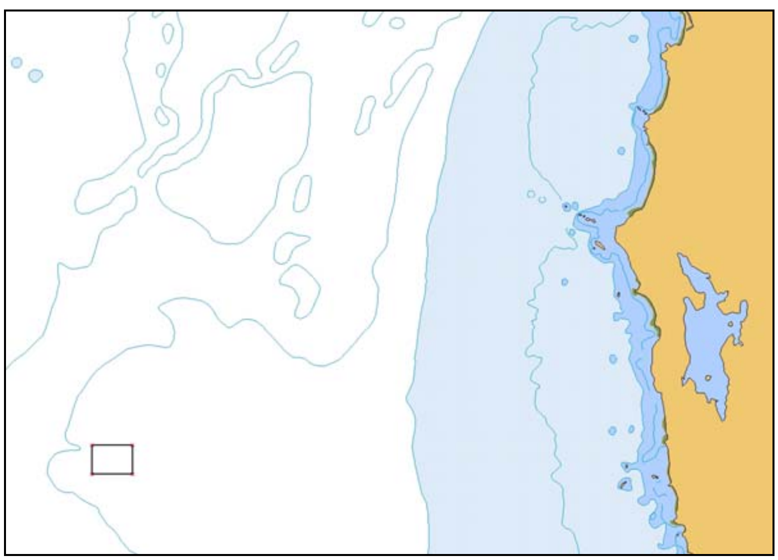


Figure 2-23. A Yelloweye Rockfish Conservation Area off the north Washington coast where commercial salmon trolling was prohibited in 2007-08.

Tribal

Treaty Groundfish Fisheries Background

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, in general terms, that they may take half of the harvestable surplus of groundfish available in the tribes' usual and accustomed (U and A) fishing areas (described at 60 CFR 660.324). West coast treaty tribes have formal allocations for sablefish, black rockfish, and Pacific whiting. The tribes also have a harvest guideline for Pacific cod beginning in 2006. 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 recommend trip limits for these species to the Council, which tries to accommodate these fisheries.

In instances of depleted species, where the harvestable surplus is estimated to be small or non-existent, there are usually no directed fisheries for that species. Conservation measures may be considered in other fisheries that may impact the depleted species, while protecting the treaty rights to other groundfish in accordance with *U.S. v. Washington*. For Endangered Species Act listed stocks, the standards of Principle 3(C) (i.e., the ‘‘Conservation Necessity Principle’’) of the June 1997 Secretarial Order Number 3206 should be met before other restrictions apply. Species under rebuilding fall somewhere in between: they do not require the same level of restriction as ESA listed species, but are also not allocated in the same manner as healthy target species. In these instances the tribes and the state of Washington acting as co-managers will enter more informal negotiations to determine acceptable levels of harvest by both tribal and non-tribal fisheries while rebuilding the species.

Ad hoc tribal/non-tribal allocations[4] under the status quo management regime have been worked out in the Council process. However, some of the lower OY alternatives for depleted species, such as canary and yelloweye rockfish, may prompt formal government to government negotiations to resolve concerns regarding the need to protect the treaty right to other groundfish. Any unresolved issues over proper tribal and non-tribal allocations and the need to preserve treaty access to other species may then need to be resolved within the framework of the ongoing *U.S. v. Washington* case. This is an added step in the process of deciding revised rebuilding plans under Amendment 16-4 and the 2009-10 harvest specifications and management measures. It is unclear how any delay in this allocation decision, if it occurs in the more formal *U.S. v. Washington* process, will affect final decisions on the actions contemplated in this EIS.

Current Management Measures

The Washington coastal tribes (Makah, Quileute, Hoh, and Quinault) conducted their groundfish fisheries in 2007-08 with the following allocations and trip limits. The 2007-08 sablefish allocation was 10 percent of the total catch OY (for the portion of the stock north of 36° N latitude) of 5,723 mt. This provided an allocation of 572.3 mt of sablefish, which is further reduced after deducting an assumed 1.9 percent discard mortality for a landed catch allocation of 561.4 mt. The tribal commercial harvest of black rockfish was managed with a harvest guideline of 20,000 lbs north of Cape Alava, Washington at 48°09'30" N latitude, and 10,000 lbs between Destruction Island, Washington at 47°40' N latitude and Leadbetter Point, Washington at 46°38'10" N latitude. There were no harvest restrictions on black rockfish between Cape Alava and Destruction Island. Canary rockfish were subject to a 300 lb per trip

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

limit. Longspine and shortspine thornyheads were managed to the limited entry cumulative limits in place at the beginning of the year. Yelloweye rockfish were subject to a 100 lb trip limit. For yellowtail rockfish the entire Makah tribal fleet (the only tribal fleet that participated in a midwater fishery) was subject to a cumulative landing limit of 180,000 lbs/two months. Widow rockfish landings were limited to 10 percent 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. Other rockfish, including species in the minor nearshore, minor shelf, and minor slope rockfish complexes were subject to either a 300 lb 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 competition tribal commercial fisheries for Pacific halibut were not subject to trip limits. Full rockfish retention programs, where all overfished and marketable rockfishes are retained, as well as a Makah trawl observer program, were in place to provide catch accountability. Lingcod were subject to a 600 pound per day and 1,800 pound per week limits for all tribal fisheries except for the treaty troll fishery which was limited to 1,000 pounds per day and 4,000 pounds per week for 2007. Beginning in 2008 the tribal fleets were subject to a 250 mt harvest guideline for lingcod. Pacific cod were subject to a 400 mt harvest guideline in 2007-08. A petrale sole trip limit of 50,000 lbs/two months for the Makah bottom trawl fleet was specified for the entire year. Trip limits for English sole, rex sole, arrowtooth flounder, and other flatfish in the tribal bottom trawl fishery were the same as for non-tribal limited entry trawl fishery at the start of the season 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 was 32,500 mt in 2007 and 35,000 mt in 2008 based on the sliding scale allocation formula that specified the tribal whiting OY based on the total U.S. whiting OY. The Makah tribe was the only one of the four tribes conducting a whiting-directed fishery in 2007-08.

Washington Recreational

Washington and Oregon shared harvest guidelines for canary and yelloweye rockfish of 8.2 mt and 6.8 mt, respectively in 2007-08. Washington's share of the canary harvest guideline was 1.7 mt and that of yelloweye was 3.5 mt. If either of these harvest guidelines were attained inseason, the WDFW and ODFW would consult and decide if inseason state actions would be needed to maintain impacts within these harvest guidelines. Such state management actions would include closing recreational fisheries, restricting recreational fishery seasons, and/or restricting the depths where the fishery was allowed to continue. In 2007, a 1.5 mt residual yield of yelloweye rockfish was reserved for managing all the recreational fisheries coastwide as the first priority. The Council was able to use this residual yield to keep any of the coastwide recreational fisheries open. If this yield was not needed for maintaining 2007-2008 recreational fisheries, the Council would be able to use this residual yield to maintain commercial fisheries (see the discussion under California Recreational for more details).

The following seasons, bag limits, size limits, and area restrictions also applied to 2007 and 2008 Washington recreational groundfish fisheries.

<u>The 2007-08 Washington Recreational Groundfish Season</u>

The 2007-08 Washington recreational groundfish season is displayed in Figure 2-24. The fishery was much more restricted in marine management areas 3 and 4 north of the Queets River where canary and yelloweye rockfish are more abundant and therefore caught incidentally at a higher rate.

<table>
<tr><th>Marine Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>3 & 4 (N. Coast)</td><td colspan="4">Open all depths</td><td colspan="5">Open <20 fm May 21-Sep 30 a/</td><td colspan="3">Open all depths</td></tr>
<tr><td>2 (S. Coast)</td><td colspan="2">Open all depths</td><td colspan="3">Open <30 fm Mar 15 - June 15 b/</td><td colspan="7">Open all depths</td></tr>
<tr><td>1 (Col. R.)</td><td colspan="4">Open all depths</td><td colspan="5">Open all depths c/</td><td colspan="3">Open all depths</td></tr>
<tr><td colspan="13">a/ Groundfish retention allowed >20 fm on days when Pacific halibut is open.
b/ Retention of sablefish and Pacific cod allowed seaward of 30 fm from May 1- June 15.
c/ Retention of groundfish, except sablefish and Pacific cod, prohibited with Pacific halibut on board from May 1 - September 30.</td></tr>
</table>

Figure 2-24. The status quo Washington recreational groundfish season by marine management area in 2008.

2007-08 Bag and Size Limits

The Washington recreational groundfish fishery bag limit was 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 no retention of canary or yelloweye rockfish, and a sublimit of two lingcod with a 22-inch minimum size during the open lingcod season.

2007-08 Lingcod Seasons

The lingcod season in Marine Areas 1-3 (Washington-Oregon border at 46°16’ N Latitude to Cape Alava at 48°10’ N Latitude) was open from the Saturday closest to March 15 through the Saturday closest to October 15, which was March 17 through October 13 in 2007 and March 15 through October 18 in 2008. Marine Area 4 (Cape Alava to the U.S. Canadian border) was open from April 16 through the Saturday closest to October 15, or October 15, whichever is earlier, which was April 16 through October 13 in 2007 and April 16 through October 18 in 2008.

Under the No Action Alternative, the lingcod seasons in 2009 and 2010 would be as follows:

- Marine Areas 1-3: March 14 through October 17 in 2009 and March 13 through October 16 in 2010.
- Marine Area 4: April 16- October 15 in 2009 and April 16- October 15 in 2010.

2007-08 Area Restrictions

The 2007-08 Washington recreational groundfish and Pacific halibut fisheries were restricted from the “C-shaped” YRCA in waters off northern Washington (Figure 2-22).

An additional YRCA in the Washington South Coast area, labeled South Coast Area B was implemented beginning in 2007 (Figure 2-19). This area was closed to recreational fishing for groundfish and Pacific halibut and also was a voluntary “area to be avoided” for commercial groundfish fisheries.

Coordinates defining these YRCAs are provided in Federal regulations at 50 CFR 660.390.

Oregon Recreational

Oregon and Washington shared harvest guidelines for canary and yelloweye rockfish of 8.2 mt and 6.8 mt, respectively in 2007-08. Oregon’s share of the canary harvest guideline was 6.5 mt and that of yelloweye was 3.3 mt. If either of these harvest guidelines were attained inseason, the ODFW and WDFW would consult and decide if inseason state actions would be needed to maintain impacts within these harvest guidelines. Such state management actions included closing recreational fisheries, restricting recreational fishery seasons, and/or restricting the depths where the fishery was allowed to continue. In 2007, a 1.5 mt residual yield of yelloweye rockfish was reserved for managing all the recreational fisheries coastwide as the first priority. The Council was able to use this residual yield to keep any of the coastwide recreational fisheries open. If this yield was not needed for maintaining 2007-2008 recreational fisheries, the Council would be able to use this residual yield to maintain commercial fisheries.

The following seasons, bag limits, size limits, and area restrictions also applied to 2007 and 2008 Oregon recreational groundfish fisheries.

The 2007-08 Oregon Recreational Groundfish Season

The 2007-08 Oregon recreational groundfish fishery was open year round, but restricted to depths shallower than 40 fm from April through September to reduce impacts on canary and yelloweye rockfish (Figure 2-25).

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Open all depths			Open <40 fm						Open all depths		

Figure 2-25. The status quo Oregon recreational groundfish season in 2008.

2007-08 Bag and Size Limits

A marine fish daily bag limit of 8 fish in aggregate was allowed in 2007-08 Oregon recreational fisheries. The marine bag included all species other than lingcod, salmon, steelhead, Pacific halibut, flatfish, surfperch, sturgeon, striped bass, pelagic tuna and mackerel species, and bait fish such as herring, anchovy, sardine and smelt. A flatfish daily bag limit of 25, which includes all soles and flounders except Pacific halibut, was allowed in addition to the marine fish daily bag limit.

Retention of canary and yelloweye rockfish was prohibited in 2007-08.

The following minimum size limits applied to 2007-08 Oregon recreational fisheries:

- lingcod – 22 in.
- cabezon – 16 in.
- kelp greenling – 10 in.

2007-08 Area Restrictions

A YRCA has been in place on Stonewall Bank since 2006 (Figure 2-26). No recreational fishing for groundfish and Pacific halibut can occur within this YRCA, which is bounded by the following waypoints:

44°37.458’ N lat 124°24.918’ W long;
44°37.458’ N lat 124°23.628’ W long;
44°28.71’ N lat 124°21.798’ W long;
44°28.71’ N lat 124°24.102’ W long;
44°31.422’ N lat 124°25.5’ W long.

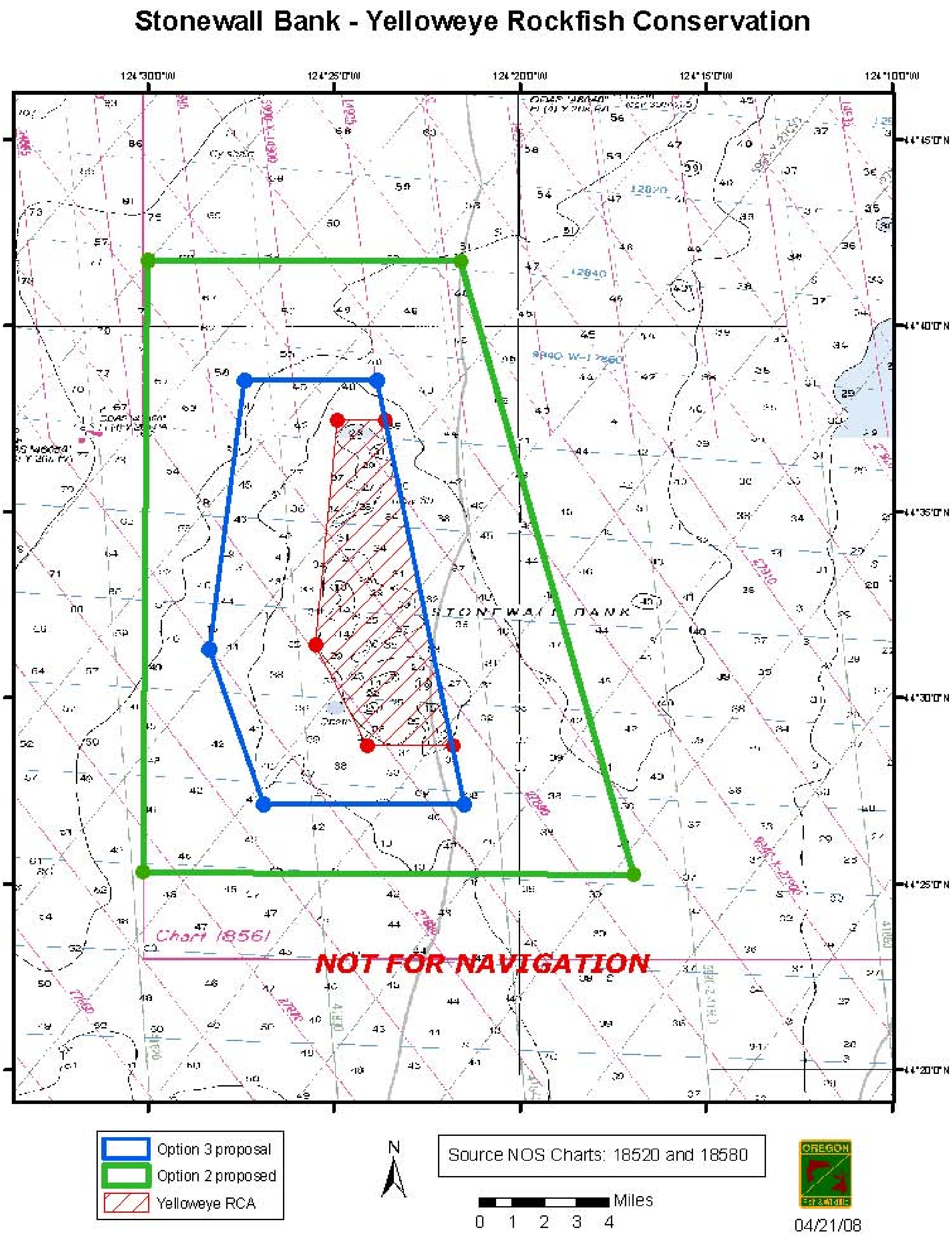


Figure 2-26. The Stonewall Bank Yelloweye Rockfish Conservation Area where recreational fishing for groundfish and Pacific halibut is prohibited. Two possible extensions to the Stonewall Bank YRCA considered for 2009-10 are also shown.

California Recreational

The 2007 and 2008 California recreational groundfish fisheries were managed under annual harvest guidelines for canary and yelloweye rockfish of 9.0 mt and 2.1 mt, respectively. If either of these harvest guidelines were attained inseason, the CDFG would enact management actions, including closing recreational fisheries, restricting recreational fishery seasons, and/or restricting the depths where the fishery was allowed to continue. In 2007, a 1.5 mt residual yield of yelloweye rockfish was reserved for managing all the recreational fisheries coastwide as the first priority. The Council was able to use this residual yield to keep any of the coastwide recreational fisheries open. If this yield was not needed for maintaining 2007-2008 recreational fisheries, the Council would be able to use this residual yield to maintain commercial fisheries. This yield was needed to manage 2007 recreational fisheries after the California recreational harvest of canary and yelloweye in the two northern management areas exceeded the respective harvest guidelines. CDFG closed the two northern areas on October 1, 2007, one and two months early for the North-Central and North management areas, respectively. Despite the inseason action, the 2.1 mt harvest guideline for yelloweye rockfish was exceeded by 5.9 mt and the 9 mt harvest guideline for canary rockfish was exceeded by 1.9 mt. The GMT estimated the total cumulative coastwide catch of both species was under their respective OYs.

The following seasons, bag limits, size limits, and area restrictions also applied to 2007 and 2008 California recreational groundfish fisheries.

<u>The 2007 and 2008 California Recreational Groundfish Seasons</u>

Figures 2-27 and 2-28 depict the status quo California recreational groundfish seasons by marine management area in 2007 and 2008, respectively. In 2007, the California recreational fishery exceeded the specified 2.1 mt yelloweye rockfish harvest guideline forcing an early closure of the fishery north of Pigeon Pt. to the Oregon-California border on October 1, 2007. The yelloweye catch in the 2007 fishery was estimated to be 8.0 mt.

To reduce the risk of again exceeding the yelloweye harvest guideline in 2008, the CDFG restricted the fishery to depths of less than 20 fm (i.e., the 20-30 fm depth zone was closed) in the North and North-Central management areas (Figure 2-28). CDFG will also more closely monitor the fishery inseason in 2008 to react more quickly to restrict the fishery if there is an escalating catch rate of yelloweye or canary rockfish that threatens to exceed prescribed harvest guidelines.

<table>
<tr><th>Management Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>North</td><td colspan="4">CLOSED</td><td colspan="5">Open <30 fm</td><td colspan="3">CLOSED</td></tr>
<tr><td>North-Central</td><td colspan="5">CLOSED</td><td colspan="4">Open <30 fm</td><td colspan="3">CLOSED</td></tr>
<tr><td>Monterey South-Central</td><td colspan="4">CLOSED</td><td colspan="7">Open <40 fm</td><td>CLOSED</td></tr>
<tr><td>Morro Bay South-Central</td><td colspan="4">CLOSED</td><td colspan="7">Open <40 fm</td><td>CLOSED</td></tr>
<tr><td>South</td><td colspan="2">CLOSED</td><td colspan="10">Open <60 fm</td></tr>
</table>

Figure 2-27. The status quo California recreational groundfish season by marine management area in 2007.

Management Area	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
North	CLOSED				Open <20 fm							
North-Central	CLOSED					Open <20 fm						CLOSED
Monterey South-Central	CLOSED				Open <40 fm							CLOSED
Morro Bay South-Central	CLOSED				Open <40 fm							CLOSED
South	CLOSED		Open <60 fm									

Figure 2-28. The status quo California recreational groundfish season by marine management area in 2008.

The sport fishery for Pacific sanddabs, using gear specified in Federal and state regulations (size #2 hooks or smaller), was exempt from the season closures and depth restrictions placed on other Federally-managed groundfish. Retention of species in the Other Flatfish complex was allowed when fishing with size #2 hooks or smaller (≤ 11 mm from point to shank) for Pacific sanddabs. All divers (boats permitted while diving for rockfish or other closed species during closed periods provided no hook and line gear on board or in possession while diving to catch rockfish) and shore-based anglers were exempt from the seasonal closures and depth restrictions for rockfish, greenlings, California scorpionfish, California sheephead, and ocean whitefish.

In the South Region, CA scorpionfish is open 12 months: 0-40 fm January-February, 0-60 fm in March-December.

<u>2007-08 Bag and Size Limits</u>

In 2007-08, the California recreational fishery was subject to a general bag limit of 20 fish. Within this general bag limit the following sublimits applied:

- a combined rockfish + cabezon + greenling (RCG) complex daily bag limit of 10 fish, of which one can be a cabezon and one can be a greenling of the genus *Hexagrammos*.
- a two-fish bag limit for bocaccio north of 40°10' N latitude to the Oregon/California border at 42° N latitude and a one-fish bag limit south of 40°10' N latitude to the U.S./Mexico border within the 10-fish RCG daily-bag-limit.
- no retention of cowcod, canary, or yelloweye rockfish.
- a daily-bag-limit of two lingcod with a minimum size limit of 24 inches.

<u>2007-08 Area Restrictions</u>

Beyond the depth restrictions depicted in Figures 2-27 and 2-28, the following area restrictions applied to the 2007-08 California recreational fishery:

- waters of Cordell Bank less than 100 fm in depth were closed to fishing at all times.
- recreational fishing for groundfish was prohibited between the shoreline and the 10 fm (18 m) depth contour around the Farallon Islands and Noonday Rock.
- fishing was not allowed within the CCAs (Figure 2-20), except shoreward of the 20 fm line where fishing was open for groundfish other than California scorpionfish, but including select non-groundfish species (California sheephead and ocean whitefish).

2.2.4.2 *Alternative 2009-10 Management Measure Alternatives*

The following 2009-10 management measure alternatives (by sector) were adopted by the Council in April 2008 for analysis. Analysis of the consequences to affected species can be found in section 4.5.4.

Analysis of the socioeconomic consequences to affected groundfish fishing sectors and west coast fishing communities can be found in Chapter 7.

Most of the management measures described below are currently being used, and have been used in the recent past to manage the groundfish fishery. Some of them are being revised modestly (such as some closed areas) to incorporate new information. There are a few new management measures that affect the whiting fishery which are discussed below and at sections XX XX XX. Most of these management measures would be used under the different OY alternatives; the only difference between the alternatives would be the size and severity of the management measures.

Limited Entry Non-Whiting Trawl

Routine management measures such as alternative trip limits and trawl RCA adjustments are included in analyses provided in section 4.3.1.2 and 4.5.2.1. The alternative management measures described in section 4.5.4.1 are also designed to stay within the limited entry non-whiting trawl trip limits and RCA configurations under each of the rebuilding alternatives. The following management measures are also analyzed and discussed in section 4.5.2.1 of this EIS.

<u>One Bottom Trawl Gear on Board North of 40°10' N Latitude</u>

The GMT has discussed the concept of only allowing a single bottom trawl gear on board several times in recent years. The GMT believes consideration of this measure is consistent with the Purpose and Need. The intention of the one bottom trawl gear on board discussion has been to increase the certainty that large footrope gear is not being used shoreward of the RCA. Large footrope trawl gear is better able to fish in rocky habitats and using this gear in shoreward areas tends to increase bycatch of overfished shelf species. In recent discussions, the GMT identified several issues that would need to be addressed before putting this type of regulation in place. In particular, if trawlers are held to a single trawl gear during a period, this may inadvertently result in increased trawl effort on the shelf for those vessels that currently fish both seaward and shoreward but are restricted to the smaller limits. In addition, switching between one trawl gear and another may force vessels to incur a cost that they currently do not incur, thus having an adverse economic impact to trawl vessels.

Additionally, sampling concerns in Oregon (approximately 2.6 percent of landings) are associated with the use of multiple trawl gears during one trip. Implementation of a one trawl gear onboard regulation would prevent this issue. Fish are not kept in separate holds by gear type and therefore samples taken at the dock cannot be associated to a specific gear or area fished (shoreward or seaward of the RCA). Gear and area codes cannot be recorded on fish tickets and logbooks when more than one gear is used. When samples cannot be linked to the gear and area fished, they are unable to be used which results in a loss of important information used in stock assessments.

Limited Entry Whiting Trawl

The following management measures are analyzed and discussed in section 4.5.2.2 of this EIS.

<u>Closing the Whiting Fishery Upon Projected Attainment of a Bycatch Limit</u>

The GMT believes that closing the whiting fishery upon projected attainment of a bycatch limit will reduce the risk of exceeding a specified bycatch limit. Closing upon projection of attainment may mean inadvertently exceeding the bycatch limit or coming in under the bycatch limit, due to imprecise projections. Closing before actually attaining the bycatch limit may result in leaving a portion of the whiting OY unharvested. However, closing upon actual attainment virtually guarantees that the bycatch limit will be exceeded, potentially jeopardizing the OY.

The Council requested that NMFS adopt the ability to close the whiting fishery when a bycatch limit is projected to be attained as part of the FMP Amendment 10 (Shore-Based Pacific Whiting Monitoring Program) rulemaking at their September 2007 meeting. The Council decided to add this task to this analysis of 2009-10 management measures in April 2008 because the proposed rule for Amendment 10 was not yet published. If this rule is adopted by NMFS in the final Amendment 10 rule, then this item does not need to be addressed further.

Maximized Retention for Catcher Vessels Delivering to Motherships

Provisions for requiring maximized retention for whiting catcher vessels delivering to motherships are tracking and monitoring issues, which are directly related to the ability to manage the fisheries within the constraints of overfished species rebuilding plans. If action is not taken on this issue for 2009-10, the GMT would have uncertainty in the accuracy of the bycatch estimates for this sector, which operates in a fishery that is managed within bycatch limits.

NMFS indicated that the proposed language for Amendment 10, Shore-Based Pacific Whiting Monitoring Program, addresses this issue. If this issue is addressed in the final Amendment 10 rule, then this item does not need to be addressed further.

Unmonitored Midwater Trawling in the RCA

Existing regulations allow midwater trawl vessels targeting whiting to fish in the trawl RCA without monitoring/observers during all operations as long as they sort and discard to meet trip limits. Participants in this fishery are only subject to a 25 percent at-sea observation rate through WCGOP coverage. Modifying regulations to require vessels in this fishery to carry an observer during all operations within the RCA is a tracking and monitoring issue, which directly relates to the ability to manage the fisheries within the constraints of overfished species rebuilding plans. Modifying regulations in order to insure that trawl vessels targeting whiting in the RCA are monitored 100 percent of the time would provide accountability for overfished stocks that may be encountered in this fishery. Targeting whiting outside the RCA (with large footrope gear on the slope for example) would still be allowed and subject to normal WCGOP observer rotations.

NMFS indicated that the proposed language for Amendment 10 addresses this issue. If this issue is addressed in the final Amendment 10 rule, then this item does not need to be addressed further.

2009-10 Area Restriction Alternatives

Include the ability to implement depth-based closures for the whiting fishery as an inseason measure upon the projected attainment of one or more bycatch limits for canary, darkblotched, and widow rockfish, or the Chinook harvest guideline.

Sector-Specific Bycatch Limits

The GMT believes that sector-specific bycatch limits may tend to decrease competition between sectors, potentially fostering the ability for each sector to manage bycatch successfully. This outcome would increase the likelihood of attaining the whiting OY. The GMT identified several issues that are related to this topic that would need to be addressed in the analysis. First, a bycatch allocation for each sector would need to be calculated. During preliminary discussions, the GMT identified two possible methods: 1) pro-rata distribution and 2) distribution based on the whiting bycatch model rates. Imposing inflexible, hard limits on each sector may inadvertently constrain one or more sectors even if the overall total bycatch across all three sectors is less than the overall three sector limit. To alleviate this possibility, sector-specific bycatch limits could be subject to adjustments or re-apportionment via a routine inseason adjustment, or sector specific bycatch could be subject to a rollover from one sector to another if one sector completes harvesting operations and has not taken all of its bycatch. The GMT notes that sector allocations are currently being developed under FMP Amendment 21, which concerns formal allocations of some groundfish species and species complexes to limited entry trawl sectors, and the 2009-10 exploration of sector-specific bycatch limits could build upon these analyses.

The Council decided in April 2008 to include the above options identified by the GMT for analysis and public review, with the following additional sub-options:

- Upon the attainment of the whiting allocation by a sector, allow the rollover of unused bycatch cap amounts to the remaining non-tribal whiting sectors pro-rated to their respective initial whiting allocations.
- Upon the attainment of the whiting allocation by a sector, add the remaining unused bycatch cap amounts to the overall residual in the scorecard to be accessed by any sector, including to cover projected overages in research catches.

Seasonal Release of Shared Bycatch Limits

The GMT discussed the concept of scheduled releases of bycatch in the whiting fishery and believes that it would tend to operate similarly to sector-specific bycatch limits. This tool would operate similarly to sector-specific caps because of the seasonal timing of fishing operations of the three whiting sectors and the fact that devoting specific bycatch amounts to specific times could have an allocative effect, like sector-specific limits. Like sector-specific limits, a scheduled release could inadvertently constrain one or more whiting sectors. Therefore, rolling over unused bycatch from one season to another may provide some flexibility in using this tool. In addition, allowing seasonal release amounts to be adjusted via an inseason action could provide another source of flexibility. The current method of releasing the bycatch limit to the fishery at the start of the season tends to favor the sectors that operate in the early part of the season.

The Council decided in April 2008 to include options for seasonal releases of an overall whiting sector bycatch cap, using the following release schedules:

- Apr 1: 45%; June 15: 40%; Fall 15%,
- Apr 1: 50%; June 15: 40%; Fall 10%,
- Apr 1: 50%; June 15: 45%; Fall 5%,
- Across all sub-options analyze the following release dates for the Fall period: Sept 1; Sept 15; and Oct 1,
- Across all sub-options any unused bycatch amounts from the previous release would carry-over to the following specified season.

<u>Changing the At-Sea Processing Restrictions in the Shoreside Whiting Fishery</u>

The Council adopted an alternative for analysis and public review that would modify whiting regulations to allow heading, gutting and tailing of whiting in the shoreside whiting fishery for vessels that are 75 ft. in length or less. This action could provide increased economic incentives by allowing a value-added product to be landed.

Limited Entry Fixed Gear

Routine management measures such as alternative trip limits and non-trawl RCA adjustments are included in the analyses provided in section 4.5.2.3 of this EIS. The following management measures are also analyzed and discussed in section 4.5.2.3.

<u>2009-10 Area Restriction Alternatives</u>

Non-trawl RCA boundary adjustments north of 40°10' N latitude are contemplated in this EIS to reduce yelloweye bycatch (Table 2-35). Analysis of impacts associated with progressively moving the entire seaward line from 100 fm to 125 fm and 150 fm have been done in previous analyses (PFMC 2006) and are provided again in Table 2-35 and section 4.5.2.3 of this EIS with updated WCGOP discard rates. There now exists enough WCGOP to consider finer scale northern non-trawl RCA adjustments. Analysis of impacts associated with progressively moving sections of the northern seaward non-trawl RCA north of 40°10' N latitude and south of the U.S.-Canada border from 100 fm to 125 fm and 150 fm are also provided in section 4.5.2.3 with latitudinal stratifications at the Columbia-Eureka INPFC line (43° N lat.), Cascade Head, Oregon (45.064° N lat.), and Point Chehalis, Washington (46.888°). Adjustments of the seaward non-trawl RCA boundary in the north largely affect sablefish targeting, but also affect targeting opportunities for slope rockfish, spiny dogfish, shortspine thornyhead, and Pacific halibut.

Table 2-35. Limited entry fixed gear alternatives designed to progressively avoid yelloweye rockfish by moving all or a portion of the seaward boundary of the non-trawl RCA north of 40°10' N latitude from 100 fm to 125 and 150 fm in 2009-10.

Fixed Gear Alternatives		Longline						Pot		Yelloweye (mt)
		36° - 40°10' N lat	North of 40°10' N lat	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°	36° - 40°10' N lat	North of 40°10' N lat	
No Action	100 Fathom		X						X	
	125 Fathom									1.5
	150 Fathom	X						X		
LEFG Alt. 1	100 Fathom								X	
	125 Fathom									0.6
	150 Fathom	X	X					X		
LEFG Alt. 2	100 Fathom			X		X			X	
	125 Fathom				X					0.7
	150 Fathom	X					X	X		
LEFG Alt. 3	100 Fathom								X	
	125 Fathom		X							1
	150 Fathom	X						X		
LEFG Alt. 4	100 Fathom			X	X	X			X	
	125 Fathom									1
	150 Fathom	X					X	X		
LEFG Alt. 5	100 Fathom			X	X	X			X	
	125 Fathom						X			1.2
	150 Fathom	X						X		
LEFG Alt. 6	100 Fathom			X		X	X		X	
	125 Fathom				X					1.2
	150 Fathom	X						X		

Gear Switching

Providing the opportunity for gear switching from longline to pot gears could potentially allow greater access to non-overfished stocks while reducing impacts to overfished species, especially yelloweye rockfish. WCGOP data indicates that yelloweye catch in pot fisheries is lower than catch in longline fisheries. Initial scoping indicates there might be an economic impact of switching from longline to pot gears. If a limited entry permit with a longline endorsement is allowed to use either pot or longline gear, the value of the longline-endorsed permit could increase and the value of pot-endorsed fixed gear permits could decrease. There would be an increased investment in new gear for those electing to switch gears. There may also be a cost in potentially reducing efficiency when targeting sablefish. There could also be increased gear conflicts on the fishing grounds. If the proposed gear switching is recommended by the Council, and analyzed for 2009-10, an amendment to the Fishery Management Plan would be needed.

Mandatory Logbooks

Logbooks are not currently mandatory in the limited entry fixed gear fishery and the states vary in their logbook requirements. Oregon has a mandatory requirement, Washington has a voluntary program, and

California has no requirement but did do a pilot study to investigate the feasibility of a nearshore logbook. Logbooks are considered in this analysis because of the information they provide on the timing and location of fishing effort. Logbooks information can improve catch projections and estimates of total catch, providing the ability to model impacts more precisely. Improved modeling allows consideration of more refined trip limits and RCA adjustments. Implementation of a mandatory coastwide logbook program would require coordination between NMFS and the states. The risk of not implementing the program would be no improvement in our knowledge of the fixed gear fleet. Logbooks can also improve stock assessments by providing information on CPUE and area of catch.

Directed Open Access

Routine management measures such as alternative trip limits and non-trawl RCA adjustments are included in the analyses provided in section 4.5.4.4. The following management measures are also analyzed and discussed in section 4.5.4.4.

<u>2009-10 Area Restriction Alternatives</u>

The same non-trawl RCA adjustment alternatives described above for the limited entry fixed gear sector would also apply to the directed open access sector (Table 2-36). Adjustments of the seaward non-trawl RCA boundary in the north largely affect sablefish targeting in the daily-trip-limit fishery, but also affect targeting opportunities on slope rockfish, spiny dogfish, shortspine thornyhead, and Pacific halibut.

Table 2-36. Open access sablefish daily-trip-limit alternatives designed to progressively avoid yelloweye rockfish by moving all or a portion of the seaward boundary of the non-trawl RCA north of 40°10' N latitude from 100 fm to 125 and 150 fm in 2009-10.

Open Access DTL Alternatives		Longline: 36° - 40°10' N lat	Longline: North of 40°10' N lat	Longline: 40°10' - Col./Eur. line 43°	Longline: Col./Eur. line 43° - Cascade Head 45.064°	Longline: Cascade Head 45.064° - Pt. Chehalis 46.888°	Longline: North of Pt. Chehalis 46.888°	Pot: 36° - 40°10' N lat	Pot: North of 40°10' N lat	Yelloweye (mt)
No Action	100 Fm		X						X	
	125 Fm									0.4
	150 Fm	X						X		
OA DTL Alt. 1	100 Fm								X	
	125 Fm									0.1
	150 Fm	X	X					X		
OA DTL Alt. 2	100 Fm			X		X			X	
	125 Fm				X					0.2
	150 Fm	X					X	X		
OA DTL Alt. 3	100 Fm								X	
	125 Fm		X							0.2
	150 Fm	X						X		
OA DTL Alt. 4	100 Fm			X	X	X			X	
	125 Fm									0.2
	150 Fm	X					X	X		
OA DTL Alt. 5	100 Fm			X	X	X			X	
	125 Fm						X			0.3
	150 Fm	X						X		
OA DTL Alt. 6	100 Fm			X		X	X		X	
	125 Fm				X					0.3
	150 Fm	X						X		

Commercial nearshore fisheries in California and Oregon would be subjected to alternative shoreward non-trawl RCA line configurations of 20 fm or 30 fm and alternative trip limits for target nearshore groundfish species in 2009-10 (Table 2-37).

Table 2-37. Alternatives for 2009-10 directed open access commercial nearshore fisheries in California and Oregon and associated impacts of target and rebuilding species.

Species	No Action OA NS Alt.	OA NS Alt. 1	OA NS Alt. 2	OA NS Alt. 3	OA NS Alt. 4	OA NS Alt. 5	OA NS Alt. 6
	30 fm restriction north of 34°27' N lat.	20 fm depth restriction north of 34°27' N lat. and 20% reduction in landed catch	30 fm depth restriction north of 34°27' N lat. and 60% reduction in landed catch	20 fm depth restriction north of 34°27' N lat.	20 fm depth restriction north of 40°10' N lat.	20 fm depth restriction, 40°10' - 43° N lat.	20 fm depth restriction north of 40°10' N lat. with maximum black rockfish opportunity coastwide
Target Species Landed Catch (mt) South of 40°10' N latitude							
Shallow nearshore rockfish	55	55	22	55	55	55	55
Black rockfish	4	4	2	4	4	4	24
Blue Rockfish	7	7	3	7	7	7	7
Other deeper nearshore rockfish	30	30	12	30	30	30	30
Cabezon	22	22	9	22	22	22	22
Kelp greenling	1	1	1	1	1	1	1
Lingcod	19	19	8	19	19	19	19
California sheephead	31	31	12	31	31	31	31
Target Species Landed Catch (mt) North of 40°10' N latitude							
Black rockfish	162	130	65	162	162	162	275
Blue Rockfish	13	10	5	13	13	13	13
Other minor nearshore rockfish	17	14	7	17	17	17	17
Cabezon	21	17	8	21	21	21	21
Kelp greenling	17	14	7	17	17	17	17
Lingcod	60	48	24	60	60	60	60
Rebuilding Species Total Catch (mt)							
Canary	3.04	2.38	1.22	2.22	2.66	2.66	3.25
Bocaccio	0.02	0.02	0.01	0.01	0.02	0.02	0.02
Widow	0.05	0.03	0.02	0.04	0.04	0.04	0.05
Yelloweye	1.30	0.49	0.52	0.54	0.59	0.59	0.78

Mandatory Logbooks

The same considerations for a mandatory logbook program in the limited entry fixed gear fishery, as described in the previous section apply to the directed open access fishery.

Incidental Open Access

The following management measures are analyzed and discussed in section 4.5.4.5 of this EIS.

Retention of Lingcod in Salmon Troll Fisheries

Industry representatives requested greater retention of lingcod in 2009-10 west coast salmon troll fisheries. Lingcod retention is not allowed by open access fishermen participating in fisheries exempt from RCA restrictions (i.e., salmon troll and pink shrimp fisheries) while fishing in the RCA. Lingcod are caught incidentally when targeting Chinook salmon, so the request was to allow retention as a ratio of Chinook caught and landed. The Council adopted the following lingcod retention options for analysis:

- Allow the retention of 1 lingcod for every 15 Chinook salmon, plus one additional lingcod, not to exceed 10 lingcod per trip, up to a maximum limit of 400 lbs/month.
- Allow the retention of 1 lingcod for every 20 Chinook salmon, plus one additional lingcod, not to exceed 10 lingcod per trip, up to a maximum limit of 400 lbs/month.

Tribal

Tribal Proposals Regarding Non-Whiting Groundfish Fisheries in 2009 and 2010

The Washington treaty tribes proposed and the Council adopted the following 2009-10 tribal management measures for analysis and public review. The following management measures are analyzed and discussed in section 4.5.1.5 of this EIS.

Black Rockfish - The 2009 and 2010 tribal harvest guidelines will be set at 20,000 pounds for the management area between the US/Canada border and Cape Alava, and 10,000 pounds for the management area located between Destruction Island and Leadbetter Point. No tribal harvest restrictions are proposed for the management area between Cape Alava and Destruction Island.

Sablefish - The 2009 and 2010 tribal set asides for sablefish will be set at 10 percent of the Monterey through Vancouver area OY minus 1.6 percent to account for estimated discard mortality. Allocations among tribes and among gear types, if any, will be determined by the tribes.

Pacific cod - The tribes will be subject to a 400 mt harvest guideline for 2009 and 2010.

For all other tribal groundfish fisheries the following trip limits will apply:

Thornyheads - Tribal fisheries will be restricted to the Limited Entry trip limits in place at the beginning of the year for both shortspine and longspine thornyheads. Those limits would be accumulated across vessels into a cumulative fleetwide harvest target for the year. The limits available to individual fishermen will then be adjusted inseason to stay within the overall harvest target as well as estimated impacts to overfished species.

Canary Rockfish - Tribal fisheries will be restricted to a 300 pound per trip limit.

Other Minor Nearshore, Shelf and Slope Rockfish - Tribal fisheries will be restricted to a 300 pound per trip limit for each species group, or the Limited Entry trip limits if they are less restrictive than the 300 pound per trip limit.

Yelloweye Rockfish - The tribes will continue developing depth, area, and time restrictions in their directed Pacific halibut fishery to minimize impacts on yelloweye rockfish. Tribal fisheries will be restricted to 100 pounds per trip.

Lingcod - Tribal fisheries will be subject to a 250 mt harvest guideline for 2009 and 2010.

Spiny Dogfish - The Makah Tribe is proposing a directed longline fishery for spiny dogfish for 2009 and 2010. The fishery would be restricted to the Limited Entry trip limits. Increased landings of dogfish by treaty fishermen in 2009 and 2010 would be dependent on successful targeting in 2008 while staying within current estimates of impacts on overfished species.

Full Retention - The tribes will require full retention of all overfished rockfish species as well as all other marketable rockfishes during treaty fisheries.

Tribal Proposals Regarding Makah Trawl Fisheries for 2009 and 2010

Midwater Trawl Fishery - Treaty midwater trawl fishermen will be restricted to a cumulative limit of yellowtail rockfish, based on the number of vessels participating, not to exceed 180,000 pounds per two month period for the entire fleet. Their landings of widow rockfish must not exceed 10 percent of the poundage of yellowtail rockfish landed in any given period. The tribe may adjust the cumulative limit for any two-month period to minimize the incidental catch of canary and widow rockfish, provided the average cumulative limit does not exceed 180,000 pounds for the fleet.

Bottom Trawl Fishery - Treaty fishermen using bottom trawl gear will be subject to the trip limits applicable to the limited entry fishery for shortspine and longspine thornyhead, Dover sole, English sole, rex sole, arrowtooth flounder, and other flatfish. For Dover sole, thornyheads (both shortspine and longspine), and arrowtooth flounder, the limited entry trip limits in place at the beginning of the season will be combined across periods and the fleet to create a cumulative harvest target. The limits available to individual fishermen will then be adjusted inseason to stay within the overall harvest target as well as estimated impacts to overfished species. For petrale sole, fishermen would be restricted to 50,000 pounds per two month period for the entire year. Because of the relatively modest expected harvest, all other trip limits for the tribal fishery will be those in place at the beginning of the season in the limited entry fishery and will not be adjusted downward, nor will time restrictions or closures be imposed, unless in-season catch statistics demonstrate that the tribe has taken half of the harvest in the tribal area. Fishermen will be restricted to small footrope (< 8 inches) trawl gear. Exploration of the use of selective flatfish trawl gear will be conducted in 2008.

Observer Program - The Makah Tribe has an observer program in place to monitor and enforce the limits proposed above.

Tribal and Council Proposals Regarding Whiting Fisheries for 2009 and 2010

Since 1996 a portion of the U.S. OY for Pacific whiting has been allocated for tribal fisheries. Beginning in 1999 the allocation was based on a sliding scale formula proposed by the Makah Tribe. To date only the Makah Tribe has prosecuted a whiting fishery; however, other coastal treaty tribes anticipate entering the fishery in the 2009-10 seasons. For 2009 both the Makah and Quileute Tribes are proposing to conduct whiting fisheries. The Council recommends that the tribal whiting fisheries in 2009 should receive a set-aside of 50,000 mt of Pacific whiting, with 42,000 mt managed by Makah and 8,000 mt managed by Quileute.

For the Makah fishery, estimated impacts to overfished species have been calculated based on the GMT's four-year weighted average approach (see section 4.5.1.2). For that portion of the set-aside being managed by Quileute, the estimated impacts derived from the weighted average of Makah's bycatch in recent years are tripled. This precautionary upward adjustment of bycatch estimates was done in lieu of bycatch rates specific to Quileute fishermen. It is designed to minimize impacts to other sectors inseason should bycatch prove to be higher due to differences in bycatch rates based on vessel, gear, or skipper effects for new participants that are unquantifiable with existing data. Estimated impacts across all whiting sectors are shown in Table 2-38.

Table 2-38. Estimated bycatch by sector for the Pacific whiting fishery based on the 2008 U.S. OY of 269,069 mt and a tribal set-aside of 50,000 mt.

Sector	Canary	Darkblotched	POP	Widow
Tribal	2.23	0.01	1.15	5.68
Mothership	1.99	5.87	1.05	114.61
CP	0.24	5.77	1.09	140.23
Shoreside	1.52	2.74	0.33	145.87
Total	5.99	14.39	3.62	406.39

Given that the Quinault Indian Nation has also expressed interest in entering the fishery as early as 2010, the Council has requested that NMFS convene government-to-government discussions to establish appropriate set-asides or allocations for treaty tribal fisheries for 2010 and beyond.

Washington Recreational

The following management measures are analyzed and discussed in section 4.5.4.7 of this EIS.

2009-10 Season Alternatives

Figures 2-29 to 2-31 provide alternative 2009-10 Washington recreational groundfish seasons by management area adopted for analysis and public review. These season alternatives vary from most restrictive in 2-14 to most liberal in Figure 2-31 to comply with the range of yelloweye catch sharing options in Table 2-10.

Washington Rec. Alternative 2 includes a Groundfish Fishing Area (GFA) in waters offshore from Washington in Marine Area 4 that is proposed to be open year-round to recreational fishing (Figure 2-32). This GFA is described using the following coordinates:

48°19 N lat. 125°22 W long;
48°19 N lat 125°18 W long;
48°16 N lat 125°18 W long;
48°16 N lat 125°22 W long.

<table>
<tr><th>Marine Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>3 & 4 (N. Coast)</td><td colspan="3">CLOSED Jan. 1 - Apr. 16</td><td>Open all depths</td><td colspan="4">Open <20 fm May 1-Aug 15 a/</td><td colspan="4">CLOSED Aug. 16 - Dec. 31</td></tr>
<tr><td>2 (S. Coast)</td><td colspan="2">Open all depths</td><td colspan="3">Open <30 fm Mar 15 - June 15 b/ c/</td><td colspan="4">Open all depths except lingcod prohibited >30 fm c/</td><td colspan="3">Open all depths</td></tr>
<tr><td>1 (Col. R.)</td><td colspan="4">Open all depths</td><td colspan="5">Open all depths d/</td><td colspan="3">Open all depths</td></tr>
<tr><td colspan="13">a/ Groundfish retention allowed >20 fm on days when Pacific halibut is open.
b/ Retention of sablefish and Pacific cod allowed seaward of 30 fm from May 1- June 15.
c/ Retention of lingcod prohibited >30 fm from March 15 - September 30.
d/ Retention of groundfish, except sablefish and Pacific cod, prohibited with Pacific halibut on board from May 1 - September 30.</td></tr>
</table>

Figure 2-29. The alternative 1 Washington recreational groundfish season by marine management area in 2009-10.

Marine Area	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
3 & 4 (N. Coast)	Open in Offshore GFA Only Jan 1 - Apr 16			Open all depths	Open <20 fm May 1-Aug 15 a/			Open in Offshore GFA Only Aug 16 – Dec 31				
2 (S. Coast)	Open all depths		Open <30 fm Mar 15 - June 15 b/ c/ d/			Open all depths except lingcod prohibited on Fri. and Sat. >30 fm c/ d/				Open all depths		
1 (Col. R.)	Open all depths				Open all depths e/					Open all depths		

a/ Groundfish retention allowed >20 fm on days when Pacific halibut is open.
b/ Retention of sablefish and Pacific cod allowed seaward of 30 fm from May 1- June 15.
c/ Retention of lingcod prohibited >30 fm on Fri. and Sat. from March 15 - September 30.
d/ Retention of lingcod prohibited south of 46°58' N lat. from March 15 - September 30.
e/ Retention of groundfish, except sablefish and Pacific cod, prohibited with Pacific halibut on board.

Figure 2-30. The alternative 2 Washington recreational groundfish season by marine management area in 2009-10.

Marine Area	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
3 & 4 (N. Coast)	Open all depths				Open <20 fm May 1-Sep 30 a/					Open all depths		
2 (S. Coast)	Open all depths		Open <30 fm Mar 15 - June 15 b/			Open all depths except lingcod prohibited on Fri. and Sat. >30 fm c/				Open all depths		
1 (Col. R.)	Open all depths				Open all depths d/					Open all depths		

a/ Groundfish retention allowed >20 fm on days when Pacific halibut is open.
b/ Retention of sablefish and Pacific cod allowed seaward of 30 fm from May 1- June 15.
c/ Retention of lingcod prohibited >30 fm on Fri. and Sat. from June 16 - September 30.
d/ Retention of groundfish, except sablefish and Pacific cod, prohibited with Pacific halibut on board.

Figure 2-31. The alternative 3 Washington recreational groundfish season by marine management area in 2009-10.

North Coast Proposed Lingcod Area
Option 2

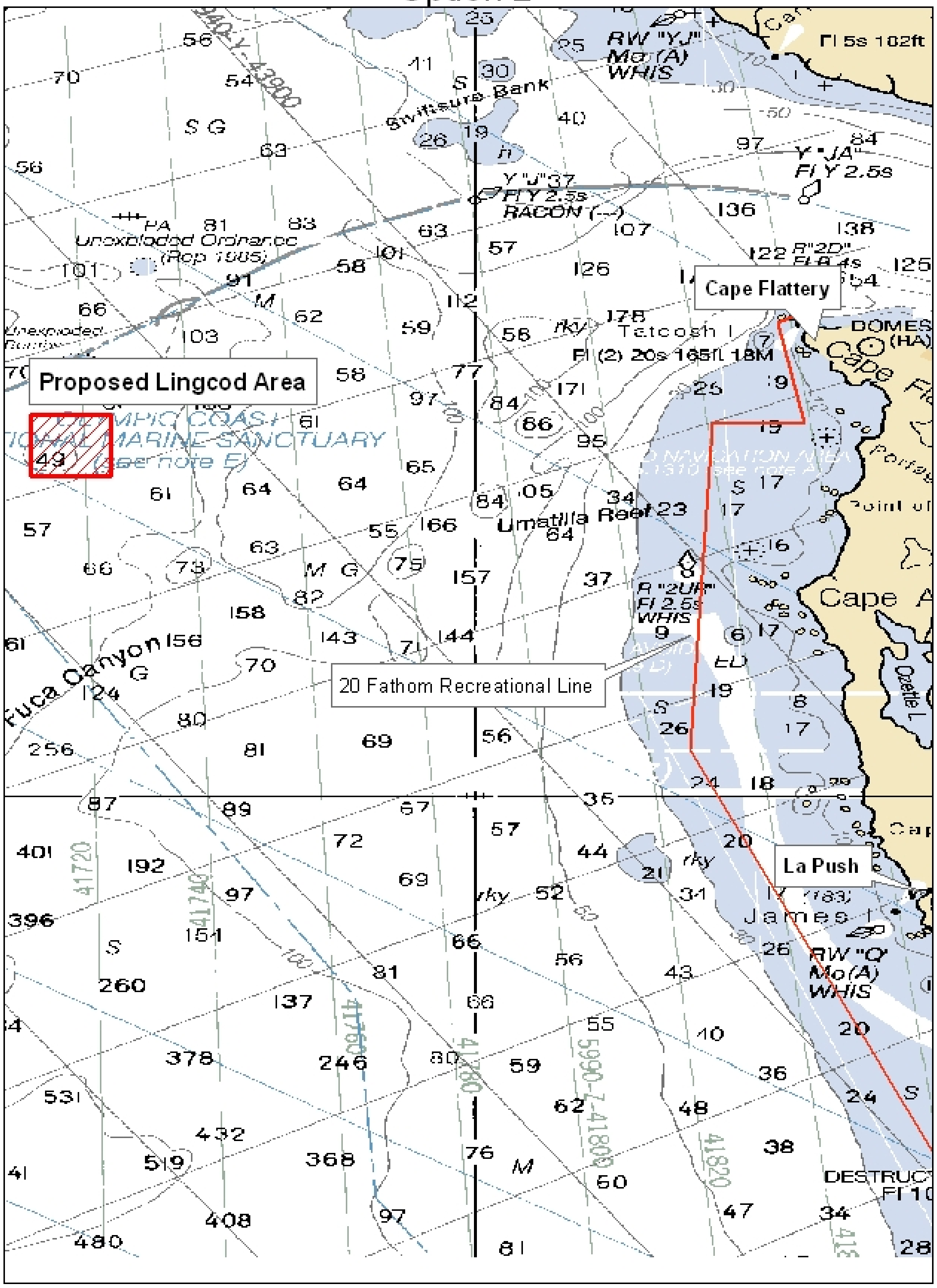


Figure 2-32. A Groundfish Fishing Area (GFA) in waters offshore from Washington in Marine Area 4 that is proposed to be open year-round to recreational fishing in 2009-10.

2009-10 Bag and Size Limit Alternatives

No alternative bag or size limits are considered other than those described for the Washington recreational fishery under the No Action Alternative.

2009-2010 Lingcod Seasons

The lingcod seasons in 2009 and 2010 for all of the options described above, including the preferred alternative, would be as follows:

- Marine Areas 1-3 March 14 through October 17 in 2009 and March 13 through October 16 in 2010.
- Marine Area 4, April 16- October 15 in 2009 and April 16- October 15 in 2010.

2009-10 Area Restriction Alternatives

The YRCAs described for the Washington recreational fishery under the No Action Alternative would apply for 2009-10 fisheries.

In Washington Marine Area 2, the following area restriction options are proposed if needed in 2009-10 (Figure 2-33):

Option 1: Prohibit the retention of rockfish and lingcod seaward of a line approximating 25 fathoms from March 15-June 15, using the following coordinates:

47°31.70 N lat	124°34.660 W long;
47°25.67 N lat	124°32.775 W long;
47°12.82 N lat	124°26.000 W long;
46°52.94 N lat	124°18.940 W long;
46°44.18 N lat	124°14.890 W long;
46°38.17 N lat	124°13.700 W long.

Option 2: In combination with any of the options and season alternatives listed above for Marine Area 2, prohibit fishing for or possession of lingcod in the following areas:

46°57.00 N lat	124°30.00 W long;
47°00.00 N lat	124°30.00 W long;
47°00.00 N lat	124°33.50 W long;
46°57.00 N lat	124°33.50 W long.

46°55.50 N lat	124°24.00 W long;
46°56.50 N lat	124°00.00 W long;
46°56.50 N lat	124°25.70 W long;
46°55.50 N lat	124°25.70 W long.

46°56.70 N lat	124°34.00 W long;
46°57.70 N lat	124°34.00 W long;
46°57.70 N lat	124°35.50 W long;
46°56.70 N lat	124°35.50 W long.

47°07.70 N lat	124°30.00 W long;
47°07.70 N lat	124°27.50 W long;
47°06.50 N lat	124°27.50 W long;
47°06.50 N lat	124°30.00 W long.

46°52.50 N lat	124°21.70 W long;
46°52.50 N lat	124°20.30 W long;
46°51.60 N lat	124°20.30 W long;
46°51.60 N lat	124°21.70 W long.

46°52.50 N lat	124°26.60 W long;
46°52.50 N lat	124°25.30 W long;
46°51.60 N lat	124°25.30 W long;
46°51.60 N lat	124°26.60 W long.

Option 3: In combination with any of the options listed above for Marine Area 2, prohibit fishing for or possession of bottomfish, lingcod and halibut in the following areas:

46°42.50 N lat	124°42.00 W long;
46°42.50 N lat	124°34.00 W long;
46°37.50 N lat	124°34.00 W long;
46°37.50 N lat	124°42.00 W long.

46°54.30 N lat	124°53.40 W long;
46°54.30 N lat	124°51.00 W long;
46°53.30 N lat	124°51.00 W long;
46°53.30 N lat	124°53.40 W long;
46°53.50 N lat	124°47.50 W long;
46°53.50 N lat	124°45.50 W long;
46°52.50 N lat	124°45.50 W long;
46°52.50 N lat	124°47.50 W long;
47°05.50 N lat	124°48.50 W long;
47°05.50 N lat	124°45.50 W long;
47°03.50 N lat	124°45.50 W long;
47°03.50 N lat	124°48.50 W long.

47°10.00 N lat	124°36.20 W long;
47°10.00 N lat	124°33.20 W long;
47°08.00 N lat	124°33.20 W long;
47°08.00 N lat	124°36.20 W long.

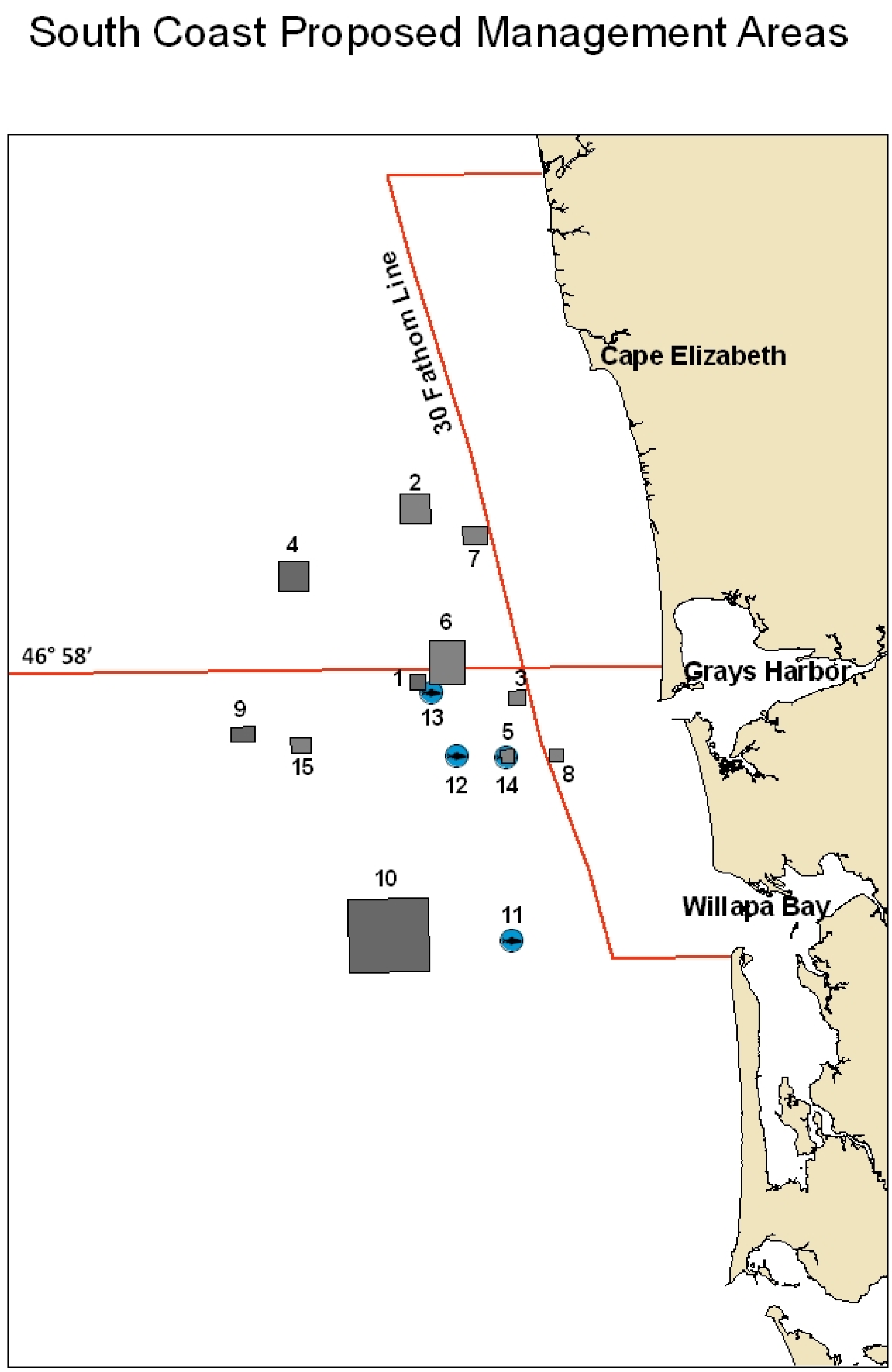


Figure 2-33. Area restrictions proposed for the 2009-10 Washington recreational fisheries on the south coast in Marine Area 2 if needed.

Mandatory Logbooks in Recreational Charter Fisheries

Consideration of a logbook program is mandated under the re-authorized Magnuson-Stevens Act, though implementation is not required. Logbooks could provide data needed to monitor catch inseason and assess stocks of recreationally important species, which may help in ensuring rebuilding plans are met. Logbooks could provide effort estimates for this fishing mode with greater accuracy than current estimation methods, although depending on the program infrastructure, the information may not be as timely as needed for inseason management. Logbooks may provide additional information that is not currently being collected through the state recreational sampling and survey programs (e.g., location data and CPUE). This data may help identify areas to be avoided to protect overfished species and may also provide valuable information for stock assessments. There may be other methods for collecting additional information from this harvest sector that are more accurate (e.g., observers). A mandatory coastwide logbook program, that meets state and federal requirements, would require coordination between NMFS and the states.

Oregon Recreational

The Oregon recreational alternatives presented for Council consideration addressed the various levels of yelloweye rockfish OY and sharing alternatives identified by the Council. The Oregon Department of Fish and Wildlife conducted several public meetings, including a meeting with the agencies Sport Advisory Committee (SAC), to gather input on the way to shape the fishery under the various levels of restrictions. A summary of the public meetings, and a summary of the SAC meeting, were reported to the Council. Basically the majority of the public desired a year round fishery with offshore closures (depth management) as the main tool to use in addressing the various impact levels of yelloweye rockfish under consideration. For safety reasons, the public were against any offshore closures closer to shore than the seaward closure at 20 fm (alternatives depth management lines included 25, 30 and 40 fm lines).

Depth management is the main tool used for controlling yelloweye rockfish catch. The alternatives range from the most restrictive (Oregon Recreational Alternative 1, Figure 2-34) with a May though September season open shoreward of 25 fathoms to the least restrictive option (Oregon Recreational Alternative 6, Figure 2-39) with a year round season and June through September open only shoreward of 40 fathoms. Oregon Recreational Alternative 4 reflects the status quo 2007-08 Oregon recreational groundfish season.

Oregon Recreational Alternative 5 reflects the possibility that the Pacific halibut catch limit may be significantly reduced from the 2008 limit. The alternative reflects a 50 percent reduction in the 2008 halibut catch limit which results in less time the groundfish fishery is restricted to shoreward of the 40 fathom line. The difference is reflected in Oregon Recreational Alternatives 5 and 6 and Figures 2-38 and 2-39.

The shorebased fishery would be managed for a year round season as yelloweye rockfish are not impacted. Also, fishing for, take, retention and possession of sanddabs and “other flatfishes”, excluding Pacific halibut would be legal year round and open shoreward of 40 fathoms during any period the groundfish fishery has any depth restrictions. The flatfish fishery would not have any depth restrictions when the groundfish fishery has no depth restrictions (i.e. 40, 30, 25 and 20 fm lines).

The following management measures are analyzed in section 4.5.2.8 of this EIS. The final Council adopted preferred-Alternative and potential inseason management actions are described in detail in section 4.5.2.8.

2009-10 Season Alternatives

Figures 2-34 to 2-39 provide 2009-10 Oregon recreational groundfish season alternatives adopted for analysis and public review.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
CLOSED				Open <25 fm					CLOSED		

Figure 2-34. The alternative 1 Oregon recreational groundfish season in 2009-10.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Open <30 fm											

Figure 2-35. The alternative 2 Oregon recreational groundfish season in 2009-10.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Open <40 fm											

Figure 2-36. The alternative 3 Oregon recreational groundfish season in 2009-10.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Open all depths			Open <40 fm						Open all depths		

Figure 2-37. The alternative 4 Oregon recreational groundfish season in 2009-10. This is also the status quo 2007-08 Oregon recreational groundfish season.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Open all depths					Open <40 fm June 20 - Aug 31			Open all depths			

Figure 2-38. The alternative 5 Oregon recreational groundfish season in 2009-10.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Open all depths					Open <40 fm				Open all depths		

Figure 2-39. The alternative 6 Oregon recreational groundfish season in 2009-10.

2009-10 Bag and Size Limit Alternatives

ODFW is considering an increase in the Oregon recreational marine daily bag limit from 8 marine fish in aggregate to 10 marine fish in aggregate in 2009-10 and also an increase in the lingcod daily bag limit from 2 to 3 fish. These daily-bag-limits provide the flexibility to make necessary adjustments through the yearly state process, reflecting the progression of the current year's fishery. The state process will likely start off each season with reduced marine and lingcod daily bag limits and may increase or further reduced them inseason depending on the progression of the fishery relative to the impact on species with harvest targets/guidelines and state landing caps. Other than this alternative, all other bag and size limits are the same as specified in 2007-08 and described under the No Action Alternative.

2009-10 Area Restriction Alternatives

Two options for extending the status quo Stonewall Bank YRCA for 2009-10 recreational fisheries are shown in Figure 2-26 and are defined by the following coordinates:

Stonewall Bank Option 2 (largest area):

44°41.7594’ N lat.	124°30.018’ W long.
44°41.7348’ N lat.	124°21.603’ W long.
44°25.2456’ N lat.	124°16.944’ W long.
44°25.2942’ N lat.	124°30.1404’ W long.
44°41.7594’ N lat.	124°30.018’ W long.

Stonewall Bank Option 3 (medium area):

44°38.544’ N lat.	124°27.4122’ W long.
44°38.544’ N lat.	124°23.8554’ W long.
44°27.132’ N lat.	124°21.501’ W long.
44°27.132’ N lat.	124°26.8944’ W long.
44°31.302’ N lat.	124°28.3476’ W long.

Mandatory Logbooks in Recreational Charter Fisheries

Mandatory logbooks are contemplated for all west coast marine recreational charter fisheries in this action. The discussion of this issue in the Washington Recreational section applies to Oregon recreational charter fisheries as well.

California Recreational

CDFG is proposing to add a new marine management area in 2009-10 by dividing the North-Central management area north and south of Pt. Arena. This will allow for differing seasons and depth constraints in the two areas driven by differing observed impact rates to yelloweye rockfish. The following management measures are analyzed and discussed in section 4.5.4.9 of this EIS.

2009-2010 Season Alternatives

California Recreational Alternatives 1 though 6 below describe the range of season and depth management measures for the 2009-10 California recreational groundfish fishery that would be required under varying OY constraints for yelloweye, bocaccio, canary, cowcod, widow, and blue rockfish. Seasons and depths are prescribed for each management area separately, including the two new areas (North-Central North of Pt. Arena and North-Central South of Pt. Arena). The seasons and depths which result from the various OY alternatives and catch-sharing options range from the most restrictive in California Recreational Alternative 1, to the most liberal in California Recreational Alternative 6. The diagrams below (Figures 2-40 through 2-45) depict the season and depth structures for each of these six alternatives, and the corresponding estimates of impacts to each species is provided. *It is important to recognize that while six alternatives are described below, there are an infinite number of season and depth alternatives that could result between the range of California Recreational Alternative 1 and California Recreational Alternative6.* CDFG has selected the most likely alternatives within the range to analyze.

The Council has determined it will establish a coastwide OY for yelloweye rockfish, the most constraining of the depleted species, within a range of 13 mt and 17 mt. For California’s recreational fishery, yelloweye impacts will limit seasons and depths in the Northern and North-Central North of Point Arena Management Areas. However, in the Morro Bay South-Central Management Area, Monterey South-Central Management Area and North-Central South of Pt. Arena Management Areas, canary and blue rockfish are the most constraining species. In the Southern Management Area, cowcod and bocaccio are the most constraining species.

In addition to the yelloweye OY, the Council must determine the yelloweye catch sharing arrangement for 2009-10, the result of which will determine the harvest guideline (HG) for California's recreational fishery. Based on past catch sharing arrangements, and considering the range of OY alternatives, CDFG has determined that the yelloweye HG for the state's recreational fishery will fall within a range of 1.1 mt to 2.8 mt.

Because it is anticipated that the 2008 catch sharing arrangements will remain in effect for the other depleted species, CDFG has modeled its season and depth structures using a HG which would result for California's recreational fishery from both the most restrictive OY alternative available to the Council as identified in Table 2-1a, and other alternatives that are identified in Table 2-1a. For example, the OY alternatives under consideration for canary rockfish range from 35 mt to 155 mt. At present, the OY is 44 mt, and California's recreational HG is 9 mt. Using the lowest OY alternative of 35 mt, California's recreational HG would be 5.5 mt. Using the preliminary preferred OY of 105 mt, California's recreational HG would be 21.5 mt. These HG values were used in formulating the season and depth structures presented in the six alternatives.

For bocaccio and widow rockfish, only the lowest OY alternative is shown among the six California season and depth alternatives because constraints from other species (primarily yelloweye and cowcod) would prevent any further relaxation of seasons or depths.

In all management areas, under California laws, divers and shore-based anglers would continue to be exempt from the seasonal closures and depth restrictions. Additionally, California would continue to provide an exemption to allow year-round fishing for leopard sharks in specified enclosed bays and estuaries. California would also continue to provide for retention and possession of sanddabs and "other flatfishes" during the seasonal and depth closures that generally apply to all federal groundfish. The state would also continue with the prohibition on recreational groundfish fishing inside 10 fathoms at the Farallon Islands.

California Recreational Alternative 1: The season structure depicted below would result from the most constraining optimum yields (OYs) under consideration by the Council, as follows: a 13 mt OY for yelloweye rockfish (using the 2007 catch sharing ratio which would produce the most restrictive 1.1 mt California recreational HG), a 230 mt OY for blue rockfish, a 35 mt OY for canary rockfish, a 371 mt OY for widow rockfish, a 218 mt OY for bocaccio, and a 2 mt OY for cowcod. The yelloweye impact under this alternative is estimated to be 0.5 mt.

<table>
<tr><th>Management Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>North</td><td colspan="4">CLOSED</td><td colspan="2">Open <20 fm</td><td colspan="6">CLOSED</td></tr>
<tr><td>North-Central N. of Pt. Arena</td><td colspan="5">CLOSED</td><td>Open <20 fm</td><td colspan="6">CLOSED</td></tr>
<tr><td>North-Central S. of Pt. Arena</td><td colspan="5">CLOSED</td><td colspan="3">Open <20 fm</td><td colspan="4">CLOSED</td></tr>
<tr><td>Monterey South-Central</td><td colspan="4">CLOSED</td><td colspan="6">Open <40 fm</td><td colspan="2">CLOSED</td></tr>
<tr><td>Morro Bay South-Central</td><td colspan="4">CLOSED</td><td colspan="6">Open <40 fm</td><td colspan="2">CLOSED</td></tr>
<tr><td>South</td><td colspan="2">CLOSED</td><td colspan="10">Open <50 fm</td></tr>
</table>

Figure 2-40. Alternative 1 (most restrictive) California recreational groundfish season structure by marine management area for 2009-10.

California Recreational Alternative 2: The season structure depicted below results from the following constraints: a 14 mt OY for yelloweye rockfish (allowing for a 1.2 mt California recreational HG), a 230 mt OY for blue rockfish, a 105 mt OY for canary rockfish, a 371 mt OY for widow rockfish, a 218 mt OY for bocaccio, and a 3 mt OY for cowcod. The yelloweye impact under this alternative is estimated to be 1.1 mt.

<table>
<tr><th>Management Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>North</td><td colspan="4">CLOSED</td><td colspan="3">Open <20 fm</td><td colspan="5">CLOSED</td></tr>
<tr><td>North-Central N. of Pt. Arena</td><td colspan="5">CLOSED</td><td>Open <20 fm</td><td colspan="6">CLOSED</td></tr>
<tr><td>North-Central S. of Pt. Arena</td><td colspan="5">CLOSED</td><td colspan="4">Open <30 fm</td><td colspan="3">CLOSED</td></tr>
<tr><td>Monterey South-Central</td><td colspan="4">CLOSED</td><td colspan="6">Open <40 fm</td><td colspan="2">CLOSED</td></tr>
<tr><td>Morro Bay South-Central</td><td colspan="4">CLOSED</td><td colspan="6">Open <40 fm</td><td colspan="2">CLOSED</td></tr>
<tr><td>South</td><td colspan="2">CLOSED</td><td colspan="10">Open <60 fm</td></tr>
</table>

Figure 2-41. Alternative 2 California recreational groundfish season structure by marine management area for 2009-10.

<u>California Recreational Alternative 3</u>: The season structure depicted below results from the following constraints: a 17 mt OY for yelloweye rockfish (allowing for a 1.7 mt California recreational HG), a 230 mt OY for blue rockfish, a 105 mt OY for canary rockfish, a 371 mt OY for widow rockfish, a 218 mt OY for bocaccio, and a 3 mt OY for cowcod. The yelloweye impact under this alternative is estimated to be 1.5 mt.

<table>
<tr><th>Management Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>North</td><td colspan="5">CLOSED</td><td colspan="3">Open <20 fm</td><td colspan="4">CLOSED</td></tr>
<tr><td>North-Central N. of Pt. Arena</td><td colspan="5">CLOSED</td><td colspan="2">Open <20 fm July 15</td><td colspan="5">CLOSED</td></tr>
<tr><td>North-Central S. of Pt. Arena</td><td colspan="5">CLOSED</td><td colspan="4">Open <30 fm</td><td colspan="3">CLOSED</td></tr>
<tr><td>Monterey South-Central</td><td colspan="4">CLOSED</td><td colspan="6">Open <40 fm</td><td colspan="2">CLOSED</td></tr>
<tr><td>Morro Bay South-Central</td><td colspan="4">CLOSED</td><td colspan="6">Open <40 fm</td><td colspan="2">CLOSED</td></tr>
<tr><td>South</td><td colspan="2">CLOSED</td><td colspan="10">Open <60 fm</td></tr>
</table>

Figure 2-42. Alternative 3 California recreational groundfish season structure by marine management area for 2009-10.

<u>California Recreational Alternative 4</u>: The season structure depicted below results from the following constraints: a 17 mt OY for yelloweye rockfish (allowing for a 1.8 mt California recreational HG), a 230 mt OY for blue rockfish, a 105 mt OY for canary rockfish, a 371 mt OY for widow rockfish, a 218 mt OY for bocaccio, and a 3 mt OY for cowcod.

<table>
<tr><th>Management Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>North</td><td colspan="4">CLOSED</td><td colspan="4">Open <20 fm</td><td colspan="4">CLOSED</td></tr>
<tr><td>North-Central N. of Pt. Arena</td><td colspan="5">CLOSED</td><td colspan="2">Open <20 fm July 15</td><td colspan="5">CLOSED</td></tr>
<tr><td>North-Central S. of Pt. Arena</td><td colspan="5">CLOSED</td><td colspan="4">Open <30 fm</td><td colspan="3">CLOSED</td></tr>
<tr><td>Monterey South-Central</td><td colspan="4">CLOSED</td><td colspan="6">Open <40 fm</td><td colspan="2">CLOSED</td></tr>
<tr><td>Morro Bay South-Central</td><td colspan="4">CLOSED</td><td colspan="6">Open <40 fm</td><td colspan="2">CLOSED</td></tr>
<tr><td>South</td><td colspan="2">CLOSED</td><td colspan="10">Open <60 fm</td></tr>
</table>

Figure 2-43. Alternative 4 California recreational groundfish season structure by marine management area for 2009-10.

California Recreational Alternative 5: The season structure depicted below results from the following constraints: a 17 mt OY for yelloweye rockfish (allowing for a 2.1 mt California recreational HG), a 230 mt OY for blue rockfish, a 105 mt OY for canary rockfish, a 371 mt OY for widow rockfish, a 218 mt OY for bocaccio, and a 3 mt OY for cowcod. The yelloweye impact under this alternative is estimated to be 1.9 mt.

<table>
<tr><th>Management Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>North</td><td colspan="4">CLOSED</td><td colspan="5">Open <20 fm, May to Sept 15</td><td colspan="3">CLOSED</td></tr>
<tr><td>North-Central N. of Pt. Arena</td><td colspan="5">CLOSED</td><td colspan="2">Open <20 fm</td><td colspan="5">CLOSED</td></tr>
<tr><td>North-Central S. of Pt. Arena</td><td colspan="5">CLOSED</td><td colspan="4">Open <30 fm</td><td colspan="3">CLOSED</td></tr>
<tr><td>Monterey South-Central</td><td colspan="4">CLOSED</td><td colspan="6">Open <40 fm</td><td colspan="2">CLOSED</td></tr>
<tr><td>Morro Bay South-Central</td><td colspan="4">CLOSED</td><td colspan="6">Open <40 fm</td><td colspan="2">CLOSED</td></tr>
<tr><td>South</td><td colspan="2">CLOSED</td><td colspan="10">Open <60 fm</td></tr>
</table>

Figure 2-44. Alternative 5 California recreational groundfish season structure by marine management area for 2009-10.

California Recreational Alternative 6: The season structure depicted below results from the following constraints: a 17 mt OY for yelloweye rockfish (allowing for a 2.8 mt California recreational HG), a 230 mt OY for blue rockfish, a 105 mt OY for canary rockfish, a 371 mt OY for widow rockfish, a 218 mt OY for bocaccio, and a 3 mt OY for cowcod. The yelloweye impact under this alternative is estimated to be 2.6 mt.

<table>
<tr><th>Management Area</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>North</td><td colspan="4">CLOSED</td><td colspan="4">Open <20 fm</td><td colspan="4">CLOSED</td></tr>
<tr><td>North-Central N. of Pt. Arena</td><td colspan="5">CLOSED</td><td colspan="3">Open <20 fm</td><td colspan="4">CLOSED</td></tr>
<tr><td>North-Central S. of Pt. Arena</td><td colspan="5">CLOSED</td><td colspan="4">Open <30 fm</td><td colspan="3">CLOSED</td></tr>
<tr><td>Monterey South-Central</td><td colspan="4">CLOSED</td><td colspan="7">Open <40 fm</td><td>CLOSED</td></tr>
<tr><td>Morro Bay South-Central</td><td colspan="4">CLOSED</td><td colspan="7">Open <40 fm</td><td>CLOSED</td></tr>
<tr><td>South</td><td colspan="2">CLOSED</td><td colspan="10">Open <60 fm</td></tr>
</table>

Figure 2-45. Alternative 6 California recreational groundfish season structure by marine management area for 2009-10.

2009-10 Bag Limits, Size Limit, and Other Management Measure Alternatives

The following bag limits, size limits, and other management measure alternatives are considered for the 2009-10 California recreational groundfish fishery:

- a 6 fish Rockfish Cabezon and Greenling RCG bag limit in the North and North-Central North of Pt. Arena Management Areas and 10 fish bag limit in the remainder of the state with a 1 fish sublimit for cabezon, 2 fish sublimit for greenlings statewide.
- increase the bag limit for cabezon from 1 to 2 fish in some management areas.
- increase the bag limit for bocaccio from 1 to 2 fish in some management areas south of 40°10' N latitude.
- increase the bag limit for kelp greenling from 1 to 2 fish in some management areas.
- eliminate gear restrictions for sanddabs and other flatfishes.
- include petrale sole in the group of sanddabs and other flatfish allowed during season closures.
- reduce the size limit for lingcod north of Pt. Arena to 22 inches.

2009-10 Area Restriction Alternatives

CDFG has evaluated four potential Yelloweye Rockfish Conservation Areas (YRCAs) which include habitat in both state and Federal waters where high yelloweye encounter rates have been documented. If implemented, YRCAs are anticipated to reduce yelloweye impacts during the open fishing seasons in both the Northern Groundfish Management Area and the North-Central North of Pt. Arena Groundfish Management Area, possibly allowing for a longer fishing season.

The four areas identified for possible use in the 2009-10 seasons are in the general area of Point St. George, South Reef, Reading Rock, and Point Delgada. The proposed boundaries for these areas and the latitude and longitude coordinates are depicted in Figures 2-46 to 2-48. The Council adopted the use of these YRCAs for implementation inseason if needed during 2009 or 2010 as their preferred alternative.

Point St. George

41°51.00' N lat	124°23.75' W long;
41°51.00' N lat	124°20.75' W long;
41°48.00' N lat	124°20.75' W long;
41°48.00' N lat	124°23.75' W long.

South Reef

41°42.20' N lat	124°16.00' W long;
41°42.20' N lat	124°13.80' W long;
41°40.50' N lat	124°13.80' W long;
41°40.50' N lat	124°16.00' W long.

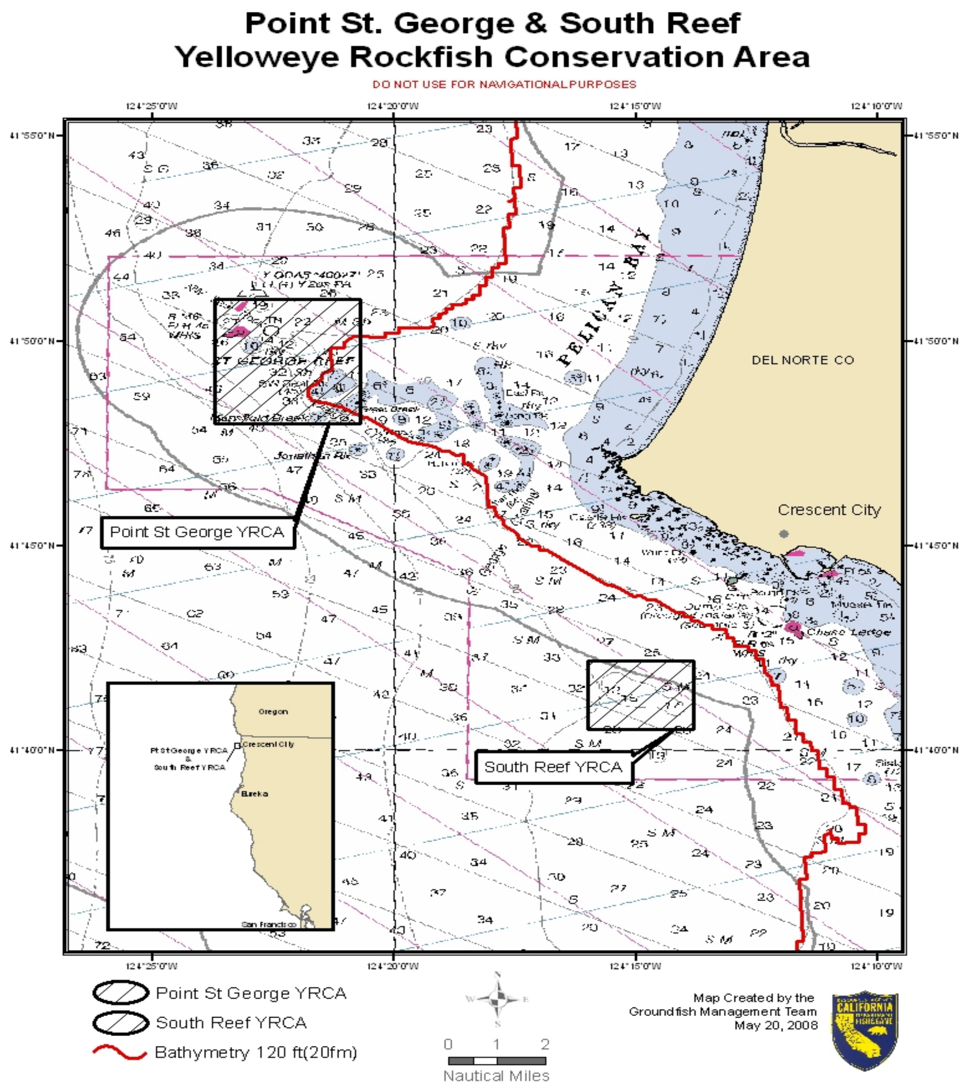


Figure 2-46. The proposed Pt. George and South Reef Yelloweye Rockfish Conservations Areas proposed by CDFG for 2009-10.

Reading Rock

41°21.50' N lat	124°12.00' W long;
41°21.50' N lat	124°10.00' W long;
41°20.00' N lat	124°10.00' W long;
41°20.00' N lat	124°12.00' W long.

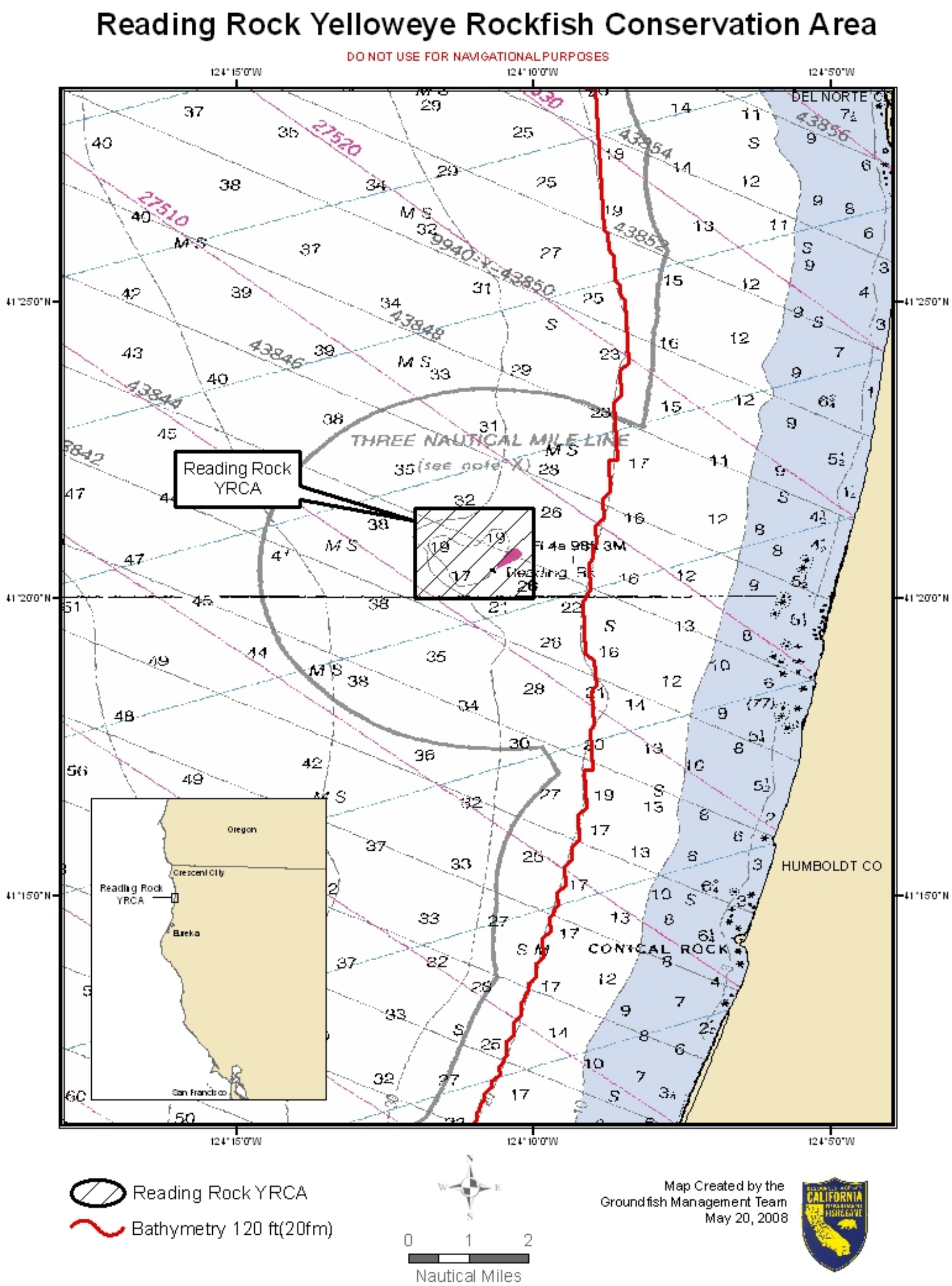


Figure 2-47. The proposed Reading Rock Yelloweye Rockfish Conservations Area proposed by CDFG for 2009-10.

Point Delgada (north)

39°59.00' N lat	124°5.00' W long;
39°59.00' N lat	124°3.00' W long;
39°57.00' N lat	124°3.00' W long;
39°57.00' N lat	124°5.00' W long.

Point Delgada (south)

39°57.00' N lat	124°5.00' W long;
39°57.00' N lat	124°2.00' W long;
39°54.00' N lat	124°2.00' W long;
39°54.00' N lat	124°5.00' W long.

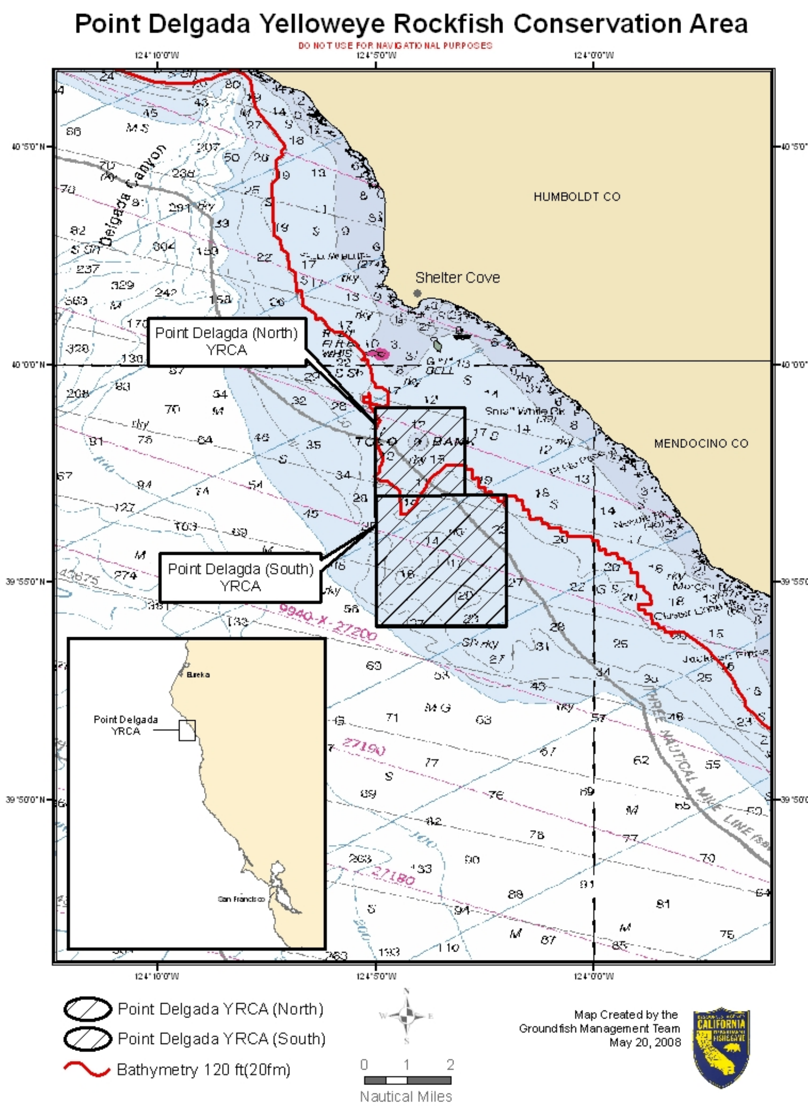


Figure 2-48. The proposed Point Delgada (north and south) Yelloweye Rockfish Conservation Areas proposed by CDFG for 2009-10.

Mandatory Logbooks in Recreational Charter Fisheries

Mandatory logbooks are contemplated for all west coast marine recreational charter fisheries in this action. CDFG already has a mandatory logbook program for their CPFV fleet. However, it is unclear whether the new Magnuson-Stevens Act mandate for charter logbooks or any contemplated action for 2009-10 west coast fisheries may influence any modifications to the state-mandated charter logbook program. The discussion of this issue in the Washington Recreational section applies to California recreational charter fisheries as well.

2.2.5 Description of General Management Measures Not Specific to Sectors

2.2.5.1 *Mandatory Sorting of Skate Species*

The requirement to sort skates will provide more species-specific catch data necessary for stock assessment. This information assists in the determination of appropriate harvest specifications.

Three species of skate are listed in the FMP (big skate, California skate, and longnose skate), but no requirement exists for sorting these species in commercial fisheries. Additionally, another five skate species are encountered regularly on the shelf and slope. These skates can be visually identified to a species level. Not implementing a requirement to sort skates may force precautionary management measures necessary to protect these species, which have sensitive life histories (i.e., relatively slow growth, late maturation, and low fecundity). Skate species compositions necessary for stock assessments would not be collected without this requirement.

Only longnose skate would be required to be sorted under the Council's preferred alternative since the stock is managed with its own harvest specifications. The other federally managed skate species will not have a scientific sorting requirement in 2009-10 under the Council's preferred alternative.

2.2.5.2 *Spatial Analysis of Potential Rockfish Conservation Areas (RCAs) and Groundfish Fishing Areas (GFAs)*

Finer scale spatial management of west coast fisheries involving RCA boundary adjustments or opening Groundfish Fishing Areas (GFAs) in areas now closed meets the Magnuson-Stevens Act objectives of providing economic benefits to the nation through more robust and selective fisheries, while minimizing bycatch. Finer spatial scales of trip limits and other management measures may also be effective in reducing overfished species bycatch. Finer scale management measures may be critical to meeting the yelloweye rockfish catch reduction required by the status quo harvest rate ramp-down strategy over the next three years, without having as adverse an economic effect on west coast fishing communities. If such management measures are not pursued, the dampening effect of the yelloweye ramp-down strategy could risk the economic stability of west coast fishing communities dependent on stocks with yelloweye rockfish bycatch associations. The GMT notes that finer scale spatial management may provide enforcement concerns.

The Northwest Fisheries Science Center in collaboration with the College of Oceanic and Atmospheric Sciences at Oregon State University has posted NWFSC bottom trawl survey and aggregated observer data for selected species on the Pacific Coast Ocean Observer System's (PaCOOS) West Coast Habitat Server (http://pacoos.coas.oregonstate.edu/). Map representations of groundfish bottom trawl survey and observer data are available via this portal, as well as tabular data for survey fish catch and observed discard rates.

PaCOOS data products originate from data collected by fishery observers in the West Coast Groundfish Observer Program (WCGOP), Fishery Resource Analysis and Monitoring Division (FRAM) at the Northwest Fisheries Science Center, NOAA Fisheries. The WCGOP's goal is to improve total catch estimates by collecting information on the discarded catch (fish returned overboard at-sea) of west coast groundfish species. All data were collected according to standard protocols and data quality control established by the WCGOP. The observed portion of overall catch or landings in a fishery varies by coverage level. Since all fishing operations are not observed, neither the maps nor the data can be used to characterize the fishery completely. This is especially true for rarely-occurring species and when observed sample sizes are small. We urge caution when utilizing these data due to the complexity of groundfish management and fleet harvest dynamics. Grid cells representing less than 3 vessels and less than 10 hauls or sets are not shown to preserve confidentiality and to ensure adequate sample size. In the limited entry groundfish bottom trawl fishery, species discard rates (species discard weight / groundfish total catch (discard + retained weight)) are categorized by approximate quartile ranges and geo-referenced to 10 x 10 kilometer grid cells. The observed trawl towline (line drawn from the start to end location of a trawl tow) was used to allocate data to 10 x 10 kilometer grid cells for calculation. In the limited-entry fixed gear fishery, species discard rates (species discard weight / groundfish total catch (discard + retained weight)) are categorized by approximate quartile ranges and geo-referenced to 20 x 20 kilometer grid cells. The observed fixed gear set location (start location of fishing) was used to allocate data to 20 x 20 kilometer grid cells for calculation.

Seventeen species in the bottom trawl fishery and sixteen species in the fixed gear fishery are represented based on combined observer data from 2002-06. The species included are Dover sole (*Microstomus pacificus*), sablefish (*Anoplopoma fimbria*), longspine thornyhead (*Sebastolobus altivelis*), shortspine thornyhead (*Sebastolobus alascanus*), lingcod (*Ophiodon elongatus*), arrowtooth flounder (*Atheresthes stomias*), English sole (*Parophrys vetulus*), petrale sole (*Eopsetta jordani*), and the rockfishes (genus *Sebastes*), darkblotched rockfish (*S. crameri*), Pacific ocean perch (*S. alutus*), chilipepper (*S. goodei*), cowcod (*S. levis*), bocaccio (*S. paucispinis*), canary rockfish (*S. pinniger*), widow rockfish (*S. entomelas*), yelloweye rockfish (*S. ruberrimus*), and yellowtail rockfish (*S. flavidus*).

Tabular data available for download within the PaCOOS application provide data fields identifying the fishery, data years, scientific name and common name for each species; a coded identifier, center latitude, and center longitude for each grid cell; and a discard rate for each species within each grid cell. Selected catch data from the NWFSC West Coast Groundfish Trawl Survey were extracted and formatted for inclusion in the PaCOOS West Coast Habitat Portal. This ongoing series of annual surveys is designed to monitor long-term trends in distribution and abundance of west coast groundfish, especially those species of management concern, along the entire continental U.S. west coast. Effort-normalized catch weights (catch per unit effort in kilograms per square meter), categorized by approximate quartile catch ranges for each species within a survey year and geo-referenced to the sample trawl location, were provided to meet the requirements for spatial display. Geo-referenced catch ranges for eleven species were included in the data product. These catch weight ranges and associated trawl locations are also available by download within the PaCOOS application. The species included for the years 2003-05 are Dover sole, sablefish, longspine thornyhead, shortspine thornyhead, arrowtooth flounder, English sole, petrale sole, darkblotched rockfish, Pacific ocean perch, chilipepper, cowcod, bocaccio, widow rockfish, yelloweye rockfish, and yellowtail rockfish.

2.2.6 Description of the Preferred Alternative

The Council's preferred alternative for the 2009 and 2010 fishing seasons was decided at their June 2008 meeting in Foster City, California. Among many other management measures recommended by the Council as part of their preferred alternative, retention of bronzespotted rockfish will not be allowed in any sector of the fishery in 2009-10 (see section 4.3.4.1 for more details). All status quo YRCAs are recommended for 2009-10 groundfish fisheries. The other preferred management measures by sector are as follows. The projected impacts of depleted groundfish species under the preferred alternative are shown in Table 2-39.

Table 2-39. Projected mortality impacts (mt) of overfished groundfish species in 2009-10 under the Council's preferred alternative.

Fishery	Bocaccio b/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting	12.3	15.5	1.3	247.9	85.7	8.1	0.6
Limited Entry Trawl- Whiting							
At-sea whiting motherships a/		6.1		8.5	1.1	153.8	0.0
At-sea whiting cat-proc a/		4.3		6.0	1.1	108.6	0.0
Shoreside whiting a/		7.6		10.5	0.3	190.0	0.0
Tribal whiting		2.1		0.0	1.1	5.5	0.0
Tribal							
Midwater Trawl		3.6		0.0	0.0	40.0	0.0
Bottom Trawl		0.8		0.0	3.7	0.0	0.0
Troll		0.5		0.0	0.0		0.0
Fixed gear		0.3		0.0	0.0	0.0	2.3
Limited Entry Fixed Gear	13.4	1.0	0.1	1.0	0.3	1.4	1.3
Open Access: Directed Groundfish							
Sablefish DTL + other	10.6	0.1	0.1	0.2	0.1	0.0	0.3
Nearshore	0.2	2.7	0.0	0.0	0.0	0.4	0.6
Open Access: Incidental Groundfish	1.3	0.9	0.0	0.0	0.0	0.4	0.3
Recreational Groundfish e/							
WA		20.9					5.2
OR						1.0	
CA	67.3	22.9	0.1			6.2	2.8
EFPs	13.7	2.7	0.3	1.3	0.0	5.5	0.3
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.							
	2.0	8.0	0.2	2.0	2.0	1.1	2.8
TOTAL	120.8	100.0	2.1	277.4	95.4	522.0	16.5
2009 OY f/	288	105	4.0	285	189	522	17
Difference	167.2	5.0	1.9	7.6	93.6	0.0	0.5
Percent of OY	41.9%	95.2%	52.5%	97.3%	50.5%	100.0%	97.0%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data sources.					

a/ Non-tribal whiting values for canary, darkblotched, and widow reflect bycatch limits for the non-tribal whiting sectors. The widow bycatch limit is the difference between the OY and the projected impacts in all non-whiting fisheries. All other species' impacts are projected from the GMT's whiting impact projection model. The Council may elect to change these bycatch limits when setting final whiting management measures in March of 2009 or 2010 or under any inseason action at any of their future meetings.

b/ South of 40°10' N. lat.

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

Table 2-39. Projected mortality impacts (mt) of overfished groundfish species in 2009-10 under the Council's preferred alternative (continued).

d/ Bycatch amounts by species unavailable, but bocaccio occurred in 0.1% of all port samples and other rockfish in another 0.1% of all port samples (and squid fisheries usually land their whole catch).
e/ Values in scorecard represent projected impacts for all species except canary and yelloweye rockfish, which are the prescribed harvest guidelines.
f/ 2009 and 2010 OYs are the same except for darkblotched (291 mt in 2010), POP (200 mt in 2010), and widow (509 mt in 2010).

2.2.6.1 *Limited Entry Non-Whiting Trawl*

The Council-preferred trip limits and RCA configurations for 2009-10 limited entry non-whiting trawl fisheries are shown in Table 2-40a and the associated impacts of target and rebuilding species are shown in Table 2-40b. These management measures are designed to maximize fishing opportunity given the available OYs for constraining overfished species and target species. In the north, yelloweye rockfish is the primary constraining species to trawl activities shoreward of the trawl RCA and darkblotched rockfish is the constraining stock to opportunities seaward of the trawl RCA. In the south, cowcod is the primary constraining species. In addition, several target species' OYs are attained under proposed opportunities, leading to a de-facto constraint on other target species. Petrale sole in particular is one target species that is fully attained under proposed trip limits and RCA configurations and this leads to a constraint on DTS species and shelf flatfish.

Industry members in the north have reported that market gluts occur during the period 1 fishery. As crabbers transition out of the crab fishery in February and try to capitalize on period 1 opportunities before the end of the period, a pulse of petrale sole and Dover sole can occur. The pulse associated with crab vessels transitioning to trawl activity is often exacerbated by poor weather that limits fishing opportunity to a few select days in period 1. Several industry members have reported that this pulse adversely impacts the market and can result in lower exvessel prices. In order to spread out the amount of petrale sole caught during the first period of the year, the attached proposal extends the time period when petrale areas are in effect. Specifically, petrale sole areas in the north are in effect from January through March. Trip limits on petrale sole are set lower in the January to February time period than would otherwise be the case, but it is expected that more opportunity to effectively target petrale sole will occur in March, thus spreading out the amount of petrale sole landed in the first several months of the year.

Discrete areas closed to bottom trawls in 2007-08, such as the CCAs, EFH closed areas, and specific YRCAs described in section 2.2.4.1, are also closed in 2009-10 under the Council's preferred alternative.

The Council does not recommend implementing a regulation specifying one bottom trawl gear on board north of 40°10' N latitude for 2009-10. The GMT identified several issues that would need to be addressed before putting this type of regulation in place. Thus the GMT recommended dropping this issue from the analysis.

Table 2-40a. Council-preferred trip limits and RCA configurations by area, gear type (in the north), period, and target species for 2009-10 limited entry non-whiting trawl fisheries.

Area	RCA Boundaries (fm)			Bimonthly Trip Limits (Allowable Landed Pounds per Two Months)							
	Period	Inline	Outline	Sablefish	Longspine Thornyhead	Shortspine Thornyhead	Dover Sole	Other Flatfish	Petrale Sole	Arrowtooth Flounder	Slope Rockfish a/
North of 40°10' N lat.: Large Footrope Trawl	Jan-Feb	75	200 b/	18,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
	Mar	75	200 b/	18,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
	Apr	75	200								
	May-Jun	75	c/	22,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	Jul-Aug	75		22,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	Sep-Oct	75	200	22,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	Nov-Dec	75	200 b/	18,000	22,000	17,000	110,000	110,000	40,000	150,000	1,500
North of 40°10' N lat.: Selective Flatfish Trawl d/	Jan-Feb	75	200 b/	5,000	3,000	3,000	40,000	90,000	16,000	90,000	1,500
	Mar	75	200 b/	7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	Apr	75	200								
	May-Jun	75	c/	7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	Jul-Aug	75		7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	Sep-Oct	75	200	7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	Nov-Dec	75	200 b/	5,000	3,000	3,000	40,000	90,000	16,000	90,000	1,500
38° - 40°10' N lat. e/	1	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	15,000
	2	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	15,000
	3	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	15,000
	4	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	10,000
	5	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	10,000
	6	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	15,000
South of 38° N lat. e/	1	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	55,000
	2	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	3	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	4	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	5	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	6	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	55,000

a/ Splitnose rockfish limits equal to slope rockfish limits.

b/ Petrale sole areas north of 40°10' N latitude in effect from January through March and from November through December.

c/ Seaward RCA boundaries set at 150 fm north and 200 fathoms south of Cape Falcon to 40°10' N latitude.

d/ The fishery shoreward of the RCA north of Cape Alava is closed.

e/ Chilipepper rockfish limits set at 5,000 lbs per two months in areas south of 40°10' N latitude.

Table 2-40b. Predicted impacts (mt) of target and rebuilding species north and south of 40°10' N latitude associated with the Council's preferred alternative for 2009-10 limited entry non-whiting trawl fisheries.

Species		North	South	Total
Rebuilding Species	Canary	12.8	2.8	15.5
	POP	85.7	0.0	85.7
	Darkblotched	211.2	36.7	247.9
	Widow	1.8	6.3	8.1
	Bocaccio	0.0	12.3	12.3
	Yelloweye	0.6	0.0	0.6
	Cowcod	0.0	1.3	1.3
Target Species	Sablefish	2,442.7	614.4	3,057.2
	Longspine	445.9	338.7	784.6
	Shortspine	1,040.7	345.1	1,385.8
	Dover sole	10,026.4	3,012.3	13,038.7
	Arrowtooth	1,846.9	64.0	1,910.9
	Petrale sole	2,102.5	347.1	2,449.6
	Other Flatfish	1,573.7	558.5	2,132.2
	Slope rockfish	81.0	205.6	286.7

2.2.6.2 *Limited Entry Whiting Trawl*

The preferred 2009-10 limited entry whiting trawl management measures adopted by the Council as their preferred alternative include sector-specific bycatch limits, the ability for NMFS to restrict the depths whiting vessels fish if necessary to reduce bycatch on a sector-specific basis, full monitoring of all whiting catcher vessels fishing in the RCA during the primary season, a request that NMFS automatically close the non-tribal whiting fishery upon projection of attainment of a bycatch limit rather than waiting until the limit is attained, 100 percent observer coverage for vessels fishing in the RCA during the primary season and sorting their catch at sea (observer coverage to be paid by the vessel owner), and an exemption from the at-sea processing rules for vessels ≤75 ft. in length in the shoreside whiting sector to allow them to freeze and tail their whiting to allow for value-added product delivery.

<u>Closing the Whiting Fishery upon Projected Attainment of a Bycatch Limit</u>

The Council-preferred alternative for 2009-10 non-tribal whiting fisheries establishes the authority for NMFS to close any sector of the non-tribal whiting fishery upon projected attainment of a total catch bycatch limit to reduce the risk of exceeding a specified bycatch limit. Closing upon projection of attainment may mean inadvertently exceeding the bycatch limit or coming in under the bycatch limit, due to imprecise projections. Closing before actually attaining the bycatch limit may result in leaving a portion of the whiting OY unharvested. However, closing upon actual attainment virtually guarantees that the bycatch limit will be exceeded, potentially jeopardizing the OY. The Council recommends this regulation be adopted under the rulemaking for 2009-10 groundfish harvest specifications and management measures if this rulemaking occurs prior to that for FMP Amendment 10.

<u>Maximized Retention for Catcher Vessels Delivering to Motherships</u>

The Council adopted a maximized retention regulation and 100 percent electronic monitoring for catcher vessels delivering to motherships as part of their preferred alternative for 2009-10 whiting fisheries. This monitoring requirement is the same as that prescribed for shoreside whiting vessels under anticipated Amendment 10 regulations.

Unmonitored Midwater Trawling in the RCA

Existing 2007-08 regulations allow midwater trawl vessels targeting whiting to fish in the trawl RCA without monitoring/observers during all operations as long as they sort and discard to meet trip limits. The Council recommends modifying regulations to require vessels in this fishery to carry an observer during all operations within the RCA to enable tracking and monitoring of all catch, which directly relates to the ability to manage the fisheries within the constraints of overfished species rebuilding plans. Vessel owners or skippers in the shoreside fishery, who elect to sort their catch and discard while fishing within the RCA, will be required to pay for 100 percent observer coverage for all their fishing efforts within the RCA. Modifying regulations in order to insure that trawl vessels targeting whiting in the RCA are monitored 100 percent of the time would provide accountability for overfished stocks that may be encountered in this fishery. Targeting whiting outside the RCA (with large footrope gear on the slope for example) would still be allowed and subject to normal WCGOP observer rotations. The Council recommends this regulation be adopted under the rulemaking for 2009-10 groundfish harvest specifications and management measures if this rulemaking occurs prior to that for FMP Amendment 10.

2009-10 Area Restriction Alternatives

The Council-preferred alternative for 2009-10 non-tribal whiting fisheries gives NMFS the ability to implement depth-based closures for the whiting fishery on a sector-specific basis as an inseason measure upon the projected attainment of one or more total catch bycatch limits for canary, darkblotched, widow rockfish, or any other bycatch species managed with a total catch limit. Any of the specified management lines between the 75-fm and 150-fm lines may be used to restrict fishing depths for the non-tribal sectors. The preferred alternative also maintains the authority for NMFS to implement the Ocean Salmon Conservation Zone (i.e., fishing restricted to depths seaward of the 100 fm line) if the Chinook harvest guideline is projected to be attained inseason.

Sector-Specific Bycatch Limits

The Council adopted sector-specific bycatch limits for the non-tribal sectors of the 2009 and 2010 whiting fisheries as their preferred alternative. Bycatch limits for canary, darkblotched, and widow rockfish will be apportioned according to the pro-rata distribution of the whiting allocation with 34 percent of the available yields of these species' bycatch limits allocated to the catcher-processor sector, 24 percent to the mothership sector, and 42 percent to the shoreside sector (Table 2-41). The Council also established a rollover provision for unused bycatch limit yields, such that when a whiting sector is closed by attaining its whiting allocation or if it is closed by projected attainment of a sector-specific bycatch limit, any remaining yield of the bycatch limit is distributed to the other non-tribal whiting sectors using the same pro-rata apportionment used to allocate whiting quota and sector-specific bycatch limits.

Table 2-41. The preferred 2009-10 sector-specific total catch bycatch limits for canary, darkblotched, and widow rockfish that are based on the pro-rata apportionment of allocated whiting yields.

Sector	Total Catch Limits (mt)		
	Canary	Darkblotched	Widow a/
Catcher-processors	6.1	8.5	153.8
Motherships	4.3	6.0	108.6
Shoreside	7.6	10.5	190.0
Total	18.0	25.0	452.4

a/ The Council's widow rockfish rebuilding plan holds all non-whiting fisheries harmless and manages the remaining available yield of widow rockfish for whiting fisheries. The GMT is projecting a 52.3 mt widow yield set-aside to accommodate 2009-10 tribal fisheries, research, EFPs, and non-groundfish fisheries (Table 2-6).

Therefore, as much as 452.4 mt of widow rockfish may be available for the non-tribal whiting fisheries in 2009 and 439.4 mt for 2010 fisheries given the current estimate for the widow set-aside and Council-preferred widow rockfish OYs.

Seasonal Release of Shared Bycatch Limits

This strategy for managing bycatch in the non-tribal whiting fisheries is not part of the preferred alternative and was eliminated from further discussion and analysis.

Changing the At-Sea Processing Restrictions in the Shoreside Whiting Fishery

The Council adopted an exemption from the at-sea processing regulations to allow shoreside whiting vessels that are 75 ft. in length or less to head, gut, tail, and freeze their whiting catch at sea. This action is expected to provide increased economic incentives in 2009 and 2010 shoreside whiting fisheries by allowing a value-added product to be landed.

Compliance Monitoring While Offloading Catch in the Shoreside Whiting Fishery

The Council's preferred alternative allows NMFS the flexibility to ensure compliance monitors are at shoreside plants 100 percent of the time when whiting offloads are occurring either through the biennial specifications rulemaking process or through Amendment 10 rulemaking.

2.2.6.3 *Limited Entry Fixed Gear*

Council-preferred 2009-10 limited entry fixed gear management measures include a depth restriction for the offshore fishery between Cape Blanco and Cascade Head, the ability to routinely adjust RCA lines in four subareas north of 40°10' N latitude inseason, and a mandatory federal logbook program to improve the ability to model fleet distribution and other aspects of area management.

The Council also recommends higher than status quo Conception area sablefish DTL limits of 400 lbs/ per day or one landing per week up to 1,500 lbs, which can be accommodated by the higher 2009 and 2010 sablefish OYs.

2009-10 Area Restriction Alternatives

The Council-preferred alternative for 2009-10 limited entry fixed gear fisheries restricts the off-shore fishery between Cape Blanco at 43° N latitude and Cascade Head at 45.064° N latitude to waters seaward of the 125 fm management line except on days when the directed halibut fishery is open, when the fishery is then restricted to waters seaward of the 100 fm line (LEFG Alt. 6 in Table 2-35). This regulation is projected to reduce yelloweye rockfish impacts by limited entry fixed gear fishermen targeting sablefish and other target groundfish species by 0.3 mt relative to status quo. The Council also recommends the ability to routinely adjust non-trawl RCA configurations inseason for four northern subareas bounded by Cape Mendocino at 40°10' N latitude, Cape Blanco, Cascade Head, Pt. Chehalis at 46.888° N latitude, and the U.S.-Canada border.

Gear Switching

The Council does not recommend a gear switching strategy for the 2009-10 limited entry fixed gear sector that would allow longline-endorsed permit holders to switch to pot-trap gear nor is the Council recommending differential management measures by fixed gear type. While the Council may want to further explore this concept for the future after the next biennium, they would like to see more analysis of effects before recommending this strategy.

Mandatory Logbooks

The Council recommends a mandatory federal logbook system for all fixed gear fisheries be implemented in the next management cycle. Federal logbook data would enable the GMT and other managers to better model implications of area management strategies for fixed gear fisheries. While the Council understands a new federal logbook system may not be developed in time for the start of next year's fishery on January 1, they would like a new logbook system in place as soon as possible in the next biennial management cycle.

2.2.6.4 *Directed Open Access*

The same area management strategies recommended for 2009-10 limited entry fixed gear fisheries (i.e., the preferred non-trawl RCA configuration discussed above), are recommended for the directed open access sector as part of the Council's preferred alternative (OA DTL Alt. 6 in Table 2-36). Additionally, the Council recommends moving the current shoreward boundary of the non-trawl RCA between 40°10' N latitude and Cape Blanco from 30 fm inshore to 20 fm to reduce yelloweye bycatch (i.e., OA NS Alt. 5 in Table 2-37). The status quo shoreward boundaries of the non-trawl RCA (i.e., 60 fm south of 34°27' N latitude, 30 fm from 34°27' N latitude to 40°10' N latitude, and 30 fm from Cape Blanco to the Columbia River) would be in effect at the beginning of 2009 under the Council's preferred alternative.

The Council also recommends Conception area open access sablefish DTL limits of 400 lbs/day or one landing per week up to 1,500 lbs, not to exceed 8,000 lbs/2 months in their preferred alternative. These higher than status quo limits are accommodated by the higher 2009 and 2010 Conception area sablefish OYs and the bimonthly limit is anticipated to limit effort shifts from the north to the Conception area.

The Council also recommends implementing a mandatory logbook program as described above for the limited entry fixed gear sector for the directed open access sector under the preferred alternative.

2.2.6.5 *Incidental Open Access*

West coast salmon trollers will be allowed to keep incidentally caught lingcod with a ratio limit of 1 lingcod per 15 Chinook plus 1 lingcod up to a trip limit of 10 lingcod under the Council's preferred alternative for 2009-10 fisheries.

Salmon trollers will not be allowed to fish in the status quo YRCA off northern Washington (Figure 2-23) in 2009-10 under the Council's preferred alternative.

2.2.6.6 *Tribal*

The 2009-10 tribal non-whiting groundfish management measures described in section 2.2.4.2 are part of the Council's preferred alternative. Additionally, the Council recommends a 2009 tribal set-aside of whiting of 50,000 mt to accommodate the anticipated participation of the Quileute Tribe in the tribal whiting fishery. The Council also set aside increased yields of canary, darkblotched, Pacific ocean perch, and widow as shown in Tables 2-6 and 2-7c to accommodate the expected bycatch in these new tribal whiting fisheries. The Council also asked NMFS to convene the co-managers, including the states of Oregon and Washington and the Washington coastal treaty tribes, in government to government discussions to develop a proposal for 2010 and subsequent years for tribal set-asides of Pacific whiting.

2.2.6.7 *Washington Recreational*

Based on the harvest sharing recommendations provided by the Council, the Washington recreational yield amounts for canary and yelloweye rockfish are 4.9 mt and 2.7 mt, respectively (Tables 2-9 and 2-11). The following management measures are designed to reduce the incidental catch of overfished rockfish, primarily yelloweye, while anglers are targeting halibut and lingcod. While these management measures are intended to keep yelloweye impacts within the state harvest share for 2009 and 2010, they will also provide information on how innovative management measures implemented in this management period might reduce yelloweye impacts as the Council moves forward with the yelloweye ramp down in 2011 and 2012.

2009-2010 Bottomfish Area and Retention Restrictions

For all areas in 2009-10, continue to prohibit the retention of yelloweye and canary rockfish. Prohibit fishing for, retention or possession of bottomfish and halibut in the C-shaped yelloweye rockfish conservation area in the north coast (Figure 2-22) and the offshore rockfish conservation area in the south coast area (Figures 2-33 and 2-49).

New south coast RCA (Figure 2-49): Prohibit fishing for, retention or possession of bottomfish and halibut in the area described by the following coordinates:

46°54.30 N lat.	124°53.40 W long.;
46°54.30 N lat.	124°51.00 W long.;
46°53.30 N lat.	124°51.00 W long.;
46°53.30 N lat.	124°53.40 W long.

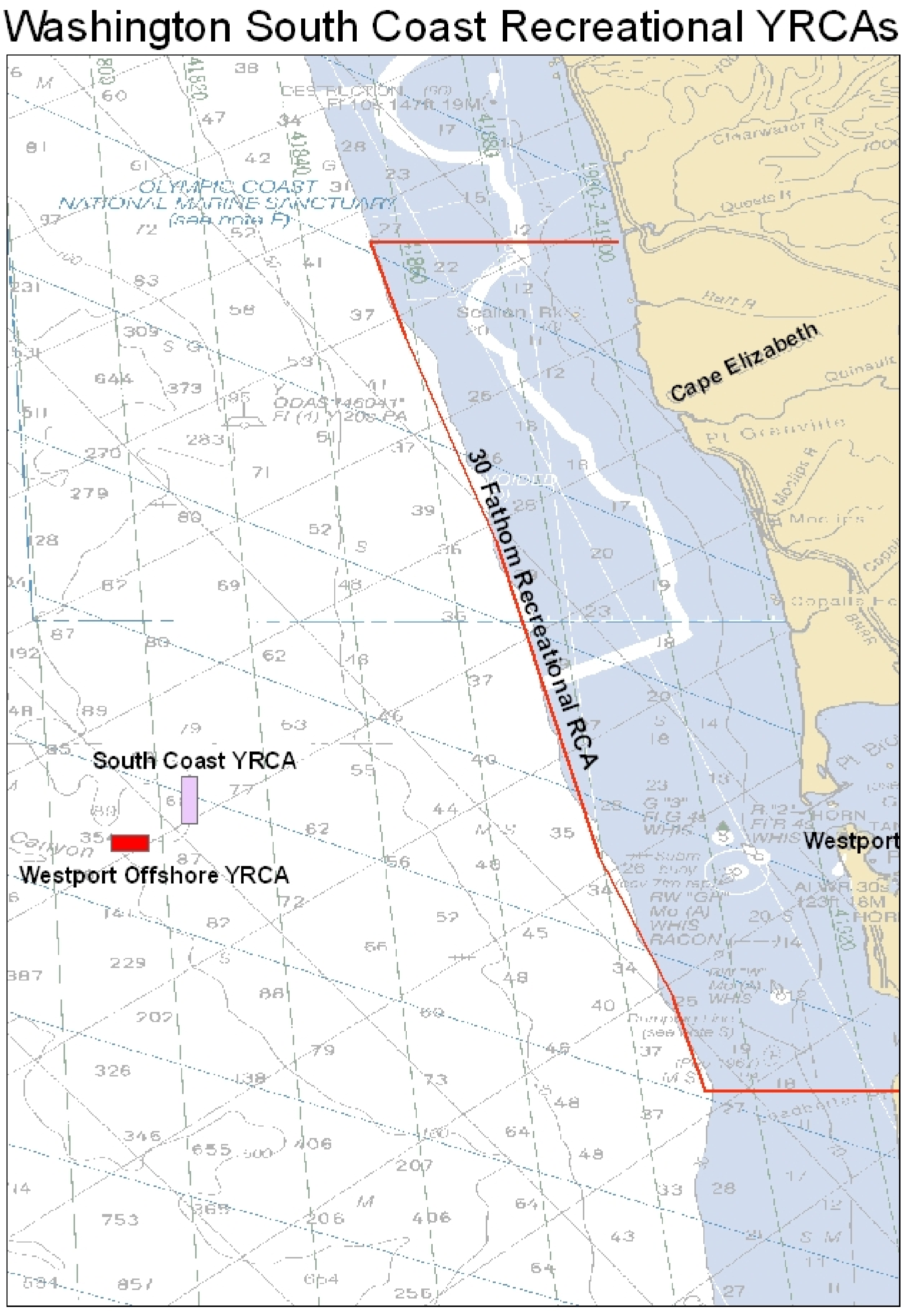


Figure 2-49. The existing South Coast "B" Yelloweye Rockfish Conservation Area (YRCA) and the new Westport Offshore YRCA where recreational bottomfish fishing will be prohibited in 2009 and 2010 under the preferred alternative.

Bag Limits

For both 2009 and 2010, the aggregate bottomfish bag limit is 15, which includes a sub-limit of 10 rockfish and 2 lingcod. These are status quo bag limits for the Washington recreational fishery.

2009-10 Recreational Groundfish Seasons

The Council-preferred Washington recreational groundfish season by marine management area in 2009-10 is shown in Figure 2-50 as proposed by WDFW.

Marine Area	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
3 & 4 (N. Coast)	Open all depths				Open <20 fm May 21-Sep 30 a/					Open all depths		
2 (S. Coast)	Open all depths		Open <30 fm Mar 15 - June 15 b/				Open all depths except lingcod prohibited on Fri. and Sat. >30 fm c/			Open all depths		
1 (Col. R.)	Open all depths				Open all depths d/					Open all depths		

a/ Groundfish retention allowed >20 fm on days when Pacific halibut is open.
b/ Retention of sablefish and Pacific cod allowed seaward of 30 fm from May 1- June 15.
c/ Retention of lingcod prohibited >30 fm, south of 46°58 on Fri. and Sat. from July 1 - September 30.
d/ Retention of groundfish, except sablefish and Pacific cod, prohibited with Pacific halibut on board.

Figure 2-50. The Washington recreational groundfish season by marine management area recommended by the Council for 2009-10 under the preferred alternative.

North Coast (Marine Areas 3 and 4)

Prohibit the retention of bottomfish seaward of a line approximating 20 fathoms from May 21- September 30, except on days that halibut fishing is open.

South Coast (Marine Area 2)

Prohibit the retention of bottomfish seaward of a line approximating 30 fathoms from March 15-April 30. Prohibit the retention of bottomfish, except sablefish and Pacific cod seaward of a line approximating 30 fathoms from May 1-June 15. Prohibit the retention of lingcod south of 46°58 N latitude and seaward of 30 fm on Fridays and Saturdays from July 1 through August 31.

Columbia River (Marine Area 1)

Prohibit the retention of bottomfish, except sablefish and Pacific cod, with halibut onboard from May 1 through September 30.

2009-10 Lingcod Seasons

Under the Council-preferred Alternative, the lingcod seasons in 2009 and 2010 would be as follows:

- Marine Areas 1-3: March 14 through October 17 in 2009 and March 13 through October 16 in 2010.
- Marine Area 4: April 16- October 15 in 2009 and April 16- October 15 in 2010.

Based on the Washington recreational impact model, the estimated mortalities for canary and yelloweye rockfish are projected in Table 2-42.

Table 2-42. Estimated mortalities and harvest targets of canary and yelloweye rockfish in the preferred alternative for the 2009-10 Washington recreational groundfish fishery.

Biennial Management Cycle	WA Share of Yelloweye (mt)	Estimated Yelloweye Impacts (mt)	WA Share of Canary (mt)	Estimated Canary Impacts (mt)
2009-10	2.7	2.5	4.9	1.2

WDFW will track the Washington recreational catch inseason and will take action as appropriate, to ensure these targets are not exceeded.

The Washington and Oregon Departments of Fish and Wildlife have agreed to continue to manage the recreational fishery under shared harvest guidelines for canary and yelloweye rockfish (Table 2-43). If inseason catch projections indicate that one or both of the state harvest targets may be exceeded, these Departments will consult with each other to share catch information. If the states determine that a management response is necessary to avoid exceeding the Oregon-Washington harvest guideline of canary or yelloweye rockfish, then the appropriate agency(ies) will implement inseason management actions to reduce catches, as necessary. Regulations will depend upon the timing of the determination for their need, and may include consideration of additional depth restrictions, time/area closures, and/or seasonal closures.

Table 2-43. The canary and yelloweye rockfish harvest guidelines shared by the Washington and Oregon recreational groundfish fisheries in 2009 and 2010 under the Council's preferred alternative.

Species	WA Share (mt)	OR Share (mt)	Shared Harvest Guidelines (mt)
Canary	4.9	16.0	20.9
Yelloweye	2.7	2.5	5.2

2.2.6.8 *Oregon Recreational*

The Council adopted Oregon Recreational Alternative 4 (Figure 2-37), as modified below for the Oregon recreational groundfish fishery in 2009 and 2010.

The preferred season structure (Table 2-44) for 2009 and 2010 produces a fishery that is open offshore year round, except from April 1 to September 30 when fishing is only allowed shoreward of 40 fm. Estimated impacts for yelloweye rockfish and canary rockfish associated with this preferred alternative are 2.5 mt for each species.

Table 2-44. Council-preferred 2009-10 Oregon recreational groundfish fishery management measures.

Month												OR Sport Yelloweye RF (mt)	OR Sport Canary RF (mt)	Marine Bag Limit a/	Lingcod Bag Limit
J	F	M	A	M	J	J	A	S	O	N	D				
Open all depth			Open <40 fm 4/1-9/30						Open all depth			2.5	2.5	10	3

a/ Marine bag includes all species other than lingcod, salmon, steelhead, Pacific halibut, flatfish, surfperch, sturgeon, striped bass, pelagic tuna and mackerel species, and bait fish such as herring, anchovy, sardine and smelt.

Marine Fish Daily Bag Limit

The Council adopted a marine fish daily bag limit of 10 fish in aggregate (as defined above) as their preferred alternative for 2009-10 Oregon recreational fisheries. This will provide management flexibility to make necessary adjustments to the marine fish daily bag limit through the yearly state process, reflecting the progression of the current year's fishery. The species most affected by adjustments in the marine fish daily bag limit are nearshore rockfish including black rockfish. The fishery will be managed within the black rockfish harvest guideline.

Lingcod Daily Bag Limit

The Council recommends adoption of a lingcod daily bag limit of 3 fish for 2009-10 Oregon recreational fisheries. This will provide management flexibility to make inseason adjustments to the lingcod daily bag limit through state rules if either the Pacific halibut catch limit is less than in 2008 or the marine bag limit is adjusted inseason.

Flatfish Daily Bag Limit

The Council recommends maintaining a flatfish daily bag limit of 25 fish in aggregate (excluding Pacific halibut) for 2009-10 Oregon recreational fisheries.

Minimum Length Limits

The Council recommends maintaining the existing length limits in place for 2007-08; 22-inches for lingcod; 16-inches for cabezon; and 10-inches for kelp greenling for 2009-10 Oregon recreational fisheries.

Stonewall Bank YRCA

The Council recommends maintaining the existing Stonewall Bank YRCA prohibiting groundfish retention within a defined area (Figure 2-26), encompassing the high relief rocky habitat of Stonewall Bank, residing approximately 15 miles offshore from Newport, Oregon. This same area is closed to the retention of Pacific halibut. Targeting and retention of Pacific halibut and groundfish would be prohibited in the area year-round.

Groundfish Retention in the All-Depth Pacific Halibut Fishery

Currently only sablefish may be retained in the Pacific halibut fishery at any depth in the area from Cape Falcon to Humbug Mountain, Oregon. North of Cape Falcon both sablefish and Pacific cod may be retained at any depth during the Pacific halibut fishery. It is expected that groundfish retention in the all-depth Pacific halibut fishery will be similarly constrained in 2009 and 2010.

Inseason Management

The inseason actions that may be implemented if the 2009 or 2010 Oregon recreational groundfish fishery does not proceed as expected include: length limit adjustments, bag limit adjustments (including non retention), gear restrictions, and season, depth, days per week and area closures.

Depth management will be the main inseason tool for controlling yelloweye rockfish and canary rockfish harvest, as retention is prohibited. Offshore closures may be implemented inseason at 30, 25, or 20 fathoms as the presence of these two species is reduced nearshore and release survival increases. ODFW will monitor inseason progress toward recreational harvest targets for yelloweye rockfish and canary rockfish. If inseason catch projections indicate that one or both of the state harvest targets may be exceeded, ODFW and WDFW will consult to share catch information. If the states determine that a management response is necessary to avoid exceeding the Oregon-Washington harvest guideline of yelloweye or canary rockfish, then the appropriate agency(ies) will implement inseason management actions to reduce catches, as necessary. Regulations will depend upon the timing of the determination for their need.

Adjustments to the daily marine fish bag limit to no more than 10 fish may be implemented to achieve season duration goals in the event of accelerated or decelerated black rockfish or other nearshore rockfish harvest. The lingcod daily bag limits may be adjusted to no more than 3 fish in the event the marine bag limit changes or the halibut catch limit is reduced from 2008 levels. Season and/or area closures may also be considered if harvest targets are projected to be attained. Non-retention and length restrictions are the likely inseason tools to use for cabezon and greenling as release survival is very high. They may also be used to reduce impacts on nearshore species, such as black rockfish and other nearshore rockfish species.

Gear restrictions and/or release technique requirements may be implemented to reduce the impact of overfished rockfish species if successful techniques are developed, researched, reviewed, and accepted. Research in this area is currently being conducted and will continue into 2009-10, testing the effectiveness and selectivity of various gears and the survivability of rockfish released at depth.

Directed yellowtail rockfish and/or flatfish fisheries may be implemented inseason, as were implemented in 2004, in the event of a closure of the recreational groundfish fishery due to attainment of target species harvest guidelines or state harvest caps. Specific gear restrictions may be implemented in the event that flatfish remains open during a groundfish closure. Fisheries will be monitored to ensure that impacts to yelloweye rockfish and canary rockfish are not in excess of the harvest targets.

In the event that the duration of total season is reduced from 12 months; the nearshore waters are closed to groundfish fishing due to management of nearshore species; or the Pacific halibut catch limit is reduced from 2008 levels, the fishery may be expanded to waters seaward of the RCA that is in effect at the time, promoting directed yellowtail rockfish and offshore lingcod opportunity. Fisheries will be monitored to ensure that impacts to yelloweye rockfish and canary rockfish are not in excess of the harvest targets.

2.2.6.9 *California Recreational*

The final Council-preferred Alternative includes the following management measures with respect to California recreational fisheries. California Department of Fish and Game (CDFG) will continue recreational management measures described under the status quo alternative regarding area closures, bag limits, etc with the following exceptions to the season and depth changes described below and other measures.

The status quo (No Action) California recreational management measures that continue to apply include the following:

- Regulations apply to groundfish (with sanddab fishery exception) and associated state-managed species (rock greenling, California sheephead, and ocean whitefish).
- No retention of cowcod, canary, or yelloweye rockfish.
- Lingcod size limit of 24 inches with a daily-bag-limit of two fish.
- Notwithstanding other fishing opportunities for groundfish, lingcod may not be retained during January, February, March, and December.
- Waters of Cordell Bank less than 100 fm in depth are closed to fishing at all times.

- Recreational fishing for groundfish prohibited between the shoreline and the 10 fm (18 m) depth contour around the Farallon Islands and Noonday Rock. Exceptions for sanddabs and “other flatfish”, fishing from shore and divers do not apply within this area.
- All divers (boats permitted while diving for rockfish or other closed species during closed periods provided no hook and line gear on board or in possession while diving to catch rockfish) and shore-based anglers would be exempt from the seasonal closures and depth restrictions for rockfish and other federal groundfish as well as associated state managed groundfish including greenlings, California scorpionfish, California sheephead, and ocean whitefish.
- Fishing is allowed within the CCAs shoreward of the 20 fm line when fishing is open for select groundfish and select non-groundfish species.
- In the South Region, CA scorpionfish is open 12 months: 0-40 fm January-February, 0-60 fm in March-December.
- In the South Region, the season for groundfish other than lingcod is open from March to December and the season for lingcod is open from April to November in depths of 0-60 fm.
- California would continue to provide an exemption to allow year-round fishing for leopard sharks in specified enclosed bays and estuaries.
- Allow retention and possession of sanddabs and Other Flatfish during the seasonal and depth closures that generally apply to all federal groundfish.

The management measures that differ from status quo include the following:

- The sport fishery for sanddabs and species in the “Other Flatfish” complex will no longer be subject to gear restrictions regarding maximum hook size, number of hooks and weight.
- Subdivision of the North-Central Management Area at Point Arena into what will be referred to as the North-Central North of Point Arena and North-Central South of Point Arena Management Areas (depicted in Figure 2-51).
- Combined rockfish + cabezon + greenling (RCG) complex daily-bag-limit of 10 fish, of which two can be a cabezon, two can be a greenling of the genus *Hexagrammos* and two can be bocaccio.
- The Yelloweye Rockfish Conservation Areas (YRCAs) described in section 2.2.4.2 and depicted in Figures 2-46 to 2-48 were adopted by the Council for use inseason to reduce impacts on yelloweye rockfish if the catch is tracking high without closing entire Management Areas.
- Season and depth restrictions for rockfish, cabezon, and greenlings, other federal groundfish and state managed associated species differ from status quo (Figure 2-28) in all regions but the Southern Management Area. These are summarized in the Figure 2-51 below.

The season and depth restrictions in Figure 2-51 below are the result of efforts to minimize impacts on constraining species while maximizing fishing opportunity in each management area. Yelloweye rockfish is the most constraining species in the Northern and North-Central North of Point Arena Management Areas. In the Morro Bay South-Central Management Area, Monterey South-Central Management Area and North-Central South of Pt. Arena Management Area blue rockfish is the most constraining species. In the Southern Management Area, cowcod and bocaccio are the most constraining species. The impacts resulting from the preferred alternative are provided in Table 4-95 in section 4.5.3.8.

Management Area	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
North	CLOSED				Open <20 fm, May 15 - Sept 15				CLOSED			
North-Central N of Pt. Arena	CLOSED				Open <20 fm, May 15 - Aug 15			CLOSED				
North-Central S. of Pt. Arena	CLOSED					Open <30 fm, June 13 - Oct 31					CLOSED	
Monterey South-Central	CLOSED				Open <40 fm, May 1 - Nov 15						CLOSED	
Morro Bay South-Central	CLOSED				Open <40 fm, May 1 - Nov 15						CLOSED	
South	CLOSED		Open <60 fm									

Figure 2-51. Preferred season and depth restrictions for the California recreational fishery for 2009-10.

2.2.7 Alternative Management Measures Considered, But Eliminated From Detailed Study

The Council does not recommend implementing a regulation specifying one bottom trawl gear on board north of 40°10' N latitude for 2009-10. The GMT identified several issues that would need to be addressed before putting this type of regulation in place. Thus the GMT recommended dropping this issue from the analysis.

The Council decided not to recommend a seasonal release of shared bycatch limits for 2009-10 limited entry whiting trawl fisheries. The Council opted instead to recommend sector-specific bycatch limits to manage bycatch in 2009-10 whiting fisheries.

The Council did not recommend the ability for longline-endorsed permit holders in the limited entry fixed gear fishery to switch gears to use pots or traps. Differential management measures using these gears in the limited entry fixed gear fishery is not recommended for 2009 and 2010 fisheries. This issue is not studied further than the information provided to the Council in June 2008.

2.3 Summary of Effects of the Alternatives

2.3.1 Effects on West Coast Groundfish Species

A consideration in selecting a preferred alternative is the effect on west coast species. There are negligible effects on non-groundfish species associated with the proposed action, but the alternatives have direct effects on west coast groundfish species. Chapter 4 of this EIS explores species impacts in greater detail. In general, the species effects of the preferred alternative are greatest on yelloweye rockfish and those species co-occurring with yelloweye that are vulnerable to hook-and-line gears due to the continued implementation of a yelloweye harvest rate ramp-down strategy designed to rebuild that stock. Under the preferred alternative, fisheries that have the greatest impact on yelloweye rockfish (i.e., recreational fisheries in northern Washington and northern California and commercial fixed gear fisheries north of 40°10' N latitude) are most affected relative to the No Action Alternative. Changes in the management of blue rockfish in California under the preferred alternative are also predicted to constrain fisheries south of 40°10' N latitude, most notably recreational fisheries.

Chapter 4 also explores changes in the management of groundfish fishing sectors for 2009 and 2010. Most notably, management of the non-tribal whiting trawl sectors will be significantly different under the preferred alternative due to implementation of sector-specific bycatch limits for canary, darkblotched, and widow rockfish.

2.3.2 Effects on West Coast Fishing Communities

A consideration in selecting a preferred alternative is the effect of management measures on west coast fishing communities. Chapter 7 of this EIS explores the socioeconomic impacts of alternative harvest levels and corresponding management measures on west coast fishing sectors, ports, and communities. Those effects are summarized below in Table 2-45 for commercial fisheries, and Table 2-46 for recreational fisheries. Table 2-47 (taken from the 2007-08 Groundfish Specifications EIS) summarizes those communities that are considered “vulnerable” and “most vulnerable” to changes in management measures. (See section 7.1.5 for a discussion of these measures).

Table 2-45 shows all communities potentially benefiting relative to No Action under the Council preferred alternative for commercial fisheries. Table 2-46 shows potentially adverse impacts to “most vulnerable” communities in northern California (Eureka and Fort Bragg) under the Council preferred alternative for recreational fisheries. In general, “most vulnerable” communities on Washington’s South and Central coast are no worse off under the Council preferred commercial and recreational alternatives, while “most vulnerable” communities in Oregon (Newport and Coos Bay) appear unambiguously better off under the Council preferred alternatives.

Table 2-45. Summary of percentage change in estimated income impacts from all ocean area commercial fisheries by port group compared to the No Action Alternative. (Note assumes OA NS Alt 5 nearshore open access alternative). (Income impacts are a measure of total economic activity connected with Council-managed ocean area commercial fisheries landings and processing.)

Port Area	*2007 ($million)*	*No Action ($million)*	Percent Change in All Ocean Area Commercial Fisheries Income Impacts Compared with No Action								
			Reb. Alt 1_09aCP	Reb. Alt 1_09b	Reb. Alt 1_10CP	Reb. Alt 2	Reb. Alt 3	Reb. Alt 4	Reb. Alt 5a	Reb. Alt 5b	Council Preferred
Washington											
Northern Puget Sound	*12.7*	*12.6*	+4.3%	+4.3%	+3.4%	+7.5%	+1.1%	+8.5%	+8.5%	+8.5%	+8.5%
Southern Puget Sound	*2.7*	*2.7*	+1.0%	+1.0%	+0.7%	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%
North Washington Coast	*14.2*	*14.2*	+20.9%	+20.9%	+18.2%	+19.9%	+19.8%	+21.0%	+21.0%	+21.0%	+21.0%
South and Central Washington Coast	*124.5*	*130.0*	+4.1%	+2.7%	+4.0%	-1.0%	-3.6%	+6.5%	-0.9%	+6.5%	+1.5%
Unidentified Washington	*8.6*	*8.6*	+2.8%	+2.8%	+1.9%	+2.8%	+2.8%	+2.8%	+2.8%	+2.8%	+2.8%
Oregon											
Astoria	*84.4*	*87.5*	-0.7%	-1.7%	+1.1%	-2.5%	-9.2%	+5.4%	-0.6%	+5.2%	+2.8%
Tillamook	*3.0*	*3.0*	+0.1%	+0.1%	+0.0%	-0.2%	-0.2%	+0.2%	+0.2%	+0.2%	+0.5%
Newport	*30.8*	*33.9*	+2.7%	-0.1%	+5.5%	-3.1%	-13.7%	+12.9%	-2.5%	+12.6%	+6.0%
Coos Bay	*36.9*	*37.1*	-3.0%	-3.3%	+1.1%	+2.1%	-6.7%	+5.0%	+3.1%	+4.8%	+4.3%
Brookings	*7.3*	*7.3*	-2.8%	-2.8%	+2.5%	+5.7%	-5.3%	+8.6%	+7.7%	+7.7%	+8.5%
California											
Crescent City	*21.2*	*21.3*	-1.0%	-1.2%	+0.4%	-0.2%	-2.9%	+2.0%	+0.6%	+1.7%	+1.2%
Eureka	*20.8*	*21.1*	-5.5%	-6.1%	+0.9%	+1.6%	-11.0%	+6.5%	+2.8%	+5.8%	+4.9%
Fort Bragg	*12.1*	*12.5*	-8.7%	-8.7%	+1.9%	+0.7%	+9.6%	+3.4%	+2.5%	+2.5%	+5.0%
Bodega Bay	*10.6*	*10.6*	-0.1%	-0.1%	+0.0%	-0.1%	-0.1%	+0.1%	+0.1%	+0.1%	+0.1%
San Francisco	*16.7*	*16.8*	-3.2%	-3.2%	+0.5%	-0.0%	+1.2%	+1.1%	+0.8%	+0.8%	+1.4%
Monterey	*40.1*	*40.2*	-0.1%	-0.1%	+0.4%	+0.4%	+0.8%	+0.7%	+0.6%	+0.6%	+0.8%
Morro Bay	*4.2*	*4.2*	+2.4%	+2.4%	+1.8%	+2.7%	+3.5%	+2.9%	+2.9%	+2.9%	+5.7%
Santa Barbara	*83.5*	*83.5*	+0.3%	+0.3%	+0.3%	+0.3%	+0.3%	+0.3%	+0.3%	+0.3%	+0.3%
Los Angeles	*85.7*	*85.7*	+2.3%	+2.3%	+2.1%	+2.3%	+2.3%	+2.3%	+2.3%	+2.3%	+2.3%
San Diego	*8.9*	*8.9*	+11.5%	+11.5%	+10.4%	+11.5%	+11.5%	+11.5%	+11.5%	+11.5%	+11.5%
Unidentified California	*0.3*	*0.3*	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%
At-sea											
Catcher Vessel	*16.9*	*19.7*	+13.2%	+5.3%	+13.2%	-15.9%	-29.9%	+26.4%	-15.9%	+26.4%	+6.8%
Catcher-Processor	*25.8*	*27.9*	+13.2%	+5.3%	+13.2%	-15.9%	-29.9%	+26.4%	-15.9%	+26.4%	+6.8%
Tribal CV	*5.1*	*5.1*	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	-3.1%
TOTAL	*677.0*	*694.6*	+2.2%	+1.1%	+3.2%	-0.4%	-4.1%	+6.2%	+0.2%	+6.1%	+3.2%

Table 2-46. Summary of percentage change in recreational angler income impacts from by port area from No Action. (Income impacts are a measure of total economic activity connected with Council-managed ocean area recreational angler trip expenditures.)

Region	*No Action*	Council Pref. Alt
North Washington Coast	*0.4*	-
South & Central WA Coast	*3.1*	-
Astoria-Tillamook	*1.0*	8.8%
Newport	*3.7*	8.8%
Coos Bay	*0.9*	8.8%
Brookings	*1.3*	8.8%
North Coast: Humboldt and Del Norte counties	*1.0*	-14.3%
North-Central Coast: Mendocino county	*0.5*	-54.4%
North-Central Coast: San Mateo County through Sonoma County	*5.3*	-9.7%
South-Central Coast: San Luis Obispo County through Santa Cruz County	*4.7*	-2.9%
South Coast: Ventura and Santa Barbara counties	*4.0*	-
South Coast: San Diego County through Los Angeles County	*21.7*	-
TOTAL	*47.6*	-1.0%

Table 2-47. The vulnerable and most vulnerable counties to change in groundfish management measures.

State	Port Group Area	County	Vulnerable * Most Vulnerable **
Washington	Puget Sound	Whatcom	*
		San Juan	*
		Skagit	
		Snohomish	
		King	
		Pierce	
		Thurston	
		Mason	
	North Washington Coast	Jefferson	
		Clallam	*
	South & Central WA Coast	Grays Harbor	**
		Pacific	**
Oregon	Astoria-Tillamook	Clatsop	*
		Tillamook	*
	Newport	Lincoln	**
	Coos Bay	Lane	
		Douglas	
		Coos	**
	Brookings	Curry	*
California	Crescent City	Del Norte	*
	Eureka	Humboldt	**
	Fort Bragg	Mendocino	**
	Bodega Bay	Sonoma	
		Marin	
	San Francisco	Alameda	
		Contra Costa	
		San Mateo	
		San Francisco	

Table 2-47. The vulnerable and most vulnerable counties to change in groundfish management measures (continued).

State	Port Group Area	County	Vulnerable * Most Vulnerable **
California	Monterey	Santa Cruz	
		Monterey	*
	Morro Bay	San Luis Obispo	*
	Santa Barbara	Santa Barbara	*
		Ventura	
	Los Angeles	Los Angeles	*
		Orange	
	San Diego	San Diego	

CHAPTER 3 WEST COAST MARINE ECOSYSTEMS AND ESSENTIAL FISH HABITAT

3.1 Affected Environment

A description of west coast marine ecosystems and the affected essential fish habitat are available in volume 1 of the Council's 2008 Stock Assessment and Fishery Evaluation (SAFE) document. Volume 1 of the 2008 SAFE document is available by request to the Council office or online at www.pcouncil.org/groundfish/gfsafe.html.

3.1.1 West Coast Marine Ecosystems

The term ecosystem is generally defined as a "functional unit of the environment" within which the basic processes of energy flow and cycling are identifiable and can be (relatively) localized. In this sense, marine ecosystems are extremely difficult to identify, as most are relatively open systems, with poorly defined boundaries and strong interactions across broad spatial scales. The California Current ecosystem, like other Eastern boundary current ecosystems, are especially difficult to define, as they are characterized by tremendous fluctuations in physical conditions and productivity over multiple time scales (Parrish et al. 1981;Mann and Lazier 1996). Food webs tend to be structured around coastal pelagic species (CPS) that exhibit boom-bust cycles over decadal time scales (Bakun 1996;Schwartzlose et al. 1999). Similarly, the top trophic levels of such ecosystems are often dominated by highly migratory species such as salmon, albacore tuna, sooty shearwaters, fur seals and baleen whales, whose dynamics may be partially or wholly driven by processes in entirely different ecosystems, even different hemispheres. For this analysis, the ecosystem is considered in terms of physical and biological oceanography, climate, biogeography, essential fish habitat (EFH), marine protected areas, and the role of depleted species' rebuilding in the marine ecosystem.

3.1.2 Physical and Biological Oceanography

The California Current is essentially the eastern limb of the Central Pacific Gyre, and begins where the west wind drift (or the North Pacific Current) reaches the North American Continent. This occurs near the northern end of Vancouver Island, roughly between 45° and 50° N latitude and 130° to 150° W longitude (Ware and McFarlane 1989). A divergence in the prevailing wind patterns causes the west wind drift to split into two broad coastal currents, the California Current to the south and the Alaska Current to the north. As there are really several dominant currents in the region, all of which vary in geographical location, intensity, and direction with the seasons, this region is often referred to as the California Current System (Hickey 1979). A more detailed description of the physical and biological oceanography of west coast marine ecosystems can be found in volume 1 of the 2008 SAFE document.

3.1.3 Interannual and Interdecadal Climate Forcing

The effects of climate on the biota of the California Current ecosystem have been recognized for some time. Many of these effects and research illuminating these processes can be found in volume 1 of the 2008 SAFE document. Additional information regarding anthropogenic climate forcing follows.

Climate change and ocean acidification pose significant additional stresses to managed fisheries on top of fishing mortality (IPCC 1995;WBGU 2006;IPCC 2007). Heat stress from warming waters and changes in the timing and magnitude of upwelling and associated nutrients and prey are just two examples. As climate change proceeds, there will likely be greater departure from historic population trends and increased uncertainty and risk in fisheries management. In addition, the effects of fishing pressure may unexpectedly magnify the effects of climate change and vice versa (IPCC 2001;Harley and Rogers-Bennett 2004;Hsieh et al. 2008). For example, overfishing and climate interactions are believed to have facilitated the sustained collapse of the Atlantic cod (Rose and O'Driscoll 2002;Beaugrand et al. 2003).

Over the past decade, researchers have observed numerous oceanographic changes along the Pacific coast which are consistent with anthropogenic climate forcing. They include: warmer surface waters in the California Current (Mendelssohn et al. 2003;Mendelssohn et al. 2005), increased stratification in the Southern region of the current (Roemmick and McGowan 1995), increased rate of eustatic sea level rise (IPCC 2007), declining pH with episodes of aragonite undersaturated waters occurring on the continental shelf (Feely et al. 2004;Orr et al. 2005;Caldeira and Wickett 2008), and changes in the timing and duration of upwelling (Barth et al. 2007;Chan et al. 2008). Ecological responses have also been observed, including shifts in planktonic community in the California Current from subtropical to tropical (Roemmick and McGowan 1995;Field et al. 2006), reproductive failures in seabird colonies (Sydeman et al. 2006;Peterson et al. 2006), numerous northward range extensions (Erickson et al. 1991;Carlton 2000;Hoff 2002;Walker et al. 2002;Tognazzini 2003;Field et al. 2007;Roberts et al. 2007;Rogers-Bennet 2007), and reoccurring seasonal dead zones off the coast of Oregon (Chan, Barth, Lubchenco, Kirincich, Weeks, Peterson, and Menge 2008).

Ludwig et al. (1993) argue the potential for adverse impacts on fish populations from the identified changes, individually and cumulatively and our inability to formulate precise predictions regarding fisheries' responses requires adoption of a more precautionary approach to exploitation than is the norm. As climate change imposes a variety of selective pressures, it will be critical for fish populations to maintain their connectivity and adaptability (IPCC 1995;IPCC 2001;FAO 2002;Arctic Council Arctic Climate Impact Assessment 2005;WBGU 2006). This will require preservation of large, genetically diverse populations which are broadly distributed, and maintenance of a more natural size distribution within populations, to promote productivity.

3.1.4 Biogeography

Biogeography describes spatial patterns of biological distribution. Along the U.S. west coast within the California Current system, such patterns have been observed to be influenced by various factors including depth, ocean conditions, and latitude. Each are discussed in volume 1 of the 2008 groundfish SAFE document.

3.1.5 Essential Fish Habitat

EFH has been described within the project area for highly migratory species, CPS, salmon, and groundfish. The MSA defines EFH to mean "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (16 U.S.C. 1802 sec. 3(10)). Regulatory guidelines elaborate that the words "essential" and "necessary" mean EFH should be sufficient to "support a population adequate to maintain a sustainable fishery and the managed species' contributions to a healthy ecosystem." The regulatory guidelines also establish authority for Councils to designate Habitat Areas of Particular Concern (HAPC) based on the vulnerability and ecological value of specific habitat types. Councils are required to minimize, to the extent practicable, the adverse effects of fishing on EFH. NMFS works through a consultation process to minimize adverse effects of non-fishing activities (50 CFR 600 subpart J). Refer to volume 1 of the Council's 2008 groundfish SAFE document for more information.

3.1.6 Marine Protected Areas

In addition to the closed areas described above, there are marine protected areas distributed throughout the project area. The EIS for Pacific Coast Groundfish EFH contains a complete analysis of these sites and is incorporated here by reference. The following is a brief summary of these areas.

Federally Designated Marine Managed Areas

- Twenty-eight National Wildlife Refuges, covering approximately 89,000 ha. Regulations vary by refuge, but generally, commercial fishing is not allowed in most refuges.
- Seven National Parks, covering approximately 570,000 ha (although only a small fraction of this area is the marine portion of the parks). Regulations vary by park.
- Five National Marine Sanctuaries covering approximately 3,000,000 ha. Regulations vary by sanctuary, but in general, all types of fishing are allowed in Federal waters of the sanctuaries.
- Four National Estuarine Research Reserves (NERR), covering approximately 8,000 ha. All fishing and fishing gear are prohibited from the Tijuana River NERR and the Elkhorn Slough NERR (which doesn't include the Slough's main channel). All other NERR sites allow or do not address specific fishing regulations.

Other Federal Areas

These are some additional areas under Federal jurisdiction that may have restrictions to vessel access, rather than specific regulations having to do with fishing or fishing gear. These data were developed in 1998 by Al Didier for the Pacific States Marine Fisheries Commission (PSMFC), so the total number of areas may have changed since these data were compiled.

- Twenty-two Regulated Navigation Areas (33CFR165) cover approximately 17,000 ha, and are located generally in urban areas such as Puget Sound, Columbia River, San Francisco Bay, Los Angeles, and San Diego.
- Forty-nine Danger Zones and Restricted Areas (33CFR334) cover approximately 170,000 ha. These are located in Puget Sound, San Francisco Bay, Monterey Bay, between Morro Bay and Point Conception, off some of the Channel Islands, and a few additional southern California locations.

- Twenty-seven weather and scientific buoys. Two buoys are located off the Washington coast, one is located off the Oregon coast, and twenty buoys are located off the California coast, with six of these located off Monterey Bay. Four of these buoys are located outside the EEZ.

Fishing regulated areas established by the Council:

- Rockfish Conservation Areas (RCAs): These areas have changed over time, as well as having a seasonal component to their locations. In addition, there are specific areas for trawl gear and non-trawl gear.
- Cowcod Conservation Areas (CCAs): Sections of the CCA cover a total area of 1,372,447 ha.
- Darkblotched Conservation Area (DBCA): The Darkblotched Conservation Area covered 1,029,415 ha.
- Yelloweye Rockfish Conservation Area (YRCA): This area encompasses 59,285 ha.
- Two National Marine Fisheries sites (Pacific Whiting Salmon Conservation Zones), covering approximately 44,000 ha. These two sites, one off the Columbia River and one off the Klamath River, prohibit fishing for Pacific Whiting with commercial mid-water trawl gear.

Currently, these area-based spatial management measures, as well as depth-based gear restrictions, are key to achieving a range of management objectives, particularly those to reduce the bycatch of rebuilding species while maintaining fishing opportunities on healthy stocks. Latitudinal area management is outlined in the ABC and OY tables within the biennial specifications (e.g., North 40°10 N. latitude and South 40°10 N. latitude) and in the trip limit tables where, in some instances, limits differ from the ABC/OY delineations because of bycatch considerations.

Complex spatial management measures have become increasingly necessary within the existing management framework, for example, the RCA configuration adopted in March 2007 to minimize canary rockfish bycatch created a spatial management regime considerably more complex than past management measures. Yet the underlying causes and consequences for the spatially varying abundance and bycatch rates were unclear; the management regime was implemented without explicit knowledge of whether the differences in high versus low bycatch rates by area reflected habitat association and stock distribution, or historical patterns of depletion that leave depleted (low bycatch) regions more vulnerable to localized depletion. As trawl rationalization management alternatives are considered by the Council, there may be a further increased need for spatial management measures, possibly in a manner different than status quo. For example, some intersector allocation alternatives, as well as trawl rationalization alternatives, could result in effort and catch being concentrated in smaller areas than status quo, as some current alternatives allocate the IQ of groundfish stocks according to the Council's ABC/OY table rather than existing cumulative limits that separates the fishery into as many as three latitudinal areas (i.e., north and south of 40° 10' N latitude and between 38° and 40° 10' N latitude). There is also some potential for greater spatial resolution of nearshore resource management relative to that offshore. For example, there is some evidence that nearshore ecosystems exhibit marked regional differences in their species composition, dynamics and productivity, and the specialization of associated fishery, offshore ecosystems (particularly the slope ecosystem and species) tend to have more population connectivity and more homogenous distribution and life history characteristics (Pacific Marine Conservation Council 2006).

There is growing recognition of spatially complex stock structure for many west coast groundfish (e.g. (Miller et al. 2005;Gunderson and Vetter 2008), as well as increasing recognition for the need to characterize and maintain fish stocks at appropriate spatial scales (Berkeley et al. 2004b;Francis et al. 2007). New approaches for evaluating relative exploitation rates or size structure of exploited populations have also provided insights into the relative impacts of fisheries over finer spatial scales than traditional assessments (Harvey et al. 2006;O'Farrell and Botsford 2006). To accommodate and respond to such complexity appropriately, there is general agreement that additional research and analyses of current data sources will be needed, as spatial analysis in fisheries research and management have tended to lag behind more academic research in marine and terrestrial ecology (Pelletier and Mahevas 2005;Wilen 2006). A recent National Research Council report found that spatial analyses may be one of the greatest obstacles faced by fishery managers, and that advances in both assessment methods and simulation techniques should provide the means to better cope with the challenges of incorporating such complexity in the face of increasingly complex and spatially explicit management regimes (National Research Council 2006). Spatially-explicit management will continue to be critical to meeting conflicting management goals and objectives, such as maintaining fishing opportunities on healthy stocks while reducing incidental catches of rebuilding species, and meeting habitat protection requirements.

State Marine Protected Areas

California: MPA boundaries for sites in California were downloaded from the California Department of Fish and Game website. In these data, there are 79 sites covering approximately 59,000 ha. The California sites have been categorized into 13 designations. California is currently renaming and recategorizing these sites into three designations (marine reserve, marine park, and marine conservation area); however, the existing designations are used here for descriptive purposes.

- Ten State Marine Reserves: These areas are located adjacent to the Channel Islands. No commercial or recreational fishing is allowed in these areas.
- Two State Marine Conservation Areas: These areas are also located adjacent to the Channel Islands. Most commercial fishing, except for spiny lobster fishing, is prohibited in these areas.
- Seven State Parks: Five of these coastal state parks are located north of San Francisco, one is south of Monterey, and one is near Irvine. Fishing regulations vary by park.
- Four State Beaches: One is located north of San Francisco and the other three are south of Point Conception. Fishing regulations vary by site.
- One State Historic Park: This site is located north of San Francisco. There are no prohibitions on fishing gear of any type.
- Nine Reserves: Several areas in, near or north of San Francisco Bay. A few areas in southern California. Regulations are highly variable by site—some prohibit all fishing, and some allow all fishing.
- Twenty-two Ecological Reserves: These sites are located all along the coast. Regulations are highly variable by site—some are designated as no-take reserves, meaning all fishing is prohibited, and some are designated to prohibit certain type of fishing. Some allow all fishing, but prohibit take of other types of resources.
- Four MRPA Ecological Reserves: three sites are located along the central California coast, and one is north of San Francisco. Recreational and commercial fishing is prohibited at all sites.
- One Invertebrate Reserve: This site is located on the central coast. Recreational fishing is allowed for finfish. Commercial fishing is allowed for finfish, lobster, abalone, and crab.
- One Natural Preserve: This site is located in northern California. No access allowed to the site.
- Three Clam Preserves: These sites are located on the central coast, just north of Point Conception. No clams may be taken, but all commercial and recreational fishing and fishing gear are allowed.
- One Marine Gardens Fish Refuge: This site is located in Monterey Bay. Most commercial fishing gear is prohibited, except nets. Recreational pot gear is prohibited, other recreational gear is allowed.
- Fourteen Marine Life Refuges: These sites are located primarily along the central and southern coast. Most commercial gear, except pot and “other” gear, is prohibited from these sites. All recreational gear types are allowed.

Oregon: MPA boundaries for three types of sites in Oregon were provided by ODFW. These are all small intertidal sites encompassing approximately 460 ha.

- Seven Marine Gardens: Generally, commercial and recreational pot gear is prohibited, other gear types not restricted.
- Six Research Reserves: Generally, commercial pot gear is prohibited.
- One Habitat Refuge: All commercial and recreational fishing activities are prohibited.

Washington: The Washington State GIS data for MPAs contain 68 individual sites covering approximately 28,000 ha. The areas are managed by one of the following organizations: Washington Department of Fish and Wildlife (WDFW), Washington Department of Natural Resources (WDNR), San Juan County Marine Resource Committee (MRC), Washington State Parks and Recreation

Commission (WSPRC), or The Nature Conservancy (TNC). The total area figure is a bit of an overestimate because some of the areas, such as state parks and TNC areas include the upland portions of the sites as well as the marine portions.

- Nine WDFW Marine Preserves: generally prohibit most types of commercial fishing gear.
- Two WDFW Wildlife Refuges: generally closed to all access.
- Nine WDFW Conservation Areas: most restrictive of fishing—all fishing and gear are prohibited from nearly all of these sites.
- Two WDFW Sea Cucumber Closures: closed to commercial harvest of sea cucumbers and urchins.
- Six WDNR Aquatic Reserves: no restrictions on commercial or recreational fishing.
- Seven WDNR Natural Areas Preserves: highest level of restriction—only allowable activities are scientific or education functions. Therefore, no commercial or recreational fishing allowed.
- Two WDNR Natural Resource Conservation Areas: no specific prohibition of fishing activities.
- Eight San Juan County MRC Bottomfish Recovery Zones: these are voluntary bottomfish no-take zones—no specific prohibition of fishing activities.
- Seven State Parks: prohibited to take non-game invertebrates and seaweed. No specific prohibition of fishing activities.
- Two TNC Conservation Easements.
- Fourteen TNC Nature Preserves: limitation on public access and all fishing activities.

3.1.7 The Role of Rebuilding Species in the Marine Ecosystem

Under Section 304 of the MSA (104-297), fishery management plans, plan amendments, or proposed regulations for overfished species must take into account status and biology of any overfished stocks of fish as well as the interaction of overfished stocks within the marine ecosystem. This section was developed to consider the relevant aspects of these stocks with respect to their interaction with other biotic elements of the ecosystem.[5] The intent is not to replicate the evaluation of status, life history, and productivity of the stocks themselves, which is discussed in more detail in Chapters 2 and 4, but rather to focus on the role of these species in the environment, and to attempt to evaluate the relative impacts of alternative management decisions analyzed in this document with respect to the long-term consequences on other elements of the ecosystem (noting that the likely or expected impacts on the stocks themselves are discussed in detail in the stock-specific summaries in Chapter 4).

The general role of rebuilding species in the marine ecosystem is discussed in more detail in volume 1 of the 2008 groundfish SAFE document.

3.2 The Effects of Fishing on Habitat and the Marine Ecosystem

With regard to EFH, NMFS recently completed 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]). The current action, authorizing harvest of groundfish within EFH, are within the scope of fishery management actions analyzed in the EIS for groundfish EFH. Those analyses are incorporated by reference. A Record of Decision for Pacific Coast

[5] Many marine organisms (such as many types of plankton, structure-forming invertebrates, and burrowing or bioturbating organisms) can and do interact with abiotic (physical and chemical) characteristics of an ecosystem that could have broader-scale impacts to marine communities and ecosystems. However, such interactions are neither known nor suspected for the rebuilding species evaluated in this section, and consequently are not explicitly considered here.

Groundfish EFH was issued on March 8, 2006, and concluded that partial approval of Amendment 19 to the FMP would minimize to the extent practicable adverse impacts to EFH from fishing. Amendment 19, approved on March 8, 2006, provides for a comprehensive strategy to conserve EFH, including its identification, designation of HAPC, and the implementation of measures to minimize to the extent practicable adverse impacts to EFH from fishing. The final rule implementing Amendment 19 provides measures necessary to conserve EFH and no additional EFH recommendations are necessary for this proposed action.

The general effects of fishing on habitat and the marine ecosystem are further described in volume 1 of the 2008 groundfish SAFE document.

3.2.1 OY Alternatives

The ability to say anything meaningful about the broad-scale ecosystem impacts associated with adopting one of the preferred alternatives above the other is by all measures an intractable question. Clearly, the relationship between OY alternatives for depleted species and targets in related rebuilding plans has the most relevance to ecosystem impacts because of the long-term, cumulative effect. They differ in the trajectories they set for rebuilding populations, and clearly those alternatives that rebuild stocks the fastest have the greatest potential to minimize the long-term impacts to the ecosystem that may have resulted from their removal. Thus, OY alternative 1, which sets depleted species' OYs to zero may result in the least ecosystem impacts. And compared to no action, the Council-preferred OY alternatives establish more aggressive rebuilding schedules for depleted species, with the exception of cowcod. But these earlier target years are as much a result of stock assessments revealing more favorable conditions in terms of stock productivity as to a reduction in harvest rates. Despite these general observations, there exists no meaningful way of quantitatively assessing the potential difference with respect to the risk of undesirable consequences of choosing one OY alternative over the other. To the extent that the various OY alternatives require corresponding management measures that vary the size of area closures, thus protecting stocks, they may mitigate the potential consequences of fishing to ecological structure and function, although this generalization is unquantifiable.

In general, there is no empirical or theoretical evidence that declines in these stocks of west coast rockfish have had impacts on predators or higher trophic level species, particularly impacts above and beyond those which might be expected by reduction of biomass to their target levels. However, there is potential evidence, largely theoretical, that among those rebuilding species that are higher trophic level predators, there could be cascading ecological consequences to some benthic communities resulting from severe depletion and potential replacement by more opportunistic species. Again, the extent to which such impacts (if real) might be of a greater magnitude than those that would be expected under scenarios in which biomass declined to target levels is impossible to quantify.

3.2.2 Management Measure Alternatives

The management measure alternative's principal function is to constrain short-term fishing mortality to levels consistent with the rebuilding targets established in rebuilding plans, or other stock management goals for precautionary zone and healthy stocks. In this respect the management measures that have been implemented by the Council in recent years appear to have contributed to increasing abundance and productivity levels for rebuilding depleted (and other) species, although such improvement may be as much a result of factors outside the control of the management regime, such as changes in climate. Components of the management measure alternatives, and the management framework generally, that employ spatial closures, which effectively eliminate fishing mortality from broad areas of habitat that are optimal for both the rebuilding species and other, healthier groundfish stocks in the California

Current, likely have an ancillary mitigating effect with respect to the ecosystem impacts of fishing. The protection of intact functional patches of habitat was identified by Baskett, et al. (2006) as one of the management measures that had the greatest potential to avoid or reverse changes in species composition on small rocky reef habitats. These area closures, intended to reduce bycatch of depleted species, are sited in those depth zones and habitats in which these species are most frequently encountered. As such, they tend to represent the optimal habitat for these species, and are either known or suspected (from catch rate data, trawl surveys, ROV surveys, and other means) to sustain the highest densities of depleted species. Consequently, this approach would be expected to effectively maintain functioning habitat areas and/or metapopulations of rebuilding species with an extremely high degree of protection.

Management measures' effects on the ecosystem operate in two ways: by affecting fish populations directly through measures to reduce fishing mortality and the protection of intact patches of habitat. Thus, management measure alternative 1, intended to constrain total catch to the low end of the range, is likely to have the least adverse impacts with respect to the ecosystem because of the extent of area closures and reductions in fishing mortality for rebuilding species. The Council-preferred alternative implements area closures generally similar to those currently in place (no action) except for the addition of a new YRCA off Westport, Washington and the potential implementation of YRCAs off northern California. In particular, the configuration and extent of the area closures within this alternative represents a short-term effect over the next biennium, which may be less relevant, in terms of the ecosystem, than how these types of management measures will be applied over the long term. In summary, it is intuitive that the lower the fishing mortality rate, and the greater the extent of spatial closures over the long term, the greater the potential for rebuilding species to fill their niche or role in the ecosystem relative to the risk of changes or shifts in equilibrium or ecosystem states. But both the precision of multispecies or ecosystem models and their ability to accurately reflect the potential cumulative impacts to the ecosystem that result in slightly differing rebuilding trajectories are extremely low, particularly with respect to any ability to detect thresholds that may exist with respect to alternative stable states within either small or broad-scale habitats and ecosystems.

In comparing the preferred alternative to no action, the cumulative effect of recent action taken to mitigate the adverse effects of fishing to EFH through the implementation of Groundfish FMP Amendment 19 needs to be taken into account. That action not only protects additional habitat areas from trawl fishing impacts into the foreseeable future, but also prohibits the use of large-footrope gear shoreward of the 100 fm depth contour, mitigating impacts to remaining nearshore high-relief reef communities. These measures became effective in June 2006 and will likely further mitigate the effects of fishing in the next biennium.

CHAPTER 4 AFFECTED SPECIES

4.1 Species Description and Status

A description of the affected species and their current status from assessments and other information are available in the Council's Stock Assessment and Fishery Evaluation (SAFE) document. Volume 1 of the 2008 SAFE document is available by request to the Council office or online at www.pcouncil.org/groundfish/gfsafe.html.

4.2 Criteria Used to Evaluate Impacts

A primary goal of the groundfish FMP is to rebuild to or maintain spawning stock biomass of groundfish stocks and stock complexes at BMSY. Two critical considerations in evaluating alternative harvest levels relative to accomplishing this goal are the uncertainty of management measures to limit total fishing-related mortality to prescribed levels and the uncertainty in our understanding of stock status and productivity. In other words, the risks of allowing higher harvests to provide increased socioeconomic benefits (see Chapter 7 for an evaluation of socioeconomic impacts) need to be evaluated by the effectiveness of harvest monitoring systems to accurately determine total fishing-related mortality and assessment uncertainty. An additional consideration for depleted stocks is the "tradeoff" of duration of rebuilding vs. the amount of allowable harvest or total fishing-related mortality. The groundfish FMP, consistent with the MSA rebuilding provisions, establishes procedures for developing rebuilding parameters; rebuilding plans must be as short as possible, taking into account the appropriate statutory factors. All of these considerations are used to develop criteria for evaluating biological impacts to groundfish stocks.

4.2.1 Catch Monitoring Uncertainty

Systems for monitoring groundfish mortalities (landings plus discard mortalities) on the west coast vary in their effectiveness depending on whether the species is primarily caught in commercial or recreational fisheries and how well at-sea discards are monitored. In general, fishing-related mortalities of commercially caught species are better known than those for stocks primarily caught by recreational fisheries. This is because commercial landings are recorded on fish receiving tickets, which are used to document the weight and exvessel value of landed catch, while recreational catches are mostly monitored using a random, stratified census of anglers. The degree of at-sea monitoring of discards also varies by fishing sector with the limited entry at-sea whiting trawl sector having the highest at-sea observer rates; followed by limited entry bottom trawl (including shoreside whiting); limited entry fixed gear; open access; California commercial passenger fishing vessels (CPFV or California recreational charter); and California (non-CPFV), Oregon, and Washington recreational. The treaty tribes report that their fisheries are observed at a high rate because their fisheries are full retention fisheries for rockfish species.

4.2.1 Stock Assessment Uncertainty

Assessment uncertainty is another evaluation criterion for evaluating stock impacts. In general, assessments of species that are adequately sampled by a reliable source of fishery independent abundance information tend to be more robust with respect to estimating stock trends and abundance (1998). On the west coast, groundfish surveys have typically been conducted using bottom trawl gear randomly stratified over latitudinal and depth strata along the continental shelf and slope (Lauth 2000;Weinberg et al. 2002). The results from these surveys are typically the key inputs to the stock assessments for west coast groundfish stock assessments. These surveys are also often the source of the biological data used to estimate life history parameters. For species that are not well sampled by traditional survey data, such as cowcod and yelloweye rockfish, other temporal indices of abundance are used to tune assessments. Many such indices, particularly fishery-dependent indices such as commercial or recreational CPUE trends, tend to be associated with higher levels of uncertainty. Fishery-dependent data are often less reliable than fishery-independent data for a variety of reasons; for example, catch rates may be stable in the face of stock declines as a result of increasing fishing power or changing spatial patterns in effort (Hilborn and Walters 1992;Walters 2003). Furthermore, management measures can substantially alter the integrity of fishery-dependent data, particularly in response to actions by managers to reduce or control effort. Consequently, assessments for data-poor species such as cowcod and yelloweye rockfish, which are based on highly uncertain catch reconstructions and recreational CPUE time series to inform biomass trends, are associated with much greater levels of uncertainty relative to other groundfish species' assessments.

Model uncertainty is also a key factor in considering how the results of stock assessments are used. The perception of stock status and productivity for many stocks, particularly those for rebuilding species, often changes substantially between stock assessments. Such changes can be a result of a range of technical factors, including how a given assessment model is structured, the assumptions used to fix or estimate key parameters (i.e., whether parameters such as natural mortality and steepness are fixed, estimated freely, or estimated with an informative prior), and the evolution of methods for developing time series and estimates of uncertainty from different sources of raw data. As the population dynamics of target species themselves are responsive to a mix of complex (and typically poorly understood) biological, oceanographic and interspecific interactions, new sources of information (e.g., new data sets, extensions of existing data sets, incorporation of environmental factors into assessments) can also result in changes in parameter estimates and model outputs. Consequently, estimates of depletion levels and stock status can vary substantially between assessment cycles; as illustrated by the increase in the estimated OY of bocaccio from ≤ 20 mt to 250 mt between 2002 and 2003, and the perception from the most recent widow rockfish assessment that this stock may not have ever been below the depleted threshold of 25 percent of initial biomass. In such cases, the most plausible result from the assessment should still be viewed as highly uncertain and the risks associated with management decision-making should account for this uncertainty.

A logical conclusion for evaluating potential management decisions, using highly uncertain assessment results, is more precaution may be needed to avoid future problems if assumptions regarding stock status are overly optimistic. For example, Punt (2005) developed a simulation model to evaluate how well a particular set of management rules actually achieved management goals in the face of measurement error, process error, and model uncertainty. The study simulating the outcomes under a given set of rules for assessing progress, with regard to the number of times a rebuilding plan was revised, the average catch during the years that the resource was being rebuilt, and the ratio of the number of years that it took for a stock to rebuild over the number of years it was expected to take a stock to rebuild based on the original rebuilding plan. In general, results indicated that greater stability tended to be associated with smaller OYs (which were based on more conservative criteria for achieving success), and that frequent revisions to harvest rates that accompanied new assessments could lead to both a less stable management regime and longer overall rebuilding times.

4.2.2 Stock Depletion

Based on the most recent round of assessments, each depleted species is estimated to be at a different level of spawning stock biomass depletion relative to its unfished spawning stock biomass. The relative level of depletion, combined with other biological characteristics of the stock, influences the sensitivity of a stock's rebuilding time to changes in OYs. The lower the relative depletion of a stock's spawning biomass, the more risk there is in deciding higher OYs. Therefore, stocks with very low levels of depletion; such as canary rockfish, cowcod, and yelloweye rockfish; are considered to have a higher sensitivity to changes in OY and higher OYs for these species are inherently more risky.

4.2.3 Rebuilding Probability

The predicted times to rebuild the seven depleted species under FMP Amendment 16-4 relative to the amount of allowable harvest (to appropriately take into account the biology of the stocks and socioeconomic impacts to fishing communities) were determined in rebuilding analyses recommended by the SSC in 2005 or, in the case of yelloweye rockfish, in 2006. These rebuilding analyses probabilistically evaluated allowable harvest vs. rebuilding duration relative to the maximum allowable time to rebuild (T_{MAX}) under the current National Standard Guidelines. The Council followed the same procedure in reviewing appropriate harvest levels for 2009 and 2010. T_{MAX} is defined as the minimum estimated time to rebuild with no allowable fishing-related mortality (T_{MIN}) plus one mean generation time. The soundness in defining T_{MAX} this way is that one mean generation, or the number of years predicted for a spawning female to replace herself in the population, is a relative biological index of stock productivity. This takes into account the biology of the stocks, as called for in the rebuilding provisions of the Magnuson Act. Therefore, the range of allowable rebuilding periods is bounded by the biological limit of T_{MIN} or $T_{F=0}$ (appropriate when the rebuilding plans are being modified after a period of time), where all stock mortality is natural mortality, and T_{MAX}, a scientifically-derived upper limit linked to stock productivity. Stocks exhibiting low productivity will necessarily have longer maximum rebuilding periods due to longer mean generation times. The probability of rebuilding by T_{MAX} (P_{MAX}) is therefore one of the criteria used to evaluate risk of alternative harvest levels for depleted species, since it is a metric that relates management risk (i.e., risk of not meeting the rebuilding target by T_{MAX}) to a stock's relative productivity.

4.2.4 Extended Duration of Rebuilding

However, given the guidance from the Ninth Circuit Court of Appeals not to follow a formulaic approach for deciding a stock's rebuilding plan, another criterion for evaluating alternative rebuilding plans is to use the extended duration of the predicted rebuilding period relative to $T_{F=0}$. This criterion is appropriate for rebuilding plans that are already in place, but which need to be reconsidered and modified as appropriate. The needs of fishing communities (see 7.1.1.1) may be taken into account by allowing some limited harvest of a depleted species as unavoidable bycatch to permit targeting of healthy stocks. Any allowable harvest of a depleted species predicts a longer rebuilding period than $T_{F=0}$. How much longer rebuilding is extended from $T_{F=0}$ is therefore a necessary evaluation criterion.

4.3 Discussion of Direct and Indirect Impacts

This section evaluates and discusses direct and indirect impacts of OY alternatives and management measure alternatives on affected species. A retrospective analysis of past management actions and resulting impacts is critical in this exercise to understand potential future impacts. To that end, final total catch estimates by fishing sector are provided for 2005 and 2006 west coast groundfish fisheries (Tables 4-1 and 4-2) and "near final" 2007 total catches (Table 4-3). The reason 2007 catches are not considered final is that the full year of WCGOP observation data is not yet available and analyzed to reconcile at-sea discards; a process which has been completed for fisheries in prior years. In lieu of these data, projected impacts from the various sector bycatch models employed by the GMT to track discards relative to known landings is used. It is anticipated that final 2007 catch estimates will be available by the end of 2008, which is too late to be incorporated in the final EIS.

Impacts of OY alternatives are also compared between management measure alternatives and with the No Action Alternative and evaluated using the criteria described in Section 4.2.

Table 4-1. Estimated total mortality (mt) of groundfish species and species complexes on the west coast in 2005.

Stock or Complex	2005 Total Catch												
	Non-treaty Sectors											Treaty Sector Total Catch	Total Catch All Sectors
	LE Trawl				LE Fixed Gear	Dir. OA	Inc. OA	Recreational					
	At-sea C-Ps	At-sea MS	SS Whiting	SS Non-whiting				CA	OR	WA	Total		
Lingcod - coastwide	0.4	2.0	5.9	269.3	16.5	74.8	3.7	241.9	144.0	87.9	473.8	30.9	877.2
Pacific Cod	-	0.0	1.2	735.4	3.7	1.1	0.1	0.0	0.0	0.0	0.0	123.8	865.3
Pacific Whiting (Coastwide)	78,889.5	48,475.6	97,557.9	876.5	1.0	0.2	7.6	0.1	0.1	0.0	0.2	35,348.6	261,157.1
Sablefish (Coastwide)	13.0	2.1	22.4	2,631.2	2,294.5	947.9	2.2	0.1	1.3	0.0	1.4	699.8	6,614.6
N. of 36° (Monterey north)	13.0	2.1	22.4	2,570.4	2,220.7	930.7	2.0	0.1	1.3	0.0	1.4	699.8	6,462.6
Sablefish S. of 36° (Conception area)	-	-	-	60.8	73.8	17.1	0.2	0.0	0.0	0.0	0.0	-	152.0
PACIFIC OCEAN PERCH	0.8	0.9	0.5	69.9	0.4	0.2	0.0	0.0	0.0	0.0	0.0	3.5	76.2
Shortbelly Rockfish	0.0	2.7	-	1.1	0.0	0.0	-	0.0	0.0	0.0	0.0	-	3.8
WIDOW ROCKFISH	43.1	35.5	76.8	6.4	0.7	0.6	0.9	1.5	1.6	0.0	3.1	30.0	197.0
CANARY ROCKFISH	0.3	0.7	2.2	27.1	0.1	1.7	0.0	3.9	5.8	3.1	12.8	4.7	49.8
Chilipepper Rockfish	-	-	0.1	82.0	2.9	0.5	0.1	3.6	0.0	0.0	3.6	-	89.2
BOCACCIO (S of 40°10')	-	-	0.0	31.4	1.6	1.5	0.3	39.1	0.0	0.0	39.1	-	74.0
Splitnose Rockfish	-	-	0.0	230.2	0.7	0.1	-	0.0	0.0	0.0	0.0	-	230.9
Yellowtail Rockfish	47.4	25.4	173.1	58.9	0.8	2.4	7.0	0.2	12.3	21.6	34.1	578.4	927.6
Shortspine Thornyhead - coastwide	6.3	0.7	0.3	641.9	142.8	0.8	0.2	0.0	0.0	0.0	0.0	10.8	803.9
N. of 34°27'	6.3	0.7	0.3	359.6	7.1	0.2	0.0	0.0	0.0	0.0	0.0	10.8	385.1
S. of 34°27'	-	-	-	144.3	134.9	0.3	0.2	0.0	0.0	0.0	0.0	-	279.8
Longspine Thornyhead - coastwide	-	-	0.0	726.4	15.0	0.0	-	0.0	0.0	0.0	0.0	0.2	741.6
N. of 34°27'	-	-	0.0	631.3	7.1	0.0	-	0.0	0.0	0.0	0.0	0.2	638.6
S. of 34°27'	-	-	-	0.0	7.9	0.0	-	0.0	0.0	0.0	0.0	-	7.9
Other thornyheads	-	-	-	7.9	4.7	0.6	-	0.0	0.0	0.0	0.0	-	13.2
COWCOD	-	-	-	1.4	0.0	0.0	-	0.2	0.0	0.0	0.2	-	1.6
DARKBLOTCHED	5.9	5.1	5.5	100.8	2.4	2.4	0.0	0.0	0.0	0.0	0.0	0.1	122.2
YELLOWEYE	-	-	0.0	0.9	0.7	1.7	-	1.9	4.0	9.0	14.9	0.8	19.0
Black Rockfish - coastwide	-	0.0	-	0.5	14.0	155.5	1.9	149.0	313.8	321.3	784.1	-	956.0
Black Rockfish (WA)	-	-	-	0.0	0.0	0.0	-	0.0	0.0	321.3	321.3	-	321.3
Black Rockfish (OR-CA)	-	0.0	-	0.5	14.0	155.5	1.9	149.0	313.8	0.0	462.8	-	634.7
Minor Rockfish North	40.4	17.1	31.0	108.3	60.2	45.9	0.4	16.0	48.7	16.3	81.1	38.6	423.1
Nearshore Species	-	-	0.0	0.2	2.5	31.4	0.1	11.9	41.9	13.8	67.6	0.2	102.0
Blue Rockfish								7.7	33.2	3.1	44.0		
Shelf Species	0.6	5.5	27.1	84.0	14.8	7.0	0.3	4.1	6.8	2.5	13.5	9.1	161.9
Slope Species	39.9	11.6	3.9	121.2	67.2	15.0	0.0	0.0	0.0	0.0	0.0	29.3	288.0

Table 4-1. Estimated total mortality (mt) of groundfish species and species complexes on the west coast in 2005 (continued).

Stock or Complex	2005 Total Catch												
	Non-treaty Sectors											Treaty Sector Total Catch	Total Catch All Sectors
	LE Trawl				LE Fixed Gear	Dir. OA	Inc. OA	Recreational					
	At-sea C-Ps	At-sea MS	SS Whiting	SS Non-whiting				CA	OR	WA	Total		
Minor Rockfish South	0.0	0.0	0.0	116.7	35.1	127.6	1.1	637.3	0.0	0.0	637.3	0.0	917.8
Nearshore Species	-	-	-	0.0	1.5	79.9	0.2	362.9	0.0	0.0	362.9	-	444.5
Blue Rockfish								146.6	0.0	0.0	146.6		
Shelf Species	0.0	0.0	0.0	12.1	7.5	18.1	0.7	273.9	0.0	0.0	273.9	0.0	312.3
Slope Species	0.0	0.0	0.0	115.5	26.2	29.7	0.1	0.5	0.0	0.0	0.5	0.0	172.1
California scorpionfish	-	-	-	0.0	0.0	2.1	0.1	24.1	0.0	0.0	24.1	-	26.3
Cabezon (off CA only)	-	-	-	0.0	0.2	30.7	0.1	41.4	0.0	0.0	41.4	-	72.4
Dover Sole	0.3	0.0	0.0	7,624.7	5.0	1.4	3.7	0.0	0.0	0.0	0.0	145.0	7,780.2
English Sole	0.0	0.1	0.0	1,206.5	0.0	0.0	5.2	0.0	0.0	0.0	0.0	65.9	1,277.7
Petrale Sole (coastwide)	-	-	0.0	2,813.1	0.3	0.1	11.4	0.4	0.0	0.0	0.4	29.7	2,855.1
Arrowtooth Flounder	0.8	0.5	0.9	3,543.2	66.4	20.9	1.7	0.0	0.0	0.0	0.0	160.5	3,794.7
Starry Flounder	-	-	0.0	26.0	0.0	0.0	0.3	3.4	0.1	0.0	3.5	1.3	31.1
Other Flatfish	2.0	1.2	0.2	1,936.5	0.5	1.9	0.9	19.5	0.3	0.0	19.9	46.9	2,009.8
Kelp Greenling	0.0	-	-	0.0	1.5	21.0	-	6.9	4.1	4.8	15.8	-	38.3
Spiny Dogfish	42.2	27.9	95.5	1,230.9	341.1	48.6	0.7	2.8	0.1	0.0	2.9	290.8	2,080.7
Longnose Skate								0.0	0.0	0.0	0.0		
Other Fish a/	0.6	1.1	0.0	2,509.0	124.5	129.6	0.3	37.8	17.6	10.5	65.9	0.5	2,831.6

a/ Catches of kelp greenling and spiny dogfish, which are member species of the Other Fish complex, are not included.

Table 4-2. Estimated total mortality (mt) of groundfish species and species complexes on the west coast in 2006.

Stock or Complex	2006 Total Catch													
	Non-treaty Sectors												Treaty Sector Total Catch	Total Catch All Sectors
	LE Trawl				LE Fixed Gear	Dir. OA	Inc. OA	Recreational				Total Catch All Non-treaty Sectors		
	At-sea C-Ps	At-sea MS	SS Whiting	SS Non-whiting				CA	OR	WA	Total			
Lingcod - coastwide	0.0	0.0	5.9	119.7	17.7	72.1	0.1	301.0	118.3	77.4	496.7	712.2	44.9	757.1
Pacific Cod	0.0	0.0	0.9	329.7	0.3	0.1	0.0	0.0	0.0	0.0	0.0	331.0	35.6	366.6
Pacific Whiting (Coastwide)	78,864.0	55,354.7	97,267.6	1.0	0.3	0.0	0.3	0.1	0.1	0.0	0.2	231,488.1	35,463.9	266,952.0
Sablefish (Coastwide)	0.0	0.0	11.1	2,466.6	2,231.0	813.9	4.9	0.0	2.1	0.0	2.1	5,529.5	669.5	6,199.0
N. of 36° (Monterey north)	0.0	0.0	11.1	2,455.0	2,168.1	697.1	4.9	0.0	2.1	0.0	2.1	5,338.3	669.5	6,007.8
Sablefish S. of 36° (Conception area)	0.0	0.0	0.0	11.6	62.9	116.8	0.0	0.0	0.0	0.0	0.0	191.2	0.0	191.2
PACIFIC OCEAN PERCH	0.0	0.0	0.1	64.9	0.2	0.1	0.0	0.0	0.0	0.0	0.0	65.3	3.9	69.1
Shortbelly Rockfish	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3
WIDOW ROCKFISH	66.9	72.3	49.5	6.0	0.3	0.6	0.0	3.2	1.1	0.0	4.3	199.9	10.0	209.9
CANARY ROCKFISH	0.1	0.9	1.6	9.4	0.2	0.0	0.0	12.5	2.9	1.1	16.5	28.7	5.5	34.2
Chilipepper Rockfish	0.0	0.0	2.3	22.0	4.8	1.4	0.0	1.7	0.0	0.0	1.7	32.3	0.0	32.3
BOCACCIO (S of 40°10')	0.0	0.0	0.0	0.8	1.2	2.9	0.0	42.5	0.0	0.0	42.5	47.3	0.0	47.3
Splitnose Rockfish	0.0	0.0	10.7	110.7	0.0	0.1	0.1	0.0	0.0	0.0	0.0	121.6	0.0	121.6
Yellowtail Rockfish	0.0	0.0	136.2	24.3	1.1	6.2	0.0	0.3	8.5	18.2	27.0	194.7	171.8	366.6
Shortspine Thornyhead - coastwide	0.0	0.0	0.1	603.7	157.1	1.8	0.0	0.0	0.0	0.0	0.0	762.6	21.5	784.1
N. of 34°27'	0.0	0.0	0.1	596.6	28.4	0.4	0.0	0.0	0.0	0.0	0.0	625.5	21.5	647.0
S. of 34°27'	0.0	0.0	0.0	7.0	128.7	1.3	0.0	0.0	0.0	0.0	0.0	137.1	0.0	137.1
Longspine Thornyhead - coastwide	0.0	0.0	0.0	659.3	16.6	0.0	0.0	0.0	0.0	0.0	0.0	675.9	0.0	675.9
N. of 34°27'	0.0	0.0	0.0	657.3	7.2	0.0	0.0	0.0	0.0	0.0	0.0	664.5	0.0	664.5
S. of 34°27'	0.0	0.0	0.0	2.0	9.4	0.0	0.0	0.0	0.0	0.0	0.0	11.4	0.0	11.4
Other thornyheads	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.9
COWCOD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.2	0.0	0.2
DARKBLOTCHED	0.0	0.0	1.7	90.7	3.7	3.1	0.0	0.0	0.0	0.0	0.0	99.2	0.1	99.3
YELLOWEYE	0.0	0.0	0.1	0.5	0.4	0.0	0.0	3.5	2.5	1.7	7.7	8.6	0.5	9.1
Black Rockfish - coastwide	0.0	0.0	0.0	2.3	12.8	137.6	0.0	170.0	265.5	341.2	776.7	929.4	0.0	929.5
Black Rockfish (WA)	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	341.2	341.2	341.3	0.0	341.3
Black Rockfish (OR-CA)	0.0	0.0	0.0	2.2	12.8	137.6	0.0	170.0	265.5	0.0	435.5	588.1	0.0	588.1
Minor Rockfish North	0.0	0.0	17.1	93.9	63.2	40.6	0.0	21.1	33.6	15.4	70.0	284.8	35.7	320.5
Nearshore Species	0.0	0.0	0.1	0.8	2.2	31.5	0.0	16.0	27.2	12.1	55.3	89.9	1.1	91.0
Blue Rockfish	0.0	0.0	0.0	0.0	1.2	17.1	0.0	9.4	16.0	2.7	28.2	46.5	0.0	46.5
Shelf Species	0.0	0.0	13.4	11.4	4.3	5.3	0.0	5.1	6.4	3.2	14.7	49.0	5.2	54.2
Slope Species	0.0	0.0	3.6	81.7	56.7	3.8	0.0	0.0	0.0	0.0	0.0	145.9	29.3	175.2

Table 4-2. Estimated total mortality (mt) of groundfish species and species complexes on the west coast in 2006 (continued).

Stock or Complex	2006 Total Catch													
	Non-treaty Sectors												Treaty Sector Total Catch	Total Catch All Sectors
	LE Trawl				LE Fixed Gear	Dir. OA	Inc. OA	Recreational				Total Catch All Non-treaty Sectors		
	At-sea C-Ps	At-sea MS	SS Whiting	SS Non-whiting				CA	OR	WA	Total			
Minor Rockfish South	0.0	0.0	19.8	89.9	51.5	145.4	2.0	840.8	0.0	0.0	840.8	1,149.5	0.0	1,149.5
Nearshore Species	0.0	0.0	0.0	0.2	1.5	80.5	1.4	548.7	0.0	0.0	548.7	632.3	0.0	632.3
Blue Rockfish	0.0	0.0	0.0	0.0	0.2	8.4	0.0	278.5	0.0	0.0	278.5	287.2	0.0	287.2
Shelf Species	0.0	0.0	19.8	4.9	6.9	25.0	0.0	292.1	0.0	0.0	292.1	348.7	0.0	348.7
Slope Species	0.0	0.0	0.1	84.9	43.0	39.9	0.6	0.0	0.0	0.0	0.0	168.5	0.0	168.5
California scorpionfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.3	0.0	0.0	46.3	46.3	0.0	46.3
Cabezon (off CA only)	0.0	0.0	0.0	0.0	1.9	48.3	0.0	27.5	0.0	0.0	27.5	77.9	0.0	77.9
Dover Sole	0.0	0.0	0.0	5,657.4	7.1	0.4	0.0	0.0	0.0	0.0	0.0	5,665.0	223.4	5,888.4
English Sole	0.0	0.0	0.0	833.2	0.0	0.0	0.8	0.0	0.0	0.0	0.0	834.0	42.0	876.0
Petrale Sole (coastwide)	0.0	0.0	0.0	2,574.8	0.2	0.2	0.3	0.4	0.0	0.0	0.4	2,576.0	26.4	2,602.4
Arrowtooth Flounder	0.0	0.0	2.4	1,722.8	3.4	1.0	0.0	0.0	0.0	0.0	0.0	1,729.6	198.8	1,928.5
Starry Flounder	0.0	0.0	0.0	64.4	0.0	0.0	4.0	1.4	0.1	0.0	1.5	69.9	0.0	69.9
Other Flatfish	0.0	0.0	0.1	1,177.9	0.2	2.7	23.8	22.2	0.2	0.0	22.4	1,227.2	59.8	1,287.0
Kelp Greenling	0.0	0.0	0.0	0.0	1.2	14.9	0.0	8.0	3.1	3.4	14.5	30.6	0.0	30.6
Spiny Dogfish	0.0	0.0	34.3	85.0	131.0	66.2	0.3	4.1	0.0	0.0	4.1	320.9	76.8	397.7
Longnose Skate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Fish a/	0.0	0.0	1.8	93.4	20.8	46.9	2.8	83.7	16.1	7.8	107.7	273.4	0.0	273.4

a/ Catches of kelp greenling and spiny dogfish, which are member species of the Other Fish complex, are not included.

Table 4-3. Estimated total mortality (mt) of groundfish species and species complexes on the west coast in 2007.

Stock or Complex	2007 Total Catch													
	Non-treaty Sectors													
	LE Trawl							Recreational						
	At-sea C-Ps	At-sea MS	SS Whiting	SS Non-whiting	LE Fixed Gear	Dir. OA	Inc. OA	CA	OR	WA	Total	Total Catch All Non-treaty Sectors	Treaty Sector Total Catch	Total Catch All Sectors
Lingcod - coastwide	0.0	0.0	5.0	118.9	15.1	79.5	0.0	173.9	95.1	56.7	325.7	544.2	47.6	591.8
Pacific Cod	0.0	0.0	0.0	43.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	43.3	45.4	88.6
Pacific Whiting (Coastwide)	73,265.0	47,810.1	73,299.3	2.3	0.6	0.0	0.1	0.0	0.0	0.0	0.0	194,377.4	30,176.9	224,554.4
Sablefish (Coastwide)	0.0	0.0	9.1	2,428.6	1,798.9	484.1	3.1	0.0	3.7	0.0	3.7	4,727.5	516.1	5,243.6
N. of 36° (Monterey north)	0.0	0.0	9.0	2,421.0	1,729.3	364.9	3.1	0.0	3.7	0.0	3.7	4,531.1	516.1	5,047.2
Sablefish S. of 36° (Conception area)	0.0	0.0	0.0	7.5	69.6	119.2	0.0	0.0	0.0	0.0	0.0	196.4	0.0	196.4
PACIFIC OCEAN PERCH	0.0	0.0	23.3	103.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	127.0	2.4	129.4
Shortbelly Rockfish	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2
WIDOW ROCKFISH	72.8	72.7	81.9	4.9	0.3	4.5	0.0	7.8	0.5	0.0	8.2	245.4	1.3	246.6
CANARY ROCKFISH	0.3	1.6	2.0	2.5	0.0	0.0	0.0	10.9	2.5	1.1	14.5	21.1	1.5	22.6
Chilipepper Rockfish	0.0	0.0	0.2	33.8	3.8	1.9	0.0	7.8	0.0	0.0	7.8	47.4	0.0	47.4
BOCACCIO (S of 40°10')	0.0	0.0	0.0	1.3	1.5	3.7	0.0	53.4	0.0	0.0	53.4	59.9	0.0	59.9
Splitnose Rockfish	0.0	0.0	0.0	61.9	0.0	0.1	0.0	0.0	0.0	0.0	0.0	62.0	0.0	62.0
Yellowtail Rockfish	0.0	0.0	186.4	11.1	1.3	6.3	0.0	0.4	6.6	13.2	20.3	225.4	74.0	299.4
Shortspine Thornyhead - coastwide	0.0	0.0	0.3	884.2	151.6	0.6	0.7	0.0	0.0	0.0	0.0	1,037.4	38.5	1,075.8
N. of 34°27'	0.0	0.0	0.2	883.4	21.5	0.3	0.7	0.0	0.0	0.0	0.0	906.1	38.5	944.6
S. of 34°27'	0.0	0.0	0.0	0.8	130.1	0.3	0.0	0.0	0.0	0.0	0.0	131.2	0.0	131.2
Longspine Thornyhead - coastwide	0.0	0.0	1.3	721.2	19.4	0.2	0.0	0.0	0.0	0.0	0.0	742.1	0.0	742.1
N. of 34°27'	0.0	0.0	1.2	720.0	5.9	0.1	0.0	0.0	0.0	0.0	0.0	727.2	0.0	727.2
S. of 34°27'	0.0	0.0	0.1	1.3	13.5	0.1	0.0	0.0	0.0	0.0	0.0	14.9	0.0	14.9
Other thornyheads	0.0	0.0	0.0	4.5	3.3	0.5	0.0	0.0	0.0	0.0	0.0	8.3	0.0	8.3
COWCOD	0.0	0.0	0.0	2.0	0.0	0.1	0.0	0.3	0.0	0.0	0.3	2.3	0.0	2.3
DARKBLOTCHED	0.0	0.0	0.9	123.1	5.0	2.4	0.0	0.0	0.0	0.0	0.0	131.4	0.3	131.8
YELLOWEYE	0.0	0.0	0.0	0.1	0.3	1.5	0.0	8.0	2.8	2.5	13.3	15.2	0.4	15.6
Black Rockfish - coastwide	0.0	0.0	0.9	0.3	11.9	149.5	0.0	143.0	255.6	278.0	676.6	839.3	0.0	839.3
Black Rockfish (WA)	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	278.0	278.0	278.9	0.0	278.9
Black Rockfish (OR-CA)	0.0	0.0	0.0	0.3	11.9	149.5	0.0	143.0	255.6	0.0	398.6	560.4	0.0	560.4
Minor Rockfish North	0.0	0.0	24.1	122.0	64.2	55.7	0.4	26.8	36.9	13.0	76.8	343.1	33.9	377.0
Nearshore Species	0.0	0.0	0.0	0.0	5.7	44.2	0.0	17.1	29.3	11.5	57.9	107.7	0.4	108.1
Blue Rockfish	0.0	0.0	0.0	0.0	3.2	23.8	0.0	6.7	17.1	2.4	26.2	53.3	0.0	53.3
Shelf Species	0.0	0.0	5.9	4.4	4.4	6.9	0.0	9.7	7.6	1.5	18.9	40.6	1.1	41.6
Slope Species	0.0	0.0	18.2	117.6	54.1	4.5	0.4	0.0	0.0	0.0	0.0	194.8	32.5	227.3

Table 4-3. Estimated total mortality (mt) of groundfish species and species complexes on the west coast in 2007 (continued).

Stock or Complex	2007 Total Catch													
	Non-treaty Sectors													
	LE Trawl							Recreational						
	At-sea C-Ps	At-sea MS	SS Whiting	SS Non-whiting	LE Fixed Gear	Dir. OA	Inc. OA	CA	OR	WA	Total	Total Catch All Non-treaty Sectors	Treaty Sector Total Catch	Total Catch All Sectors
Minor Rockfish South	0.0	0.0	0.0	108.9	26.9	126.9	1.5	693.3	0.0	0.0	693.3	957.4	0.0	957.4
Nearshore Species	0.0	0.0	0.0	0.7	3.0	84.5	1.5	326.5	0.0	0.0	326.5	416.2	0.0	416.2
Blue Rockfish	0.0	0.0	0.0	0.0	0.1	6.8	0.0	141.7	0.0	0.0	141.7	148.6	0.0	148.6
Shelf Species	0.0	0.0	0.0	9.8	4.9	25.3	0.0	366.8	0.0	0.0	366.8	406.7	0.0	406.7
Slope Species	0.0	0.0	0.0	98.5	18.9	17.1	0.0	0.0	0.0	0.0	0.0	134.5	0.0	134.5
California scorpionfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.8	0.0	0.0	63.8	63.8	0.0	63.8
Cabezon (off CA only)	0.0	0.0	0.0	0.0	4.1	43.2	0.0	21.3	0.0	0.0	21.3	68.7	0.0	68.7
Dover Sole	0.0	0.0	0.2	8,919.8	1.1	1.5	17.1	0.0	0.0	0.0	0.0	8,939.6	303.3	9,243.0
English Sole	0.0	0.0	0.1	622.2	0.0	0.0	1.2	0.0	0.0	0.0	0.0	623.4	66.5	689.9
Petrale Sole (coastwide)	0.0	0.0	0.0	2,175.5	0.2	0.1	0.2	1.0	0.0	0.0	1.0	2,177.0	45.0	2,222.0
Arrowtooth Flounder	0.0	0.0	2.8	2,024.4	2.9	1.2	4.4	0.0	0.0	0.0	0.0	2,035.8	224.9	2,260.7
Starry Flounder	0.0	0.0	0.0	19.0	0.0	0.0	1.7	0.4	0.0	0.0	0.4	21.1	0.5	21.6
Other Flatfish	0.0	0.0	1.0	916.5	0.3	3.2	13.3	16.7	0.1	0.0	16.8	951.1	48.4	999.5
Kelp Greenling	0.0	0.0	0.0	0.0	2.0	17.9	0.0	9.5	3.5	2.5	15.5	35.4	0.0	35.4
Spiny Dogfish	0.0	0.0	51.4	55.7	196.0	1.8	0.0	5.2	0.0	0.0	5.2	310.1	113.1	423.1
Longnose Skate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0
Other Fish a/	0.0	0.0	0.3	92.9	28.0	37.6	0.0	22.0	16.3	5.9	44.2	203.0	0.0	203.0

a/ Catches of kelp greenling and spiny dogfish, which are member species of the Other Fish complex, are not included.

4.3.1 Depleted Groundfish Species

Each OY alternative analyzed for depleted groundfish is evaluated using the criteria discussed above in Section 4.2. In summation, these evaluation criteria are relative catch monitoring uncertainty, relative assessment uncertainty, the level of spawning stock biomass depletion, the estimated rebuilding probability, and the extended duration of rebuilding. The tradeoff of available harvest under alternative OYs for depleted species and predicted rebuilding times for these species (i.e., the extended duration of rebuilding) is also described in Section 2.1.1 and depicted in Table 2-3 and Figure 2-2. In addition to evaluating alternative OYs for each species in isolation, tradeoffs must also be considered within the full mix of depleted stocks because of the interrelated nature of the groundfish fisheries. For instance, reducing incidental harvest of widow rockfish might increase incidental bycatch of darkblotched rockfish and vice versa (see section 4.3.1.2) for the same level of harvest of target species.

This section also describes the types of strategies that should be considered in a groundfish species' rebuilding plan. As OYs decrease across the range of alternatives, more precautionary management measures and risk-averse strategies need to be employed to reduce total fishing-related mortality to prescribed levels.

General Rebuilding Strategies

<u>Harvest Limits (Harvest Guidelines or Quotas)</u>

The Council sets OYs for each depleted stock (among other managed species). Although resulting OYs are considered harvest guidelines, the Council has treated them as hard limits on total fishing mortality for depleted species. For example, they have closed fisheries late in the year if a depleted species' OY is projected to be exceeded. In some cases, OYs for co-occurring healthy groundfish stocks are reduced to limit the incidental mortality of one or more depleted groundfish species.

<u>Permits, Licenses, and Endorsements</u>

Participation in the Washington, Oregon, and California commercial groundfish fishery was partially limited beginning in 1994 when the federal vessel license limitation program was implemented (Amendment 6). Subsequently, Amendment 9 further limited participation in the fixed-gear sablefish fishery by establishing a sablefish endorsement. There is currently no federal permit requirement for other commercial participants (fishers or processors) or recreational participants (private recreational or charter). A buyback of vessels in the limited entry trawl fishery, and associated permits, was completed in 2003. This reduced participation in this sector by roughly one-third.

Trip Landing and Frequency Limits

Cumulative trip limits have been a key fixture of groundfish management for many years. Currently, these limits set for stocks, stock complexes, and species groups dictate the total amount of fish that may be landed per fishing vessel during a one- or two-month period. Separate limits are established for the limited entry trawl, limited entry fixed gear, and open access sectors. Landing limits on target species may be adjusted in order to limit coincident catch of depleted species. A limited entry trawl trip limit of 100 pounds per month was established in 2004 for large footrope gear, which may only be used seaward of the RCA.

Seasons

Specification of different seasonal fishing opportunities by region is a management tool increasingly used to limit fishing mortality in west coast recreational groundfish fisheries. Seasons can be adjusted inseason and often vary by the depths open to fishing to fine tune the balance between fishing opportunities and conservation of depleted species.

Area Closures

Beginning in 2002, RCAs came into use as a way of decreasing bycatch of depleted species. The sector-specific RCAs encompass the depth ranges where bycatch of depleted species is most likely to occur, based on information retrieved from log books, the at-sea observer program, catch records, and trawl survey data; and fishing by designated groundfish fishery sectors is prohibited within its boundaries. The boundaries vary by season and fishery sector, and may be modified in response to new information about the geographic and seasonal distribution of bycatch. Additionally, there are discrete RCAs designed to protect certain species such as cowcod and yelloweye rockfish (two CCAs exist south of 34°27' N latitude and one Yelloweye RCA exists in waters off northern Washington). These "species-specific" RCAs also provide a measure of protection for other co-occurring depleted groundfish species.

Gear Restrictions in Trawl Fisheries

Definitions of legal gear types and restrictions on mesh size in trawl gear have been part of the FMP since its inception. A cod end 4.5 inch minimum mesh size has been specified for groundfish trawl gear for many years to reduce the bycatch mortality of juvenile groundfish species and fish that are too small to be marketable. Since 2000, restrictions have been put on the use of trawl nets equipped with large footropes. By using large footropes with heavy roller gear, bottom trawlers can access rocky habitat on the continental shelf. In areas shoreward of the RCA large footrope gear is prohibited, preventing trawlers from accessing rocky habitat in these shallower depths. In areas seaward of the RCA, either small or large footrope gear may be used, although large footrope gear is the preferred gear type in these depths since small footropes tend to dig into the softer sediments of the slope and abyssal plain. In addition, cumulative trip limits have been structured in recent years to encourage vessels to fish exclusively in deep water where some depleted species are less likely to be encountered. Trawl vessels were allowed to use all these legal gear configurations during any given cumulative limit period. However, in 2004 trawl vessels which used the small footrope configuration were restricted to lower cumulative trip limits for target species in comparison to vessels using large footrope configurations. These measures encouraged fishing exclusively in deeper water to take advantage of the higher limits afforded this gear type. In 2005 and 2006, trawl vessels were not restricted with respect to gear-specific cumulative landing limits in any one period, but they were restricted to the area they could fish, either shoreward or seaward of the RCA, in any one period. Large or small footrope trawls were allowed seaward of the RCA, while only small footrope trawls were allowed shoreward of the RCA south of

40°10' N latitude and selective flatfish trawls allowed shoreward of the RCA north of 40°10' N latitude (selective flatfish trawls were also allowed to be used south of 40°10' N latitude, but were not mandated shoreward of the RCA as they were in the north). The selective flatfish trawl net is configured with a cut back headrope, low rise, and a small footrope, a design shown to substantially reduce catches of some rockfish species while more efficiently catching target flatfish species. This is because most rockfish species rise to escape an approaching trawl net, while flatfish species tend to dive. The rockfish escape due to the low rise and cut back headrope. While this gear has been tested and mandated shoreward of the RCA since 2005 in waters north of 40°10' N latitude, it has not been fully tested in waters south of 40°10' N latitude. Therefore, the behavior and bycatch rates of southern rockfish species, such as bocaccio, when encountering a selective flatfish trawl are unknown at this time. However, this gear may also be effective at reducing bycatch of southern rockfish species in the bottom trawl fishery and should be explored further.

Bycatch reduction devices (BRDs), also known as fish excluders, are mandated for the exempt trawl fishery targeting pink shrimp. Pink shrimp trawls historically had a high bycatch of rockfish. ODFW researched various BRD configurations to determine those devices that significantly reduced rockfish bycatch without an overall reduction in pink shrimp catch efficiency. Now specific hard grate BRDs and other accepted configurations are mandated for west coast pink shrimp trawls and resulting rockfish bycatch has been reduced dramatically.

Gear Restrictions in Fixed Gear Fisheries

Limited entry and open access fixed gear fisheries on the west coast use hook and line gears, longlines (both vertically and horizontally deployed on the bottom or suspended off the bottom), and pots/traps to target groundfish. Rockfish bycatch has been shown through WCGOP observations to be much lower in pots and traps targeting groundfish than line gears. While a substantial portion of the fixed gear fleets use pots and traps, a significant amount of line gear is used to target nearshore groundfish species and sablefish. Five of the seven rockfish species currently managed under rebuilding plans are shelf species vulnerable to capture using line gears. The two depleted slope species, darkblotched rockfish and POP, are rarely caught using fixed gears. Therefore, measures that would reduce the use of line gears in west coast shelf areas, where these depleted rockfish species occur, should be considered when developing long term rebuilding strategies. Alternatively, how line gears are fished should be explored more thoroughly since some line gear configurations and fishing strategies may also reduce the bycatch of depleted groundfish species.

Size and Bag Limits

Minimum size limits are specified for many depleted groundfish species to protect recruiting and premature fish from targeted harvest.

Bag limits are a daily limit of species allowed to be retained by anglers. These measures are used for recreational fisheries to limit mortality of depleted groundfish species. In some cases, no retention is allowed for depleted groundfish species as a means to eliminate any potential targeting that might otherwise occur.

Fishery Monitoring and Bycatch Estimation

All commercial groundfish landings are monitored through a fish ticket system requiring reporting by buyers and processors. Bycatch has become a crucial component of total fishing mortality for depleted species. In the last five years, harvest limits or OYs have evolved from an allowed landing limit to a total mortality limit where at-sea dead discards are also counted against the OY. NMFS implemented the West Coast Groundfish Observer Program (WCGOP) in August 2001, and these data were first used to estimate total fishing mortality beginning in mid-2003. The limited entry trawl sector was the first commercial sector to be managed using WCGOP data to estimate discards. In 2004 bycatch modeling was expanded to the primary sablefish fishery prosecuted by limited entry fixed gear vessels as WCGOP data became available for that sector. In 2005 WCGOP data was used to model bycatch of groundfish species in nearshore commercial fisheries in California and Oregon. As more observer data from different fishery sectors become available, further model extensions will be developed to more accurately estimate bycatch of depleted species in these sectors.

Recreational fishery monitoring and bycatch estimation is a state responsibility and each west coast state employs a different system. Washington and Oregon employ a random, stratified census of anglers to estimate catch and effort with relative precision. In California, where the coastline is much longer, recreational participation much greater, and the larger number of ports, recreational monitoring and catch estimation was done through a federal census known as MRFSS. The MRFSS survey, designed to look only at national trends of marine angler participation, is not precise enough to manage the low harvest guidelines used in recreational fishery management to help rebuild depleted stocks. Therefore, in recent years, efforts have been made to improve recreational fishery sampling in California. For instance, in 2001 the Pacific States Marine Fisheries Commission (PSMFC), with support from NMFS, began a new survey to estimate party/charter boat (commercial passenger fishing vessel [CPFV]) fishing effort in California. This survey differed from the traditional MRFSS telephone survey of anglers to determine CPFV trips by two-month period. The survey sampled 10 percent of the active CPFV fleet each week to determine the number of trips taken and the anglers carried on each trip. This 10 percent sample was then expanded to make estimates of total angler trips for Southern California and Northern California. However, the requisite precision for managing the low OYs of depleted species like canary rockfish and bocaccio was still lacking. Fishery scientists from the CDFG and the PSMFC designed a new program for sampling California's recreational fisheries, incorporating both the comprehensive coverage of the MRFSS program and the high quality sampling of CDFG’s Ocean Salmon Project. The goal of this new program, the CRFS, was to produce in a timely manner marine recreational, fishery-based data needed to sustainably manage California’s marine recreational fishery resources. The CRFS program, implemented in January 2004, increased the timeliness and accuracy of recreational fisheries data to more effectively monitor catches inseason, estimate take of species of concern, develop harvest guidelines, produce higher quality fishery-dependent indices for stock assessments, and provide other information critical to management decisions.

4.3.1.1 *Impacts of Optimum Yield Alternatives*

The direct impacts of 2009-10 OY alternatives on each of the depleted species are described here. First, rebuilding strategies specific to each depleted species are described. This is followed by a discussion of rebuilding progress to date. Rebuilding progress is depicted graphically by charting the time series of spawning stock biomass of each depleted species from the 2007 assessments. Finally, an evaluation of each OY alternative against the criteria described in section 4.2 is provided as a guide in the 2009-10 decision on harvest specifications and potential rebuilding plan revisions.

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

<u>Rebuilding Strategies for Bocaccio</u>

Bocaccio OYs, compliant with the adopted rebuilding plan, have been specified for managing this stock. In most years (with the exception of a slight overage in 2003 when the OY was ≤20 mt, or about 9.2 percent of the 2007-08 OY), bocaccio total mortality has been well below the specified OY (Tables 4-1, 4-2 and 4-3). The Council and NMFS have also adopted the practice of reducing the chilipepper rockfish OY from the ABC, despite the healthy abundance of this stock, as a precautionary measure to reduce the incidental mortality of co-occurring bocaccio. Reducing the chilipepper rockfish OY for the purpose of reducing bocaccio mortality may be less necessary given the advent of managing fisheries using depth-based RCAs.

Commercial bocaccio fishery impacts are managed using a combination of area closures (discussed below) and variable cumulative landing or trip limits. A limited entry trawl trip limit of 100 pounds of bocaccio per month was established in 2004 for large footrope gear to accommodate unavoidable bycatch, which may only be used seaward of the RCA. Limited entry fixed gear and open access limits vary by two-month period and north and south of Point Conception within a range of being closed in some periods to 300 pounds per two-month period. Under the No Action Alternative, trip limits for co-occurring southern shelf rockfish species, including chilipepper rockfish, have been adjusted to limit the incidental harvest of bocaccio.

Recreational bocaccio impacts are managed using a combination of area closures (discussed below), minimum size and daily-bag-limits (discussed below), and seasons. California manages its recreational fisheries according to five subareas (referred to as Rockfish/Lingcod Management Areas) defined by latitudinal boundaries; although, to better manage yelloweye rockfish impacts, CDFG is recommending the addition of a sixth management area for 2009-10. Different closed seasons have been applied, and modified inseason, primarily to limit canary rockfish catches, the most constraining of the depleted species; but these actions also serve to limit recreational catches of bocaccio.

Area closures or RCAs are one of the more effective rebuilding strategies for reducing bocaccio mortalities. South of 40º10' N latitude, the seaward boundary of the RCA for the limited entry trawl sector is 150 fm in 2007-08, and the shoreward boundary varies between 75 fm and 100 fm, depending on sector and period. Around offshore islands south of 34°27' N latitude the inner boundary is the 60 fm management line in 2007-08. The seaward boundary is the same for limited entry fixed gear and open access sectors; the shoreward boundary either 20 fm, 30 fm, or 60 fm, depending on area and period. California has implemented, and modified inseason, closed areas in their recreational management, restricting fisheries to areas shoreward of boundaries at 20 fm, 30 fm, or 60 fm, depending on subarea and month. Additionally, the existing CCAs south of 34°27' N latitude, where sport and commercial bottom fishing is prohibited, provide significant protection for bocaccio. Any additional RCAs south of 40°10' N latitude in the 15-180 fm zone will provide some additional protection of bocaccio. The greatest density of bocaccio occurs south of 34°27' N latitude in the 54-82 fm zone;

therefore, any new RCAs in the Southern California Bight in these depths should provide the most conservation benefit. However, bocaccio are less sedentary than rockfish species such as cowcod and yelloweye. Smaller, discrete RCAs may therefore provide incrementally less conservation benefit for bocaccio relative to more sedentary species.

Minimum size and daily-bag-limits are used to restrict targeting of juvenile bocaccio and total take of bocaccio, respectively. A 10-inch minimum size limit is applicable to bocaccio in waters off California. Under the No Action Alternative, California has implemented a 10-fish bag limit for the rockfish-cabezon-greenling stock complex. Within the 10-fish bag limit there are bocaccio sub-limits of two fish north of 40º10' N latitude and one fish south of 40º10' N latitude.

Rebuilding Progress of Bocaccio

Bocaccio have shown significant rebuilding progress since being declared depleted in 1999 (Figure 4-1). Current depletion is estimated to be 12.7% of initial, unfished biomass, which is up from a minimum depletion rate of 5.9% in 1997.

Although the rebuilding OY was exceeded during the first three years of rebuilding, total mortality during the subsequent five years (including the 2007 projection in Table 4-3) has fallen far below the respective rebuilding OYs. For the eight years of rebuilding, the cumulative total mortality has fallen 40% below the cumulative OY, indicating excellent management performance overall.

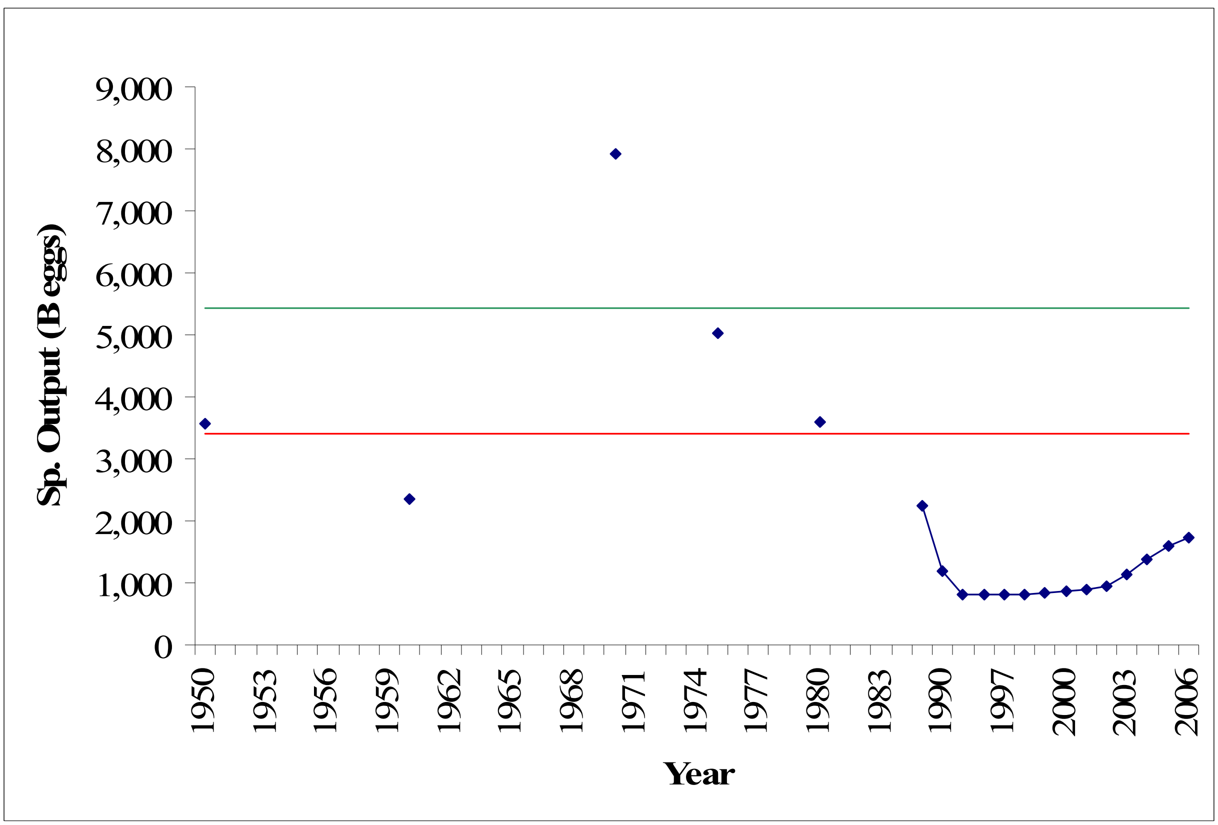


Figure 4-1. Time series of bocaccio spawning stock size relative to the FMP biomass thresholds for depletion ($B_{25\%}$) and B_{MSY} ($B_{40\%}$).

Evaluation of 2009-2010 Bocaccio OY Alternatives

Table 4-4 shows the results of the evaluation of alternative bocaccio OYs analyzed for 2009-10 using the criteria described in Section 4.2. The bocaccio OY evaluation has a mixed score using these criteria. Relatively low scores are noted using the catch monitoring uncertainty and stock depletion criteria, while relatively higher scores are assigned using the assessment uncertainty, rebuilding probability, and extended duration of rebuilding criteria.

Catch monitoring uncertainty is relatively high given the fact that a significant amount of the total mortality of bocaccio now occurs in the California recreational fishery, the sector with the largest bocaccio take in recent years (Tables 4-1, 4-2 and 4-3). All the recent recreational catch is estimated using the new CRFS program, which has been in existence since 2004. Prior to 2004, all recreational catch was estimated using the MRFSS program, a survey methodology designed to understand long-term national trends in marine recreational catch and participation. MRFSS was never designed to produce inseason catch and effort estimates with the precision needed to manage to low OYs or harvest guidelines, such as those specified for rebuilding bocaccio.

While California recreational catch time series are important fishery-dependent indices in the bocaccio stock assessment, the MacCall (2006) assessment is considered relatively certain given generally good data quality and consistency. Recruitment uncertainty was a major driver in significant changes in our understanding of bocaccio status in recent assessments (see discussion below), but many of the primary assessment data issues have been resolved leading to more certainty in assessment and associated rebuilding analysis results.

The bocaccio spawning output at the start of 2007, in terms of billions of eggs produced, is estimated to be at 12.7 percent of that for the unfished stock at equilibrium. This level of stock depletion is relatively low for the Amendment 16-4 species, which infers higher OYs for this stock may be relatively more risky.

Bocaccio rebuilding schedules across the analyzed OY alternatives range from 0-3 years relative to the shortest predicted time to rebuild the stock of 2021. Rebuilding probabilities range from 88.8% for the highest OY alternative (OY Alt. 3; 288 mt in 2009 and 302 mt in 2010) to 100% for the zero-harvest alternative. The preliminary preferred OY Alternative (288 mt in 2009 and 2010) has a rebuilding probability of just over 88.8% since the 2010 OY is lower than that for OY Alternative 3.

Rebuilding is extended by two years from the shortest possible time ($T_{F=0}$) under the harvest rates used to determine the No Action Alternative and OY Alternative 2 to three years under the preliminary preferred OY Alternative and OY Alternative 3.

Table 4-4. Evaluation of alternative 2009-10 bocaccio OYs relative to the criteria described in Section 4.2.

Evaluation Criteria	OY (mt)					
	Biennial OYs	**No Action OY Alt.**	**OY Alt. 1**	**OY Alt. 2**	**Final Pref. OY Alt.**	**OY Alt. 3**
	Yr. 1	218	0	218	288	288
	Yr. 2	218	0	227	288	302
Catch monitoring uncertainty	High uncertainty due to a significant recreational catch component using MRFSS data (prior to 2004). [a/]					
Assessment Uncertainty	Relatively certain due to generally good data quality and consistency.					
Stock depletion	12.7%					
Rebuilding Probability (P_{MAX})		>91.5%	100.0%	91.5%	>88.8%	88.8%
Rebuilding Duration Beyond $T_{F=0}$ (yrs.)		2	0	2	3	3

a/ Catch monitoring uncertainty has improved with the implementation of the California Recreational Fisheries Survey (CRFS) in 2004. However, until CRFS is fully evaluated and catch estimates are provided in a more timely fashion, catch monitoring uncertainty is still regarded as relatively high.

Canary Rockfish

Rebuilding Strategies for Canary Rockfish

All of the rebuilding strategies used to reduce mortality of depleted species on the west coast are used to help rebuild canary rockfish. Management of this stock has tended to constrain more west coast fisheries than any other groundfish stock since canary rockfish are distributed coastwide, are found in a variety of habitats, and are caught by a variety of different fishing gears. Canary rockfish are distributed from nearshore areas as juveniles out to about 150 fm as adults and are found at times suspended off the bottom or in atypical soft-bottom habitats for rockfish.

Management of canary rockfish under the harvest rates specified in the current rebuilding plan has been difficult and OYs have been exceeded in three of the last eight years. The canary rockfish cumulative OY over the period 2000-2007 has been exceeded by 14%. This overage was due primarily to an excess harvest of 40 mt in 2001, when constraints on the groundfish fishery were first being imposed. Tailoring the management regime to stay within the low harvest rates specified for canary and other depleted rockfish has been an evolutionary process of adaptive management. Better impact modeling with an increasing sample of depth-based discard rates from the WCGOP, gear restrictions, capacity reduction of the limited entry trawl fleet, educational outreach to anglers to avoid canary and other depleted rockfish, restrictive limits and non-retention regulations, and, most importantly, depth-based RCA management have all contributed to improved performance of the management regime in managing canary rockfish.

Canary rockfish are not allowed to be retained in commercial and recreational hook and line or fixed gear fisheries and a small, incidental landing limit is allowed in the limited entry trawl fishery to account for unavoidable incidental bycatch. Mandating the use of the selective flatfish trawl shoreward of the RCA north of 40°10' N latitude has helped reduce trawl bycatch. Attempts to test the benefit of selective flatfish trawls south of 40°10' N latitude through implementation of EFPs have not been successful due to lack of participation under the EFP. Nevertheless, while these trawls are legal small footrope gear in the south and are volitionally used, experience with these trawls in the north compels consideration of mandating their use shoreward of the RCA south of 40°10' N latitude. At-sea monitoring of their efficacy in southern fisheries through the WCGOP may eventually confirm their expected rockfish bycatch reduction in the south, and allow NMFS to model the reduced bycatch. Midwater trawls also catch canary rockfish. The directed midwater trawl fishery for yellowtail rockfish was discontinued in 2002 due to high bycatch of canary and widow rockfish. The midwater trawl fishery for whiting, which is not currently restricted in the trawl RCA, also catches canary rockfish. Implementation of a canary rockfish bycatch cap, where, if attained, the non-tribal fishery would close inseason even if whiting quotas have not been attained, has successfully reduced canary rockfish mortality. This strategy works for the whiting fishery because of near real-time bycatch reporting and open communication to the rest of the fleet when bycatch of canary occurs in any one area.

Use of broad based RCA configurations has had the most effect in reducing canary rockfish mortality and the concept of depth-based RCA management was largely compelled by this need. Figure 4-2 shows the catch per tow of canary rockfish in the NMFS bottom trawl survey, which can be used as an index of the stock’s depth and latitudinal distribution. While there are some instances of canary rockfish occurring south of Pt. Conception at 34°27' N latitude, they are largely distributed north of Conception with the greatest density in northern waters off Washington. They are most often found in depths from 50-100 fm, but they can occur in the 27-460 fm depth range (although they infrequently occur deeper than 250 fm). The core depth range of the trawl RCA is 100-150 fm, with both shoreward and seaward extensions of the RCA boundaries depending on seasonal conservation needs (canary rockfish and other depleted species tend to make seasonal shoreward-seaward migrations with more shallow distributions in the summer months). Most of the incidental trawl take of canary rockfish occurs shoreward of the RCA since the seaward boundary is often extended out to 200 fm to reduce mortality of darkblotched and POP. The non-trawl RCA extends out to 100 fm north of Cape Mendocino and 150 fm south. Most of the incidental non-trawl take of canary rockfish occurs seaward of the RCA in the north. More discrete area closures, such as those used to reduce mortality of cowcod and yelloweye rockfish, may also help reduce canary mortality, but will likely prove to be less effective for canary rockfish due to their mobility and apparent lack of site fidelity.

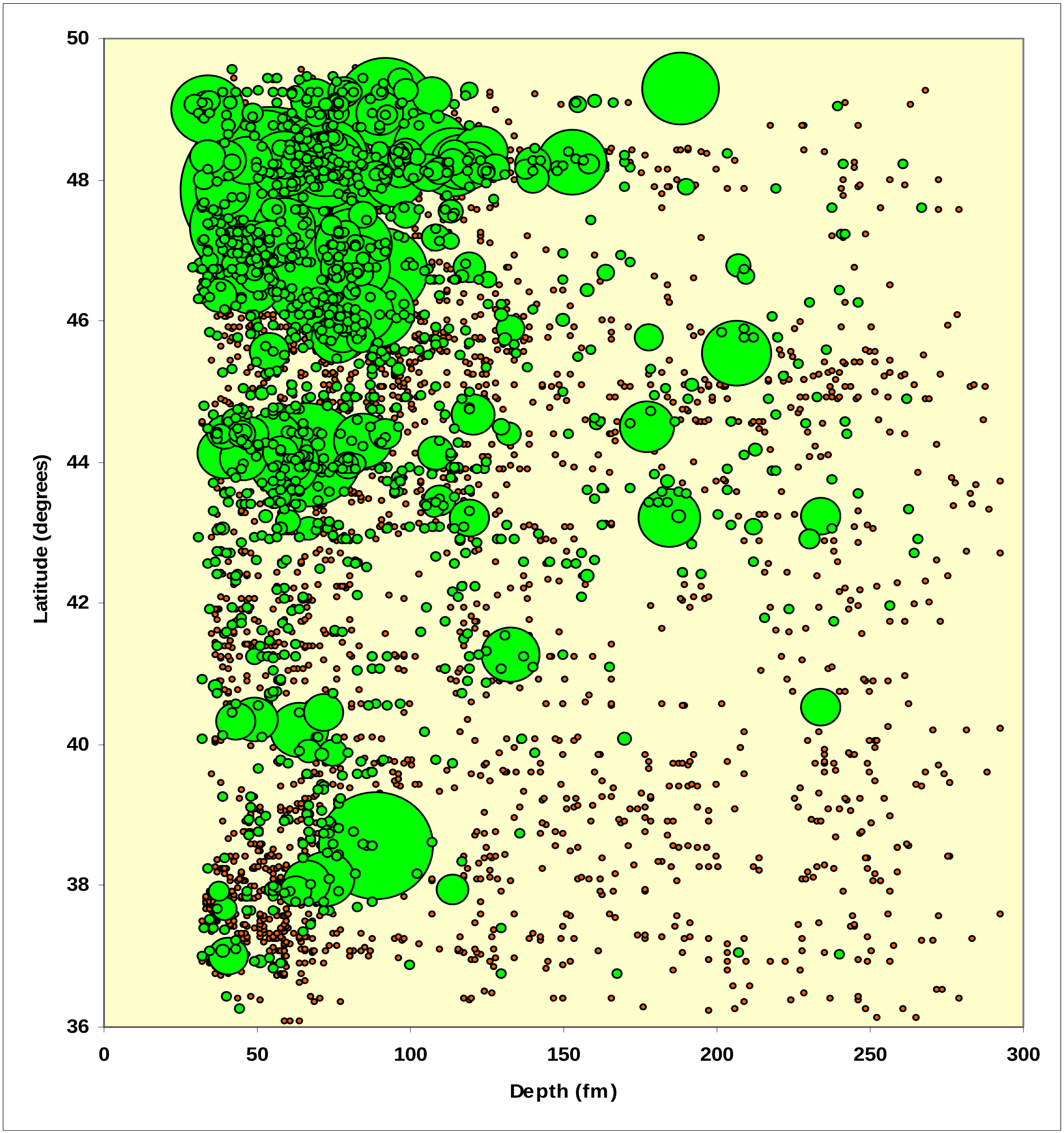


Figure 4-2. Catch per tow of canary rockfish in the NMFS triennial bottom trawl survey by latitude and depth (shaded circles are positive tows with their size proportional to CPUE, empty circles are negative tows).

Rebuilding Progress of Canary Rockfish

Canary rockfish have shown significant rebuilding progress since being declared depleted in 2000 (Figure 4-3). Spawning stock biomass has gone from a minimum depletion rate of 12.9% of unfished biomass in 1994 to 32.4% in 2007 (Stewart 2008b).

Following the 1999 assessments that provided the basis for the declaration that the coastwide canary rockfish stock was depleted, the canary OY was reduced by over 70% in 2000 and by the same margin again over the next three years. Managers employed several tools in an effort to constrain catches to these dramatically lower targets. These included: reductions in trip/bag limits for canary and co-occurring species, the institution of spatial closures, and new gear restrictions intended to reduce trawling in rocky shelf habitats and the coincident catch of rockfish in shelf flatfish trawls. Over that period, the total mortality was near the OY, and well below the ABC. The total 8-year catch was only 14% above the sum of the OYs for 2000-07. This level of removals represents only 35% of the sum of the ABCs for that period.

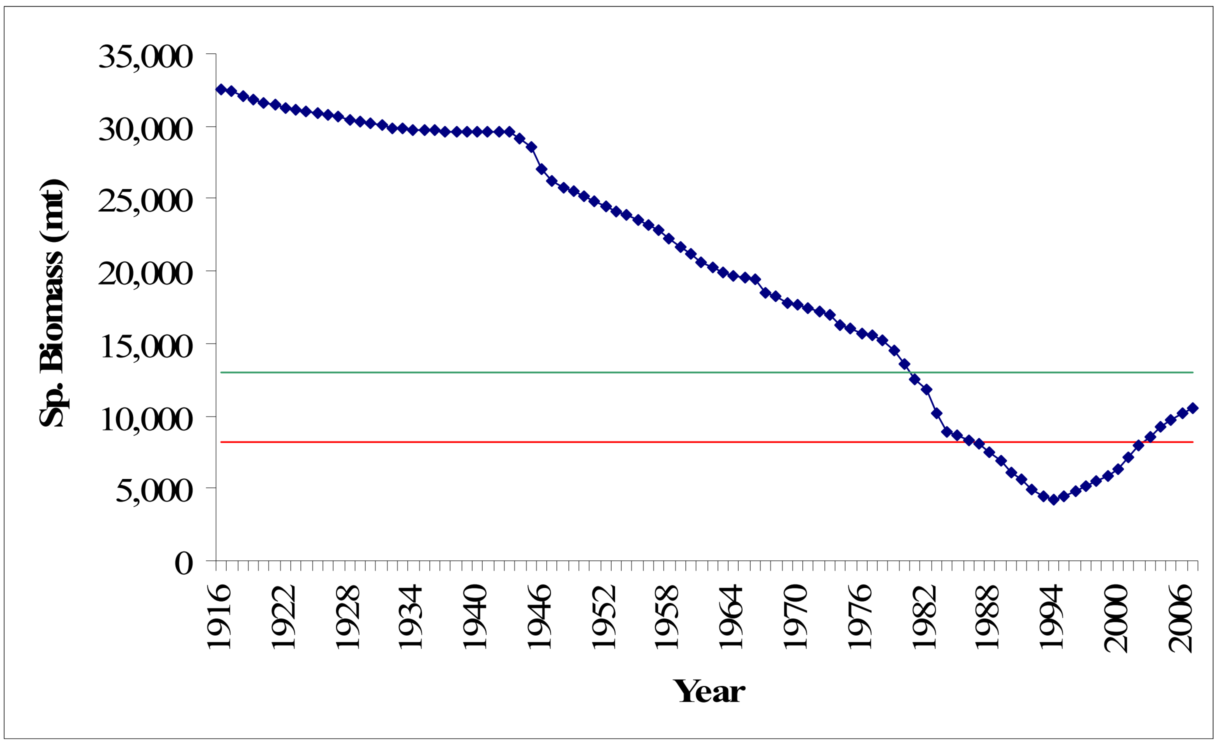


Figure 4-3. Time series of canary rockfish spawning stock size relative to the FMP biomass thresholds for depletion ($B_{25\%}$) and B_{MSY} ($B_{40\%}$).

Evaluation of 2009-2010 Canary Rockfish OY Alternatives

Table 4-5 shows the results of the evaluation of alternative canary rockfish OYs analyzed for 2009-10 using the criteria described in Section 4.2. The canary rockfish OY evaluation has a mixed to high score using these criteria. A relatively low score is assigned using the catch monitoring uncertainty criterion; a relatively moderate score for the rebuilding probability criterion, and relatively high scores for the assessment uncertainty, stock depletion, and extended duration of rebuilding criteria.

Total catch monitoring of canary rockfish is relatively uncertain, particularly since there is a significant portion of the total annual catch taken in recreational fisheries (Tables 4-1, 4-2 and 4-3). Precautionary management of recreational fisheries to stay within the canary OYs and harvest guidelines analyzed in this EIS will continue to be a predominant theme in rebuilding this stock and managing west coast fisheries in the coming years.

The canary rockfish OYs considered for 2009-10 are based on a relatively certain stock assessment, despite the fact that recent recruitments are unknown due to a lack of recent fishery-dependent information since the fishery has been structured to avoid canary. It is also recognized the bottom trawl surveys may not provide an adequate index of abundance for shelf rockfish. For canary rockfish, the particular concern is that the level of stock depletion in trawlable habitat may not be reflective of overall population status. However, the historical data inputs to the assessment are more certain than for many of the other west coast stocks and the 2007 assessment received a particularly high level of scientific scrutiny.

The level of spawning stock depletion of canary rockfish, at 32.4%, rates as the one of the highest depletion levels of all the depleted species analyzed in this EIS, second only to widow rockfish at 35.5%. A higher depletion (i.e., a spawning biomass closer to the target biomass, B_{MSY}) suggests higher OYs may be less risky than for stocks that are more severely depleted. However, some caution is still warranted given that a change in the assumed steepness (h) of the stock-recruit function in the 2007 assessment is a significant factor in this more optimistic outlook.

Rebuilding probabilities (P_{MAX}) for alternative canary rockfish OYs analyzed from 0 to 155 mt are all relatively modest at 75%. While these probabilities infer slightly more risk associated with OY alternatives for the most productive depleted species (i.e., widow), it also infers no difference in relative risk across the range of canary OYs analyzed.

The estimated median year to rebuild the canary rockfish stock under the zero-harvest alternative is 2019. An additional year of rebuilding is predicted under the harvest rates used to determine the No Action Alternative and OY Alternatives 1-4 (i.e., 2009-10 OYs of 35-85 mt) an additional two years relative to the zero-harvest alternative under the harvest rates used to determine OY Alternative 5 (2009-10 OY of 105 mt; Final Pref. OY Alt.) and 6 (i.e., 2009-10 OY of 155 mt). The tradeoff in canary OY vs. rebuilding duration across the range of OYs analyzed in this EIS is therefore relatively insignificant, spanning two years between eliminating all fishing-related mortality beginning in 2009 to maintaining the status quo harvest rate in the current rebuilding plan (155 mt in 2009-10).

Table 4-5. Evaluation of alternative 2009-10 canary rockfish OYs relative to the criteria described in Section 4.2.

Evaluation Criteria	OY (mt)							
	Biennial OYs	**No Action OY Alt.**	**OY Alt. 1**	**OY Alt. 2**	**OY Alt. 3**	**OY Alt. 4**	**Final Pref. OY Alt. 5**	**OY Alt. 6**
	Yr. 1	44	0	35	44	85	105	155
	Yr. 2	44	0	35	44	85	105	155
Catch monitoring uncertainty	High uncertainty due to a significant recreational catch component.							
Assessment Uncertainty	Relatively certain due to generally good data quality and consistency.							
Stock depletion	32.4%							
Rebuilding Probability (P_{MAX})		75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Rebuilding Duration Beyond $T_{F=0}$ (yrs.)		1	0	1	1	1	2 a/	2

a/ The stock is predicted to rebuild by 2020 under this harvest rate, or one year longer than $T_{F=0}$. However, the Council's preferred decision on a target rebuilding year is 2021, or two years longer than $T_{F=0}$.

Cowcod

Rebuilding Strategies for Cowcod

The prevailing management strategy for rebuilding cowcod is complete avoidance and allowing fisheries with only a "de minimis" fishing-related mortality. Historically, cowcod, due to their large size and superior flesh quality, were targeted in commercial and recreational fisheries. Non-retention regulations have been implemented for all west coast fisheries to eliminate any possible targeting. Most importantly, all the critical cowcod habitat known through area-specific fishery information and other site-specific survey data have been closed to any type of bottom fishing that might take cowcod. These critical habitats are encompassed in two areas in the Southern California Bight south of Point Conception called the Cowcod Conservation Areas (CCAs, Figure 2-5). Area management is a particularly effective strategy for protecting cowcod given their sedentary life style and site fidelity. Dick et al. (2008) determined these management measures have been effective in keeping total mortality well under the low OYs used to manage this stock since the implementation of the CCAs and no retention regulations in 2001.

Rebuilding Progress of Cowcod

Rebuilding progress for cowcod has been slight since the stock was declared depleted in 2000 (Figure 4-4). A very slow, gradual rebuilding trajectory has been projected for cowcod since the first rebuilding plan in 2000 (Butler and Barnes 2000) due to the very low growth rate and low potential productivity of the stock. The cowcod spawning stock has exhibited some rebuilding progress though, increasing from an estimated minimum depletion of 1.5% in 1989 to 3.8% in 2007 (Dick, Ralston, and Pearson 2008). However, this is still the most depleted groundfish stock assessed on the west coast.

Management performance under cowcod rebuilding has been consistently good. Total fishing-related mortality of cowcod has been well below rebuilding OYs, 45% below the cumulative OY (2000-07) since rebuilding measures were first implemented.

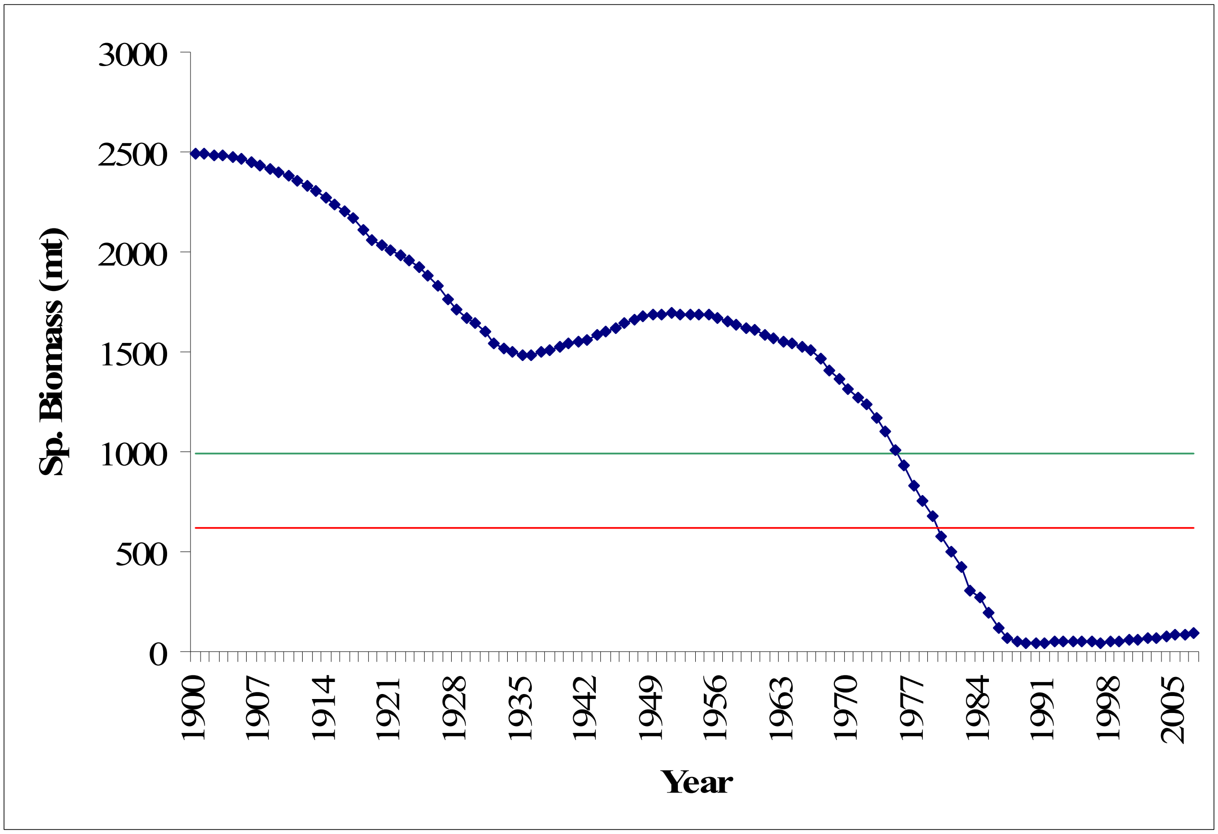


Figure 4-4. Time series of cowcod spawning stock size relative to the FMP biomass thresholds for depletion ($B_{25\%}$) and B_{MSY} ($B_{40\%}$).

<u>Evaluation of 2009-2010 Cowcod OY Alternatives</u>

Table 4-6 shows the results of the evaluation of alternative cowcod OYs analyzed for 2009-10 using the criteria described in Section 4.2. A low score is assigned using all the OY evaluation criteria. This is the most depleted assessed groundfish stock on the west coast with the longest rebuilding trajectory, which is why the range of OY alternatives considered is necessarily narrow and minimal (0-4 mt).

OY Alternative 2 (2 mt in 2009 and 2010) maintains the current SPR harvest rate and extends rebuilding 4 years beyond $T_{F=0}$. This compares to the preliminary preferred OY Alternative 3 (3 mt in 2009 and 2010) and the final preferred OY Alternative 4 (4 mt in 2009-10), which extend rebuilding 8 and 11 years beyond $T_{F=0}$, respectively. The Council selected OY Alternative 4 rather than OY Alternative 3 as their final preferred alternative because the lower OY of 3 mt risked a significantly higher impact on California coastal fishing communities since California recreational and groundfish trawl fisheries could be significantly constrained under a 3 mt OY. The revised cowcod rebuilding plan recommended by the Council is similar to the original rebuilding plan adopted prior to Amendment 16-4, which had a target rebuilding year of 2090 and which compares to 2072 in the Council-preferred alternative.

Table 4-6. Evaluation of alternative 2009-10 cowcod OYs relative to the criteria described in Section 4.2.

Evaluation Criteria	OY (mt)					
	Biennial OYs	**No Action OY Alt.**	**OY Alt. 1**	**OY Alt. 2**	**Prelim. Pref. OY Alt. 3**	**Final Pref. OY Alt. 4**
	Yr. 1	4	0	2	3	4
	Yr. 2	4	0	2	3	4
Catch monitoring uncertainty	Very high uncertainty due to a paucity of at-sea observations.					
Assessment Uncertainty	Very high uncertainty due to poor data quality.					
Stock depletion	3.8%					
Rebuilding Probability (P_{MAX})		66.2%	78.4%	72.4%	72.4%	66.2%
Rebuilding Duration Beyond $T_{F=0}$ (yrs.)		11	0	4	8	11

Darkblotched Rockfish

Rebuilding Strategies for Darkblotched Rockfish

Darkblotched rockfish are caught almost exclusively by groundfish trawl gear and predominantly bottom trawls operating on the outer continental shelf and slope north of 38° N latitude between 100 and 200 fm (Figure 4-5). The two most significant strategies used to control darkblotched fishing mortality are limited entry trawl trip limits for the southern and northern minor slope rockfish complexes, the complexes in which darkblotched are managed, and implementation of the trawl RCA, where modifications to the seaward boundary tend to have the greatest effect on darkblotched take.

Area management beyond adjustment of the seaward boundary of the trawl RCA may be an effective rebuilding strategy for darkblotched rockfish. Figure 4-5 indicates an apparent clustered distribution of darkblotched as evidenced by area-specific catch per tow data in past NMFS trawl surveys. While the clustered distribution of darkblotched in Figure 4-5 is informative, the apparent distribution is also affected by the survey sampling regime in that not all of the combined survey data is shown, zero-catch hauls are not shown, and the depths and latitudes sampled by all surveys have been irregular over time. In 2004, observers noted two very large catches (8,000-15,000 lbs), which were partially discarded (Rogers 2006). They were both from an area that also had large survey catches at approximately 40.5° N latitude in 200 fm (Figure 4-5). These large catches tended to contain larger than average fish (Rogers 2006). Closure of those areas might provide additional darkblotched conservation benefits.

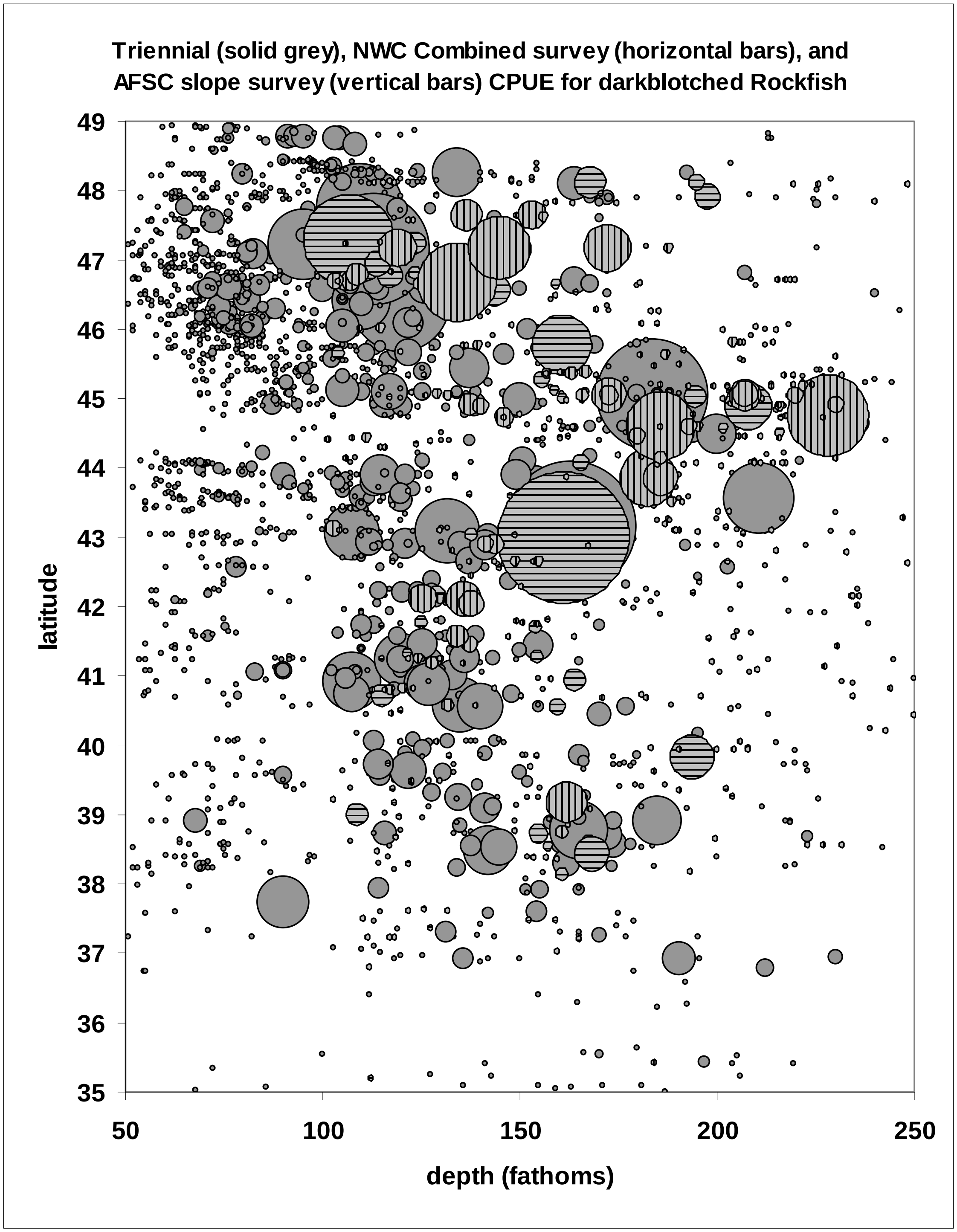


Figure 4-5. Index of west coast distribution of darkblotched rockfish by latitude and depth as determined by catch per tow in NMFS trawl surveys. Size of circle is proportional to darkblotched rockfish density at that location. Data from NWFSC's West Coast Groundfish Survey Database and the AFSC Triennial Shelf and Slope Survey Database.

Rebuilding Progress of Darkblotched Rockfish

Rebuilding progress for darkblotched rockfish as been significant since the stock was declared depleted in 2001 (Figure 4-6). The spawning stock has increased 85% since its lowest estimated abundance in 1999 and depletion has trended from a low of 10.4% of unfished in 2000 to 22.4% in 2007.

While the annual OY has been exceeded since the implementation of rebuilding measures, total catches have been 97% of the cumulative OY over the rebuilding period (2001-07).

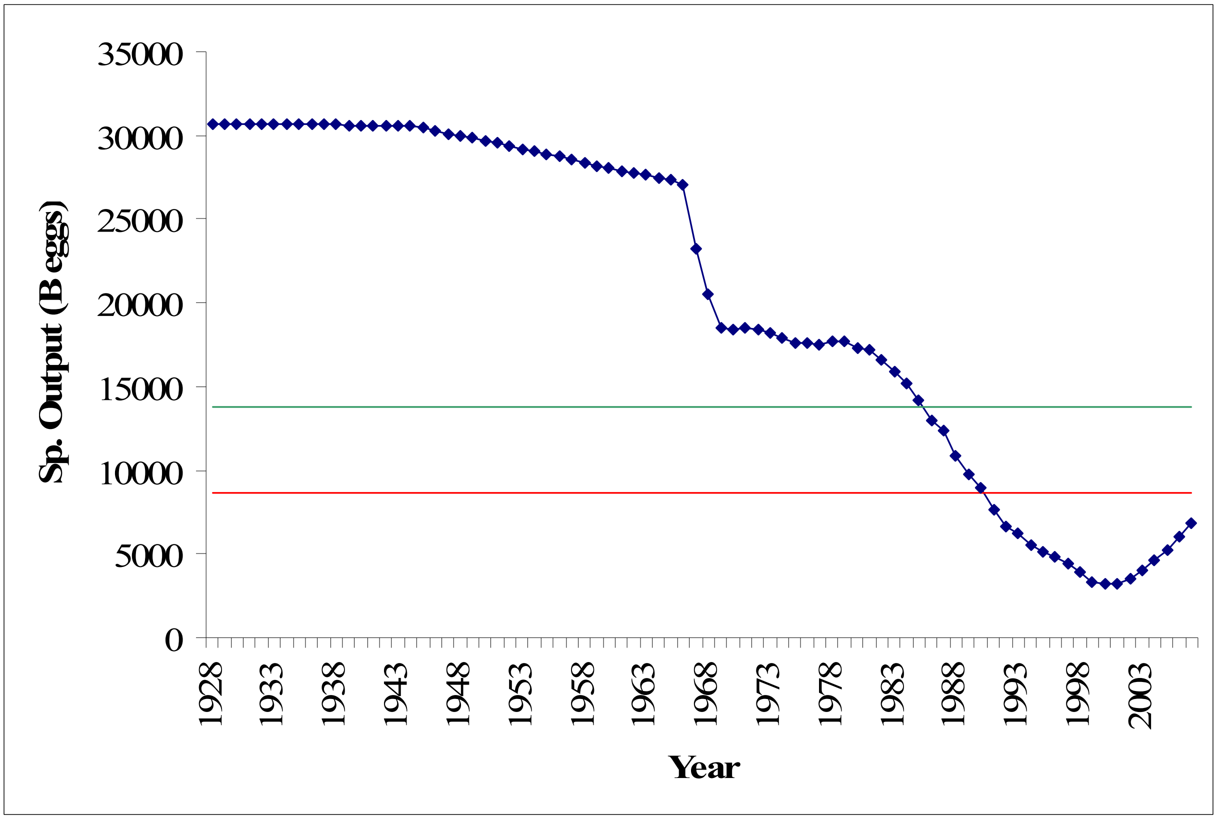


Figure 4-6. Time series of darkblotched rockfish spawning stock size relative to the FMP biomass thresholds for depletion ($B_{25\%}$) and B_{MSY} ($B_{40\%}$).

Evaluation of 2009-2010 Darkblotched Rockfish OY Alternatives

Table 4-7 shows the results of the evaluation of alternative darkblotched rockfish OYs analyzed for 2009-10 using the criteria described in Section 4.2. The darkblotched rockfish OY evaluation has a mixed score using these criteria. Moderate scores are assigned to the evaluation of assessment uncertainty, stock depletion, rebuilding probability, and extended duration of rebuilding criteria; while a relatively high score is assigned the evaluation of the catch monitoring uncertainty criterion.

Catch monitoring of darkblotched rockfish is relatively certain since the limited entry bottom trawl fishery takes the vast majority of the total annual take while targeting DTS and flatfish species on the slope. Estimation of at-sea discards of darkblotched and other species in the trawl fishery has become increasingly certain with the increased number of observations from the WCGOP.

As in other west coast groundfish assessments, there is considerable assessment uncertainty associated with fixed and estimated parameters including natural mortality and steepness. However, this is not a data-poor assessment and receives a moderate rank for assessment uncertainty.

The level of darkblotched stock depletion, at 22.4%, is considered a relatively moderate level of depletion. While the stock has performed well under rebuilding, depletion is still below the depletion threshold.

Rebuilding probabilities are relatively high for the lower OY alternatives analyzed (91%-100% for OY alternatives 1-3). The preliminary preferred OY Alternative 4 has a moderate P_{MAX} of 76.7%. While the rebuilding probability for the preliminary preferred OY alternative is higher than that for the No Action Alternative, the evaluation of this criterion indicates a moderate level of rebuilding risk.

The extended duration of rebuilding criterion receives a moderate score based on the moderate rebuilding periods associated with alternative darkblotched OYs of 0-12 years beyond $T_{F=0}$ for OY Alternatives 1-5. The final preferred OY Alternative rebuilds faster than the No Action OY Alternative and preliminary preferred OY Alternative 5, but extends rebuilding 3 years longer than OY Alternative 3, 6 years longer than OY Alternative 2, and 10 years longer than the zero-harvest rebuilding alternative.

The Council's final preferred darkblotched OY alternative is based on a GMT recommendation made at the June 2008 Council meeting. Specifically, the GMT recommended consideration of a higher widow rockfish OY and a lower darkblotched OY than was recommended as preliminary preferred OY alternatives for both species. This tradeoff was recommended because there would be no projected difference in the time to rebuild for widow rockfish with faster rebuilding of darkblotched. This recommendation acknowledged a direct tradeoff in the whiting trawl fishery whereby a higher bycatch allowance for widow rockfish would allow the whiting fishermen to adjust their fishing strategy to further reduce their bycatch of darkblotched rockfish. See section 4.5.1.2 for more details on this recommendation.

Table 4-7. Evaluation of alternative 2009-10 darkblotched rockfish OYs relative to the criteria described in Section 4.2.

Evaluation Criteria	OY (mt)						
	Biennial OYs	No Action OY Alt.	OY Alt. 1	OY Alt. 2	OY Alt. 3	Final Pref. OY Alt. 4	Prelim. Pref. OY Alt. 5
	Yr. 1	290	0	159	229	285	300
	Yr. 2	330	0	165	235	291	306
Catch monitoring uncertainty	Relatively certain due to a predominant trawl catch component.						
Assessment Uncertainty	Moderate uncertainty due to data inconsistency (ageing uncertainty).						
Stock depletion	22.4%						
Rebuilding Probability (P_{MAX})		<76.7%	100.0%	97.7%	91.0%	80.3%	76.7%
Rebuilding Duration Beyond $T_{F=0}$ (yrs.)		>12	0	4	7	10	12

Pacific Ocean Perch

Rebuilding Strategies for Pacific Ocean Perch

Pacific ocean perch have been under rebuilding since 1981. The population off the northern U.S. west coast (Columbia and U.S.-Vancouver areas) is at the southern extreme of the stock and rebuilding potential may be more affected by mortalities in waters north of the U.S./Canada border. Nevertheless, the trawl RCA configuration used to reduce darkblotched mortalities, which has been the more constraining stock in slope trawl fisheries since implementation of rebuilding measures in 2001, has significantly reduced POP mortalities. Continued use of RCA management coupled with precautionary slope rockfish trawl trip limits may be the most effective combination of strategies available to the Council and NMFS for rebuilding this stock. Given the stock's overall distribution in the Northeast Pacific, a collaborative U.S./Canada research and management plan needs to be explored.

Rebuilding Progress of Pacific Ocean Perch

Rebuilding progress of POP has been moderate with a 48% increase in spawning biomass since the stock's lowest abundance in 1996 (Figure 4-7). The depletion has increased from a low of 18.5% in 1996 to 27.5% in 2007.

Total catches of POP have remained below rebuilding OYs during the course of rebuilding since the stock was declared depleted in 1999. Total cumulative catch during 2000-06 has been 42% of the cumulative OYs during this rebuilding period.

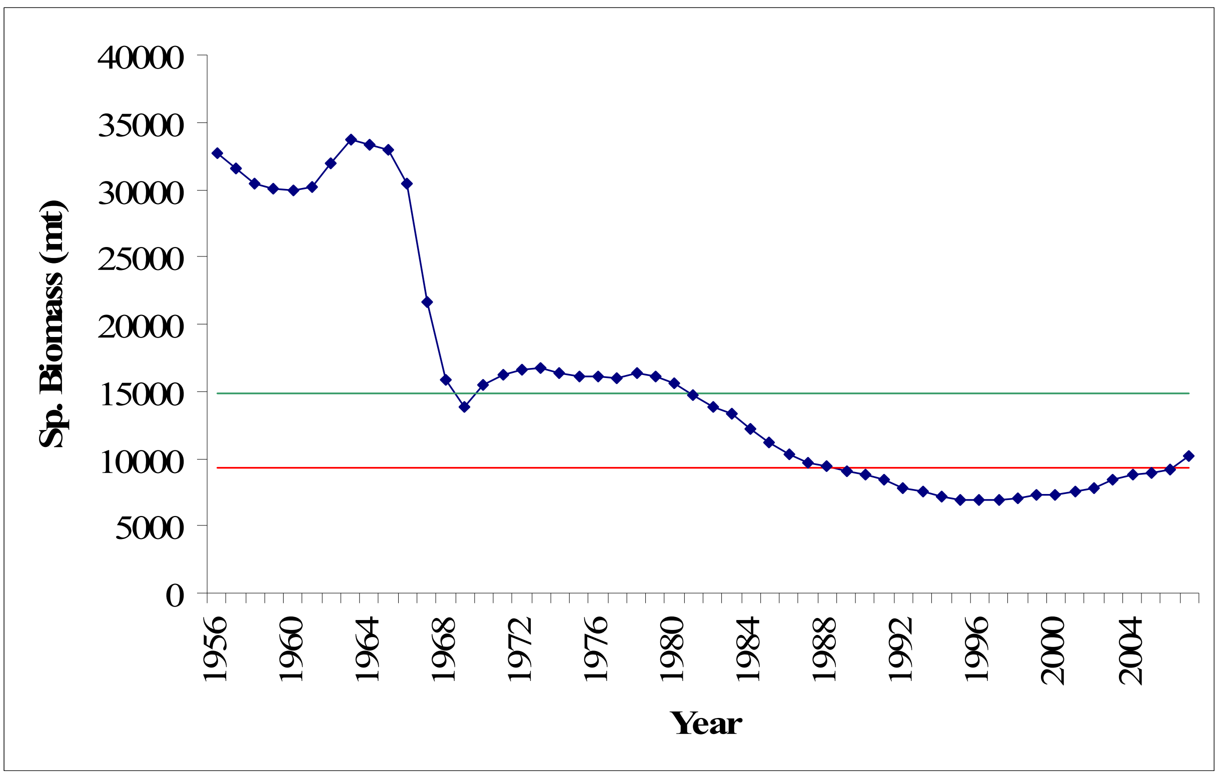


Figure 4-7. Time series of Pacific ocean perch spawning stock size relative to the FMP biomass thresholds for depletion ($B_{25\%}$) and B_{MSY} ($B_{40\%}$).

Evaluation of 2009-2010 Pacific Ocean Perch OY Alternatives

Table 4-8 shows the results of the evaluation of alternative POP OYs analyzed for 2009-10 using the criteria described in Section 4.2. The POP OY evaluation has a relatively high score using these criteria, with high scores for all criteria except stock depletion, which was assigned a moderate score.

Both catch monitoring uncertainty and assessment uncertainty are relatively low for this species given the fact that the vast majority of total fishing-related mortality occurs in limited entry bottom trawl efforts.

Stock depletion is 27.5%, while higher than all the depleted species except canary and widow, is only barely above the depletion threshold. A moderate score for this criterion is therefore warranted.

Rebuilding probabilities are high for all the OY alternatives with the lowest P_{MAX} being 94.4%. This criterion receives a high score and all the OYs within the range analyzed are considered relatively risk-averse.

A high score was also assigned to the extended duration of rebuilding criterion with only a year of extended rebuilding for the No Action Alternative, OY Alternative 3, and the preferred OY Alternative 4 relative to $T_{F=0}$.

Table 4-8. Evaluation of alternative 2009-10 Pacific ocean perch OYs relative to the criteria described in Section 4.2.

Evaluation Criteria	OY (mt)					
	Biennial OYs	**No Action OY Alt.**	**OY Alt. 1**	**OY Alt. 2**	**OY Alt. 3**	**Final Pref. OY Alt. 4**
	Yr. 1	150	0	130	164	189
	Yr. 2	150	0	137	173	200
Catch monitoring uncertainty	Relatively certain due to a predominant trawl catch component.					
Assessment Uncertainty	Relatively certain due to generally good data quality and consistency.					
Stock depletion	27.5%					
Rebuilding Probability (P_{MAX})		>95.0%	100.0%	95.6%	95.0%	94.4%
Rebuilding Duration Beyond $T_{F=0}$ (yrs.)		1	0	0	1	1

Widow Rockfish

Rebuilding Strategies for Widow Rockfish

The Council chose to eliminate the non-tribal midwater trawl fishery targeting yellowtail and widow rockfish in 2003 to reduce widow rockfish exploitation (PFMC 2003b). The WDFW sponsored a midwater trawl EFP in 2002 and 2003 to attempt to shape a fishery that effectively targeted yellowtail while avoiding widow. However, this EFP was discontinued prematurely in 2003 because about 28 percent of the catch was widow rockfish (B. Culver, personal communication). There is still a tribal midwater trawl fishery that targets yellowtail rockfish, but incidentally catches some widow rockfish.

The 2005–06 limits for this fishery were a fleet-wide (the Makah Tribe was the only tribe prosecuting a midwater trawl fishery) cumulative landing limit of 180,000 lbs of yellowtail rockfish/two months. Widow rockfish landings were limited to 10 percent 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. Management of the tribal midwater trawl fishery is designed to minimize impacts to canary and widow rockfish through avoidance. Observer data is analyzed daily and vessels are told which areas to avoid when these species are encountered.

The Council also chose to manage widow rockfish bycatch beginning in 2004 by precautionary management of midwater trawl fisheries that target Pacific whiting. This has traditionally been the fishery with the greatest incidental bycatch of widow rockfish, excluding the directed yellowtail/widow midwater trawl fishery which was discontinued in 2002. While the shoreside whiting sector has exhibited a clear recent trend of reduced widow rockfish bycatch, widow bycatch in the at-sea sectors has been more random. All whiting trawl sectors showed a significant decrease in widow rockfish bycatch in 2003 (Figure 4-8). The at-sea vessels receive daily reports of bycatch by vessels in their fishery, where there is 100 percent observer coverage, and actively avoid areas where there has been a high bycatch of salmonids, widow, and yellowtail rockfish. Another contributing factor to the lower widow bycatch in 2003 was a significantly increased abundance of whiting in 2003 which resulted in shorter tows to fill trawls. In years when whiting are less abundant and more dispersed, widow bycatch can become an increasing concern as vessels extend their search for whiting schools and have longer tow times (D. Myer, personal communication). Shorter tows on aggregated whiting schools would sensibly reduce widow bycatch since whiting tows are made in daylight hours when widow rockfish are dispersed. There was also a greater abundance of whiting off the north Washington coast in 2003 that kept at-sea whiting vessels more northerly and away from Oregon and southern Washington coastal areas where widow are more abundantly distributed.

In recent years, the widow bycatch rate in whiting trawl fisheries has increased steadily as widow have become more abundant (Figure 4-8). The whiting fishery was prematurely closed early in 2007, before whiting quotas were caught by the shoreside and catcher-processor sectors because the whiting bycatch limit was exceeded. The fishery was able to proceed later in the year since there was still available widow yield and the OY was not exceeded (Table 4-3). This experience highlighted the need for improvements in bycatch limit management and total catch monitoring in the whiting fishery and led the Council to recommend analysis of many of the alternative whiting fishery management measures described in section 2.2.4.2.

Figure 4-8. Annual widow rockfish bycatch rate by non-tribal whiting fishery sector from 2004 to 2007 (prior to the early closure on July 26).

In recent years, the GMT has recommended consideration of the following management strategies to reduce widow rockfish bycatch in whiting fisheries: 1) a precautionary reduction in whiting OYs, 2) hard widow rockfish bycatch caps by sector in the whiting fisheries or a hard cap imposed for all sectors combined, 3) establishing avoidance strategies by timely reporting of widow bycatch rates by area that would compel the fleet to move away from such areas, and 4) prohibiting the whiting fishery in areas of highest widow rockfish densities.

As stated above, the Council has elected to specify hard widow rockfish bycatch caps on the non-tribal sectors of the whiting fishery. It is noted that the majority of widow rockfish bycatch in whiting fisheries occurs infrequently in "disaster tows" that may be due to inexperience on the part of the skipper or an unpredictable encounter. Since each sector has a different season, it is conceivable that one sector could pre-empt fishing opportunities for another by experiencing a few “disaster tows.” Originally, in 2004, the Council recommended hard bycatch caps for both canary and widow rockfish for all whiting sectors combined, including the tribal sector. However, in 2005, these hard caps were adjusted and implemented only for the non-tribal shoreside and at-sea sectors combined. The specified widow rockfish bycatch cap was originally 200 mt, but adjusted inseason to 212 mt. The 2006 cap was set at 200 mt. Managing the whiting fishery with hard bycatch caps has forced active avoidance of widow and has successfully reduced widow bycatch to desired levels. The strategy works due to timely reporting to the rest of the fleet of areas where higher widow bycatch occurred. The at-sea fleets (catcher-processors and motherships) have 100 percent observer coverage. They also have an independent contractor collect at-sea bycatch information daily, who reports back to the fleet when the bycatch of any particular species of concern rises in any one area. The fleet then moves to areas where whiting can be more cleanly targeted.

The shoreside sector has a similar mechanism for minimizing bycatch. This sector has operated under an EFP[6] that mandates full retention of species and landing of all the catch. This allows full sampling of the total catch upon landing. The buyer reports back to the fleet if a landing from a particular area shows a higher than desired bycatch. However, catch can be discarded at sea if landing the bag poses an immediate threat to vessel safety. Since the shoreside fleet does not operate with 100 percent observer coverage, there may be an incentive to discard at sea if a larger than expected bycatch of widow rockfish occurs. The NMFS started placing cameras on all shoreside whiting vessels in 2004 as an experimental effort to determine if discarding occurs on otherwise unobserved trips. In 2004, a total of 1,003 trips and 1,030 sets were observed using deck-mounted cameras. Non-retention occurred in 19 percent of sets observed. Most of this non-retention was from fish bled from the codend of the trawl, although some discard occurred from fish dumped off the deck. Most of the observed discards occurred during the last haul of the trip and most discards were < 45 kg total estimated weight. Starting in 2006, camera monitoring is mandated in the Shoreside Whiting EFP.

An innovative government-industry collaboration coordinated by the NMFS Northwest Fishery Science Center, the Pacific Whiting Conservation Cooperative, and the Fisherman's Marketing Association was launched in 2004 to explore the development of an abundance index methodology specifically for widow rockfish. The goal of this effort was an exploration of non-extractive techniques using acoustics and cameras. This feature was viewed as particularly important owing to the depleted status of this species. As proof of concept, pilot survey work off Newport, Oregon in March 2005 confirmed the ability to reliably locate, observe, and quantitatively measure widow rockfish schools with conventional single frequency fishery acoustics techniques in combination with underwater video cameras. The sites sampled off central Oregon, a subset of those identified by fishermen in the ad hoc working group, were found to contain widow rockfish aggregations, which supports the strategy to rely on use of local fisherman's knowledge of fishing grounds as a sampling framework. The acoustics data collected with the scientific echo-sounder installed on a fishing vessel was of good scientific quality, which allowed a detailed examination of patterns of variability in widow rockfish populations (see report entitled "Update on the Development of a Commercial Vessel-Based Stock Assessment Survey Methodology for U.S. West Coast Widow Rockfish: A Report to the ad hoc Working Group" by P. Ressler, G. Fleischer and V. Wespestad). The success of the pilot work indicated that the acoustic surveys could be a successful monitoring tool but should be expanded to include other study sites along the west coast in order to provide coastwide monitoring of the species. Such research is critical for determining a much needed, reliable index of widow rockfish abundance as the established NMFS bottom trawl is ineffective for this semi-pelagic species and fishery-dependent indices no longer reliably track abundance since the fisheries avoid widow rockfish. A reliable, fishery-independent survey will be a very important contribution to our understanding of stock status and trends, which should lead to better area management strategies for widow rockfish, as well as holding potential for other depleted rockfish.

Rebuilding Progress of Widow Rockfish

Rebuilding progress of widow rockfish has been significant since the stock was declared depleted in 2001 (Figure 4-9). The stock's spawning output has increased by over 13% since the 2003 minimum. The rebuilding outlook is excellent with successful rebuilding (i.e., attainment of the B_{MSY} level) projected for next year over a wide range of harvest rates, including harvest rates much higher than contemplated for 2009-10 management. This outlook is based on confirmed strong year classes entering the spawning population. A retrospective look at depletion indicates the spawning stock reached a minimum depletion of 31.3% in 2003, which is coincidentally above the depletion threshold

[6] Maximized retention is anticipated soon under Amendment 10 rulemaking, obviating the need for an EFP to prosecute full retention rules.

(i.e., the stock was never depleted). Nevertheless, the Council announced in 2006 that it intends to continue managing widow rockfish under the rebuilding plan. Stock depletion is estimated to be 35.5% in 2007, less than 5% below the rebuilding target.

Rebuilding management measures have performed well, with the cumulative total catch during the rebuilding period (2002-07) only 48% of cumulative OYs.

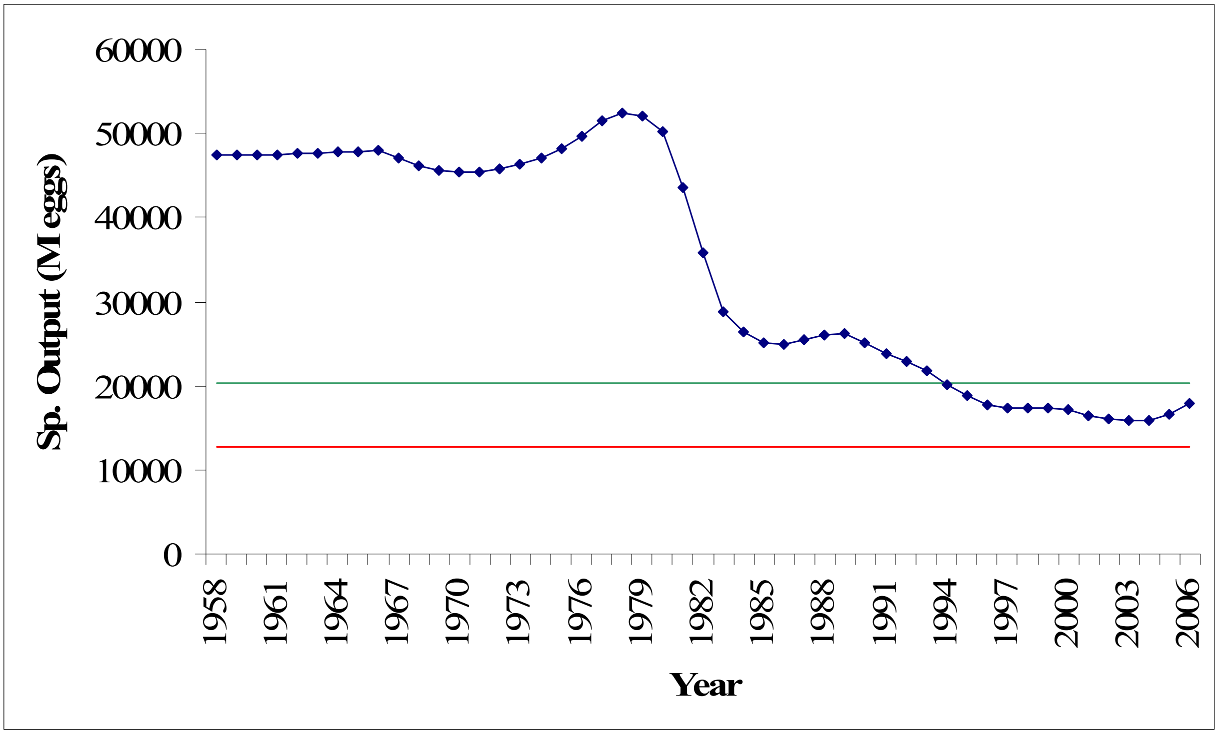


Figure 4-9. Time series of widow rockfish spawning stock size relative to the FMP biomass thresholds for depletion ($B_{25\%}$) and B_{MSY} ($B_{40\%}$).

Evaluation of 2009-2010 Widow Rockfish OY Alternatives

Table 4-9 shows the results of the evaluation of alternative widow rockfish OYs analyzed for 2009-10 using the criteria described in Section 4.2. The evaluation of widow rockfish OY alternatives scored high relative to these criteria, with only the assessment uncertainty criterion rated with a low to moderate score.

Catch monitoring of widow rockfish is relatively certain given that the stock is mostly caught as bycatch in trawl fisheries and is predominantly caught in whiting-directed trawl fisheries where at-sea observation rates are highest on the west coast.

Conversely, the assessment result is relatively uncertain due to the lack of a reliable widow abundance index. In past assessments, widow bycatch in whiting-directed trawl fisheries has been used to understand biomass trends. However, with the need for whiting fleets to reduce their widow bycatch, that index is no longer recommended for assessing stock trends. The promise of an effective and useable hydroacoustic survey index is still many years off. The survey would have to be proven through continued research before managers and scientists invest in these resources. And, if that happens, multiple years of survey data would be needed before temporal biomass trends can be discerned and used in assessment. Therefore, assessment uncertainty is relatively uncertain, which should be considered when the Council determines a final rebuilding plan. (In fact, this uncertainty was taken into account when the Council decided not to pursue "delisting" widow rockfish as an depleted species given the assessment result that the stock never did reach a threshold of depletion below $B_{25\%}$. The Council understood there was very little new data informing this new assessment and acknowledged the uncertainty was too great to depart from the rebuilding plan.)

All of the widow rockfish OY alternatives analyzed in this EIS have P_{MAX} rebuilding probabilities of 100%, indicating the harvest rates used to determine these OYs are risk-averse rebuilding specifications.

The strong, year classes recruiting to the widow rockfish spawning stock are evidenced by the extremely short rebuilding times predicted across a large range of OYs (Table 2-3 and Figure 2-2). All the OY alternatives analyzed are predicted to rebuild in the shortest time possible (2009, as is projected for the zero-harvest alternative).

Table 4-9. Evaluation of alternative 2009-10 widow rockfish OYs relative to the criteria described in Section 4.2.

Evaluation Criteria	OY (mt)					
	Biennial OYs	**No Action OY Alt.**	**OY Alt. 1**	**OY Alt. 2**	**Prelim. Pref. OY Alt. 3**	**Final Pref. OY Alt. 4**
	Yr. 1	368	0	371	475	522
	Yr. 2	368	0	362	475	509
Catch monitoring uncertainty	Relatively certain due to a predominant trawl catch component.					
Assessment Uncertainty	Relatively uncertain due to lack of a reliable abundance index.					
Stock depletion	35.5%					
Rebuilding Probability (P_{MAX})		100.0%	100.0%	100.0%	100.0%	100.0%
Rebuilding Duration Beyond $T_{F=0}$ (yrs.)		0	0	0	0	0

Yelloweye Rockfish

Rebuilding Strategies for Yelloweye Rockfish

Yelloweye rockfish have a similar life history pattern as cowcod. They are sedentary and exhibit more side fidelity than most rockfish species. Prohibiting fishing activities that are prone to catch yelloweye in areas they frequently occur is likely to be one of the best strategies for minimizing total mortality. Broad, depth-based RCAs are effective at reducing fishing-related mortality, and, in fact, the seaward boundary of the non-trawl RCA north of 40º10' N latitude is configured to reduce mortality of yelloweye by fixed gears. However, specific yelloweye RCAs (YRCAs) are likely to be most effective at reducing incidental mortality in hook and line fisheries. Figure 4-10 depicts the relative density of yelloweye by depth and latitude as indicated by catch per tow in west coast trawl surveys. Assuming the composite trawl survey CPUEs accurately represent yelloweye distribution, yelloweye RCAs north of 39º N latitude in depths out to 100-125 fm should provide the most protection for yelloweye against incidental exploitation.

Gear restrictions have been shown to be effective at reducing yelloweye mortality as well. Mandating small footrope and selective flatfish trawls shoreward of the trawl RCA has significantly reduced yelloweye mortality in the trawl fishery.

Yelloweye rockfish are a transboundary stock ranging from the Bering Sea and Gulf of Alaska south to Baja California. On the U.S. west coast the distribution of yelloweye is skewed to the north, with the areas of highest density off the north Washington coast. Canadian fisheries target yelloweye rockfish a few miles north of the U.S.-Canada border, while retention is prohibited in U.S. waters. Without any genetic evidence indicating the Canadians are fishing on a different stock, the close proximity of yelloweye populations in U.S. and Canadian waters infers both nations are fishing on the same stock, but obviously under a different management strategy. Successful rebuilding of yelloweye rockfish may ultimately be most influenced by an international agreement with Canada to develop a joint assessment and management approach. This same reasoning can also be applied to other transboundary stocks under rebuilding such as canary rockfish and POP.

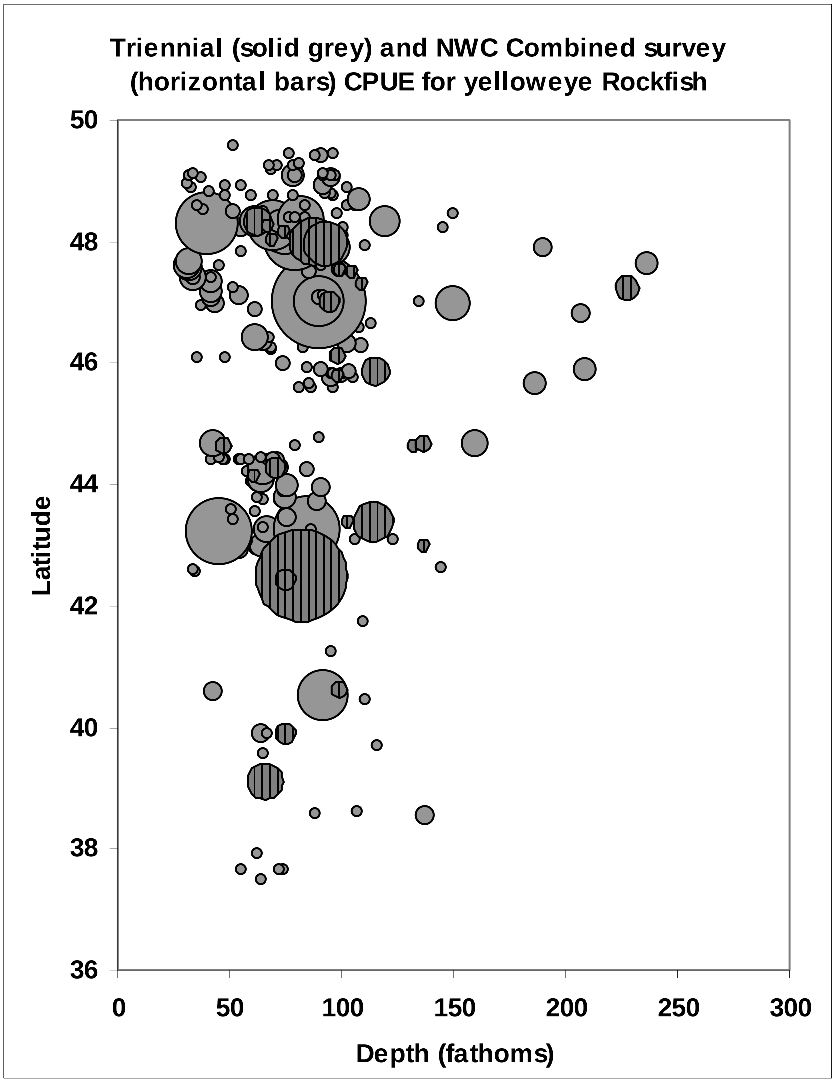


Figure 4-10. Index of west coast distribution of yelloweye rockfish by latitude and depth as determined by catch per tow in NMFS trawl surveys. Size of circle is proportional to yelloweye rockfish density at that location. Data from NWFSC's West Coast Groundfish Survey Database and the AFSC Triennial Shelf and Slope Survey Database.

Rebuilding Progress of Yelloweye Rockfish

Rebuilding progress of yelloweye rockfish has been moderate with spawning stock biomass estimated to have increased by 36% since its low point in 2000 (Figure 4-11). Stock depletion has increased slowly from a low of 12.1% in 2000 to 16.4% in 2007.

Management measures have performed well at staying within rebuilding OYs with total cumulative catch during the rebuilding period (2002-07) at 73% of the cumulative OYs. However, under the status quo harvest rate ramp-down strategy, staying within future OYs without eliminating significant hook-and-line fishing opportunities will be a significant challenge.

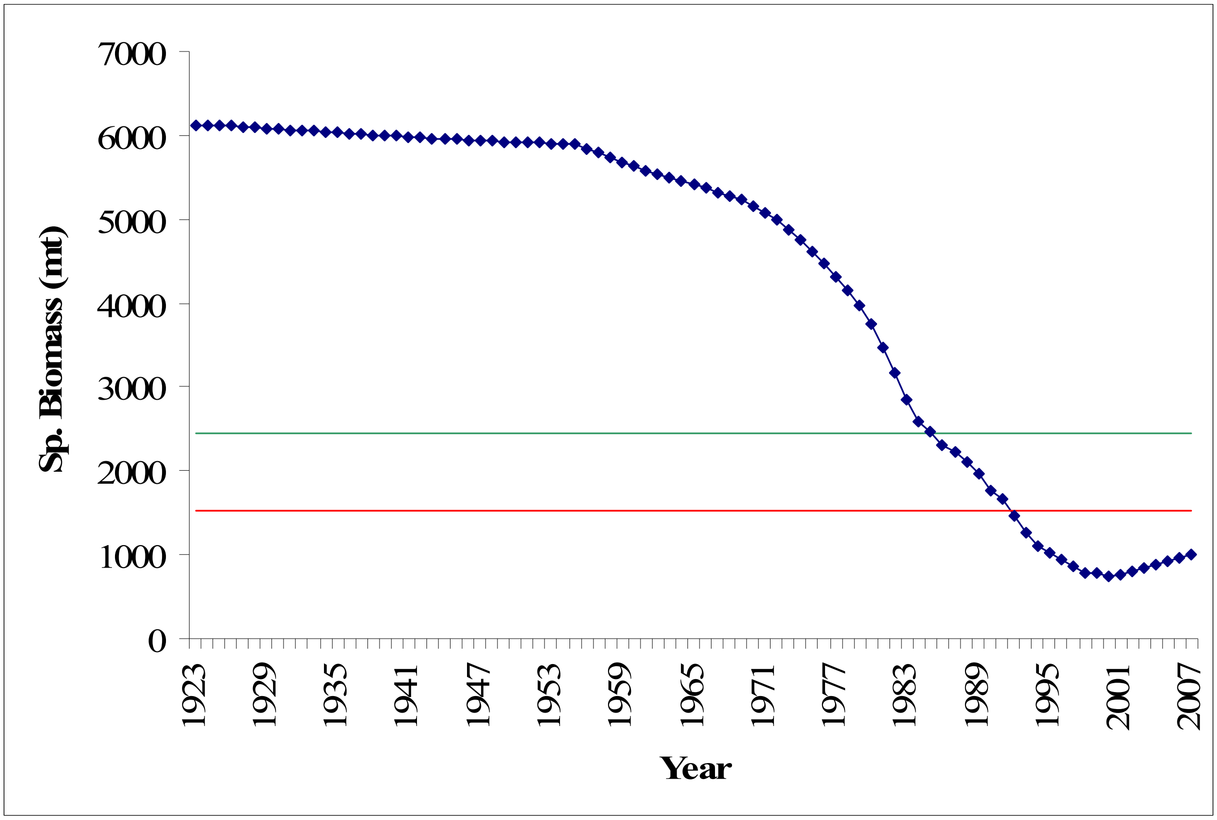


Figure 4-11. Time series of yelloweye rockfish spawning stock size relative to the FMP biomass thresholds for depletion ($B_{25\%}$) and B_{MSY} ($B_{40\%}$).

Evaluation of 2009-2010 Yelloweye Rockfish OY Alternatives

Table 4-10 shows the results of the evaluation of alternative yelloweye rockfish OYs analyzed for 2009-10 using the criteria described in Section 4.2. Low scores were assigned to the alternative OYs using all criteria evaluated.

There is considerable uncertainty in catch monitoring systems for tracking total catches of yelloweye. The sector currently taking the most yelloweye through unavoidable bycatch is the recreational sector targeting groundfish and Pacific halibut and, as pointed out in Section 4.2, recreational catch monitoring is relatively uncertain. However, catch monitoring uncertainty is even more extreme for yelloweye since it is a rare species in the catch for any sector and, of the commercial sectors currently taking yelloweye, the fixed gear fisheries take the most and WCGOP at-sea observations are more sparse for fixed gear fisheries (particularly in the south). Precautionary management is called for with such high catch monitoring uncertainty.

The yelloweye rockfish assessment is also one of the more uncertain assessments done for west coast groundfish since the fishery-dependent catch data are sparse and not well known and there is a significant lack of fishery-independent data in the assessment since bottom trawl surveys do not catch yelloweye particularly well. The assessment is therefore tuned to highly uncertain recreational CPUE indices that may be more affected by past management restrictions and catch monitoring uncertainty than trends in stock biomass. This high uncertainty calls for precautionary management of stock rebuilding since the true state of nature may be more pessimistic (or optimistic) than the current assessment indicates.

Rebuilding probabilities are relatively low for the yelloweye OY alternatives considered for 2009-10, ranging from 100% under the zero-harvest alternative to 50% (the lower legal limit) for OY Alternative 4. These preliminary preferred OY (the status quo ramp-down strategy; 17 mt in 2009 and 14 mt in 2010) has a P_{MAX} of about 69%. This compares to a P_{MAX} <50% under the status quo OY, which is under the lower legal limit.

The relatively low productivity of the west coast yelloweye stock predicts very long rebuilding periods. The shortest possible time to rebuild the stock under a zero-harvest strategy is 2049 (Table 2-3). The harvest rate used to determine OY Alternative 2 (13 mt in 2009 and 14 mt in 2010) and the preliminary preferred OY Alternative 3 is estimated to extend rebuilding an additional 33 years beyond that, while OY alternatives 4 and 5 are estimated to extend rebuilding an additional 41 and 35 years, respectively from $T_{F=0}$.

The Council chose the status quo ramp-down strategy as its preliminary preferred alternative. Their rationale for the ramp-down strategy was the need to overhaul the management regime to accommodate the lower harvest rate and, most notably, determine the best way to manage future commercial and recreational fisheries targeting Pacific halibut, which is where most of the current yelloweye fishing-related mortality occurs. Additionally, the Council wants to collect additional information and better explore available spatial data to determine a potentially more comprehensive and effective area management strategy for reducing yelloweye mortalities. The final preferred OY Alternative 4 is an alternative harvest rate ramp-down strategy that holds the OY constant at 17 mt in 2009 and 2010 before assuming a constant harvest rate strategy. This alternative was considered due to the higher than anticipated yelloweye bycatch in the northern California recreational groundfish fishery in 2007. The rationale for this alternative is CDFG and the Council need more time to determine effective YRCAs to reduce yelloweye bycatch.

Table 4-10. Evaluation of alternative 2009-10 yelloweye rockfish OYs relative to the criteria described in Section 4.2.

Evaluation Criteria	OY (mt)						
	Biennial OYs	**No Action OY Alt.**	**OY Alt. 1**	**OY Alt. 2**	**Prelim. Pref. OY Alt. 3**	**OY Alt. 4**	**Final Pref. OY Alt. 5**
	Yr. 1	23	0	13	17	15	17
	Yr. 2	20	0	14	14	15	17
Catch monitoring uncertainty	Very high uncertainty due to a paucity of at-sea observations and a significant recreational catch component.						
Assessment Uncertainty	Very high uncertainty due to poor data quality.						
Stock depletion	16.4%						
Rebuilding Probability (P_{MAX})		<50%	100.0%	69.5%	68.9%	50.0%	68.9%
Rebuilding Duration Beyond $T_{F=0}$ (yrs.)		>41	0	33	35 a/	41	35 a/

a/ The stock is predicted to rebuild by 2082 under this harvest rate, or 33 years longer than $T_{F=0}$. However, the Council's preferred decision on a target rebuilding year is 2084, or 35 years longer than $T_{F=0}$.

4.3.1.2 *Impacts of Rebuilding Alternatives*

The analysis of rebuilding alternatives (Table 2-4) is designed by the GMT to show the complex interrelationships and trade-offs associated with the mix of depleted species' OYs under consideration for 2009-10 fisheries. Since the available yield of each depleted species differentially constrains groundfish fishing sectors, comparing the management measures by sector across these alternatives reveals the trade-offs in deciding 2009-10 OYs and potentially revised rebuilding plans for depleted species. The following section describes the implications of 2009-10 rebuilding alternatives for each non-tribal groundfish sector. The management measures that follow are predicted to be accommodated under each rebuilding alternative and are offered to aid in deciding preferred OYs for depleted species. These management measures are not necessarily those under the preferred alternative, which are described in section 2.2.6 and discussed and analyzed in section 4.5.3.

Most 2009-10 west coast groundfish fisheries will likely be constrained by the low yelloweye OYs considered, including the OYs under the status quo ramp-down strategy. All commercial and recreational hook and line fisheries will be constrained by yelloweye. Even the limited entry non-whiting trawl fishery is likely to be constrained by yelloweye, although canary is still a constraining species under the lower OYs analyzed. Only the limited entry whiting trawl fishery is not likely to be constrained by yelloweye. There is very little yelloweye bycatch in whiting-directed fisheries. However, the widow OYs will likely to be a constraining species for 2009-10 whiting fisheries and canary rockfish, under the lower OYs analyzed, may also constrain whiting fishing opportunities.

As stated in section 2.1.1.8, Rebuilding Alternative 1 is designed to allow more fishing opportunities on the continental shelf north and south of 40°10' N latitude by specifying relatively higher OYs for bocaccio, canary rockfish, cowcod, widow rockfish and yelloweye rockfish, while allowing fewer fishing opportunities on the slope by specifying relatively lower OYs for darkblotched rockfish and POP. Rebuilding Alternative 2 is conversely designed to allow fewer fishing opportunities on the shelf north and south of 40°10' N latitude by specifying relatively lower OYs for the shelf species (bocaccio, canary, cowcod, widow, and yelloweye), and higher fishing opportunities on the slope by specifying relatively higher OYs for the slope species (darkblotched and POP). Rebuilding Alternative 3 is the most restrictive coastwide since it is constructed with relatively low OYs for all the depleted species. Rebuilding Alternative 4 is the most liberal coastwide since it is constructed with relatively high OYs for all the depleted species. Rebuilding Alternatives 5a and 5b allow mixed fishing opportunities by sector north and south of 40°10' N latitude and in shallow and deeper waters and are designed to show further trade-offs between rebuilding OYs that may not be captured by rebuilding alternatives 1 through 4. Finally, the preferred depleted species OYs in 2009 and 2010 are analyzed as the preferred rebuilding alternative. Section 4.5.2 describes the 2009-10 management measure alternatives for each of these sectors in greater detail, as well as the species impacts under each alternative.

Limited Entry Non-Whiting Trawl

Tables 4-11a through 4-16a provide example 2009-10 limited entry trawl trip limits and RCA configurations under the constraints imposed by each Rebuilding Alternative and the companion tables showing the predicted total catch of target and depleted species under each trawl scenario are provided in Tables 4-11b to 4-16b and in section 4.5.2.1.

Table 4-11a. Limited entry trawl trip limits and seasonal RCA configurations designed to optimize fishing opportunities under Rebuilding Alternative 1.

Subarea	Period	RCA Boundaries (fm)		Sablefish	Longspine	Shortspine	Dover Sole	Other Flatfish	Petrale Sole	Arrowtooth Flounder	Slope Rockfish b/
		Shoreward a/	Seaward								
North Large Footrope	1	75	250 c/	15,000	8,000	8,000	50,000	90,000	50,000	90,000	2,000
	2	75	250	15,000	8,000	8,000	50,000	90,000	30,000	90,000	2,000
	3	75	250	15,000	8,000	8,000	50,000	90,000	30,000	90,000	2,000
	4	75	250	15,000	8,000	8,000	50,000	90,000	30,000	90,000	2,000
	5	75	250	15,000	8,000	8,000	50,000	90,000	30,000	90,000	2,000
	6	75	250 c/	15,000	8,000	8,000	50,000	90,000	50,000	90,000	2,000
North SFFT	1	75	250 c/	5,000	3,000	3,000	40,000	90,000	16,000	90,000	2,000
	2	75	250	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	3	75	250	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	4	75	250	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	5	75	250	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	6	75	250 c/	5,000	3,000	3,000	40,000	90,000	16,000	90,000	2,000
38°-40°10' N lat. d/	1	100	200 c/	15,000	8,000	8,000	50,000	90,000	50,000	10,000	15,000
	2	100	200	15,000	8,000	8,000	50,000	90,000	30,000	10,000	15,000
	3	100	200	15,000	8,000	8,000	50,000	90,000	30,000	10,000	15,000
	4	100	200	15,000	8,000	8,000	50,000	90,000	30,000	10,000	10,000
	5	100	200	15,000	8,000	8,000	50,000	90,000	30,000	10,000	10,000
	6	100	200 c/	15,000	8,000	8,000	50,000	90,000	50,000	10,000	15,000
S 38° N lat. d/	1	100	150	15,000	8,000	8,000	50,000	90,000	50,000	10,000	40,000
	2	100	150	15,000	8,000	8,000	50,000	90,000	30,000	10,000	40,000
	3	100	150	15,000	8,000	8,000	50,000	90,000	30,000	10,000	40,000
	4	100	150	15,000	8,000	8,000	50,000	90,000	30,000	10,000	40,000
	5	100	150	15,000	8,000	8,000	50,000	90,000	30,000	10,000	40,000
	6	100	150	15,000	8,000	8,000	50,000	90,000	50,000	10,000	40,000

a/ Areas shoreward of the RCA north of Cape Alava are closed.
b/ Splitnose rockfish limits equal to slope rockfish limits.
c/ The seaward RCA boundary is modified to include specified petrale sole fishing areas.
d/ Chilipepper rockfish limits using small footropes are 5,000 lbs/2 months in the south.

Table 4-11b. The predicted total catch (mt) of target and depleted species in the 2009-10 limited entry trawl fishery north and south of 40°10' N latitude under Rebuilding Alternative 1.

Species	Total Catch (mt) by Area		
	North	South	Total
Canary	11.1	2.6	13.7
POP	35.8	0.0	35.8
Darkblotched	100.4	17.4	117.8
Widow	1.2	3.8	5.0
Bocaccio	-	9.7	9.7
Yelloweye	0.6	0.0	0.6
Cowcod	-	1.1	1.1
Sablefish	1,742.8	452.8	2,195.6
Longspine	252.0	189.9	441.9
Shortspine	450.0	161.2	611.3
Dover	4,923.0	1,355.6	6,278.5
Arrowtooth	1,697.0	86.0	1,782.9
Petrale	2,068.8	318.7	2,387.5
Other Flatfish	1,307.9	446.3	1,754.2
Slope Rockfish	56.3	146.0	202.2

Table 4-12a. Limited entry trawl trip limits and seasonal RCA configurations designed to optimize fishing opportunities under Rebuilding Alternative 2.

Subarea	Period	RCA Boundaries (fm)		Sablefish	Longspine	Shortspine	Dover Sole	Other Flatfish	Petrale Sole	Arrowtooth Flounder	Slope Rockfish a/
		Shoreward	Seaward								
North Large Footrope	1	0	200 b/	20,000	22,000	14,000	90,000	110,000	115,000	150,000	2,000
	2	0	200	20,000	22,000	14,000	90,000	110,000	50,000	150,000	2,000
	3	0	150	20,000	22,000	14,000	90,000	110,000	30,000	150,000	2,000
	4	75	WA/ 200 OR	20,000	22,000	14,000	90,000	110,000	30,000	150,000	2,000
	5	0	200	20,000	22,000	14,000	90,000	110,000	50,000	150,000	2,000
	6	0	200 b/	20,000	22,000	14,000	90,000	110,000	115,000	150,000	2,000
North SFFT c/	1	0	200 b/								
	2	0	200								
	3	0	150								
	4	75	WA/ 200 OR	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	5	0	200								
	6	0	200 b/								
38°-40°10' N lat.	1	75	150	20,000	22,000	14,000	90,000	110,000	115,000	10,000	15,000
	2	75	150	20,000	22,000	14,000	90,000	110,000	50,000	10,000	15,000
	3	100	150	20,000	22,000	14,000	90,000	110,000	30,000	10,000	15,000
	4	100	150	20,000	22,000	14,000	90,000	110,000	30,000	10,000	10,000
	5	100	150	20,000	22,000	14,000	90,000	110,000	50,000	10,000	10,000
	6	75	150	20,000	22,000	14,000	90,000	110,000	115,000	10,000	15,000
S 38° N lat.	1	75	150	20,000	22,000	14,000	90,000	110,000	115,000	10,000	40,000
	2	75	150	20,000	22,000	14,000	90,000	110,000	50,000	10,000	40,000
	3	100	150	20,000	22,000	14,000	90,000	110,000	30,000	10,000	40,000
	4	100	150	20,000	22,000	14,000	90,000	110,000	30,000	10,000	40,000
	5	75	150	20,000	22,000	14,000	90,000	110,000	50,000	10,000	40,000
	6	75	150	20,000	22,000	14,000	90,000	110,000	115,000	10,000	40,000

a/ Splitnose rockfish limits equal to slope rockfish limits.

b/ The seaward RCA boundary is modified to include specified petrale sole fishing areas.

c/ Vessels using selective flatfish gear in the north in periods 1, 2, 3, 5, and 6 are not held to a lower limit

Table 4-12b. The predicted total catch (mt) of target and depleted species in the 2009-10 limited entry trawl fishery north and south of 40°10' N latitude under Rebuilding Alternative 2.

Species	Total Catch (mt) by Area		
	North	South	Total
Canary	1.7	2.6	4.3
POP	92.6	0.0	92.6
Darkblotched	207.8	32.8	240.5
Widow	1.8	5.5	7.3
Bocaccio	-	11.1	11.1
Yelloweye	0.1	0.0	0.1
Cowcod	-	1.0	1.0
Sablefish	2,386.8	610.8	2,997.7
Longspine	448.3	338.7	787.0
Shortspine	880.8	284.0	1,164.8
Dover	8,192.7	2,334.7	10,527.5
Arrowtooth	1,276.6	49.4	1,326.0
Petrale	1,945.2	362.0	2,307.2
Other Flatfish	970.8	556.2	1,527.0
Slope Rockfish	91.8	185.4	277.2

Table 4-13a. Limited entry trawl trip limits and seasonal RCA configurations designed to optimize fishing opportunities under Rebuilding Alternative 3.

Subarea	Period	RCA Boundaries (fm)		Sablefish	Longspine	Shortspine	Dover Sole	Other Flatfish	Petrale Sole	Arrowtooth Flounder	Slope Rockfish a/
		Shoreward	Seaward								
North Large Footrope	1	0	250 b/	11,000	6,000	5,000	30,000	110,000	50,000	50,000	2,000
	2	0	250	11,000	6,000	5,000	30,000	110,000	30,000	50,000	2,000
	3	0	250	11,000	6,000	5,000	30,000	110,000	30,000	50,000	2,000
	4	75	250	11,000	6,000	5,000	30,000	110,000	30,000	50,000	2,000
	5	0	250	11,000	6,000	5,000	30,000	110,000	30,000	50,000	2,000
	6	0	250 b/	11,000	6,000	5,000	30,000	110,000	50,000	50,000	2,000
North SFFT c/	1	0	250 b/	5,000	3,000	3,000	25,000	50,000	16,000	50,000	2,000
	2	0	250								
	3	0	250								
	4	75	250								
	5	0	250								
	6	0	250 b/								
38°-40°10' N lat.	1	75	200 b/	30,000	30,000	30,000	100,000	110,000	70,000	10,000	15,000
	2	100	200	30,000	30,000	30,000	100,000	110,000	30,000	10,000	15,000
	3	100	200	30,000	30,000	30,000	100,000	110,000	30,000	10,000	15,000
	4	100	200	30,000	30,000	30,000	100,000	110,000	30,000	10,000	10,000
	5	75	200	30,000	30,000	30,000	100,000	110,000	30,000	10,000	10,000
	6	75	200 b/	30,000	30,000	30,000	100,000	110,000	70,000	10,000	15,000
S 38° N lat.	1	75	150	30,000	30,000	30,000	100,000	110,000	70,000	10,000	40,000
	2	100	150	30,000	30,000	30,000	100,000	110,000	30,000	10,000	40,000
	3	100	150	30,000	30,000	30,000	100,000	110,000	30,000	10,000	40,000
	4	100	150	30,000	30,000	30,000	100,000	110,000	30,000	10,000	40,000
	5	75	150	30,000	30,000	30,000	100,000	110,000	30,000	10,000	40,000
	6	75	150	30,000	30,000	30,000	100,000	110,000	70,000	10,000	40,000

a/ Splitnose rockfish limits equal to slope rockfish limits.

b/ The seaward RCA boundary is modified to include specified petrale sole fishing areas.

c/ Vessels using selective flatfish gear in the north in periods 1, 2, 3, 5, and 6 are not held to a lower limit

Table 4-13b. The predicted total catch (mt) of target and depleted species in the 2009-10 limited entry trawl fishery north and south of 40°10' N latitude under Rebuilding Alternative 3.

Species	Total Catch (mt) by Area North	South	Total
Canary	1.3	2.8	4.1
POP	31.6	0.0	31.6
Darkblotched	91.5	38.2	129.6
Widow	1.0	6.9	7.9
Bocaccio	-	10.1	10.1
Yelloweye	0.1	0.0	0.1
Cowcod	-	1.0	1.0
Sablefish	1,248.0	909.9	2,157.9
Longspine	238.7	461.8	700.5
Shortspine	284.7	607.6	892.4
Dover	2,926.9	2,614.1	5,540.9
Arrowtooth	1,028.0	49.7	1,077.7
Petrale	1,548.4	329.7	1,878.1
Other Flatfish	984.8	541.8	1,526.6
Slope Rockfish	56.3	165.0	221.3

Table 4-14a. Limited entry trawl trip limits and seasonal RCA configurations designed to optimize fishing opportunities under Rebuilding Alternative 4.

Subarea	Period	RCA Boundaries (fm)		Sablefish	Longspine	Shortspine	Dover Sole	Other Flatfish	Petrale Sole	Arrowtooth Flounder	Slope Rockfish b/
		Shoreward a/	Seaward								
North Large Footrope	1	75	200 c/	18,000	22,000	14,000	110,000	110,000	40,000	150,000	2,000
	2	75	200	20,000	22,000	14,000	110,000	110,000	30,000	150,000	2,000
	3	75	150	20,000	22,000	14,000	110,000	110,000	30,000	150,000	2,000
	4	75	WA/ 200 OR	20,000	22,000	14,000	110,000	110,000	30,000	150,000	2,000
	5	75	200	20,000	22,000	14,000	110,000	110,000	30,000	150,000	2,000
	6	75	200 c/	18,000	22,000	14,000	110,000	110,000	40,000	150,000	2,000
North SFFT	1	75	200 c/	5,000	3,000	3,000	40,000	90,000	16,000	90,000	2,000
	2	75	200	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	3	75	150	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	4	75	WA/ 200 OR	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	5	75	200	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	6	75	200 c/	5,000	3,000	3,000	40,000	90,000	16,000	90,000	2,000
38°-40°10' N lat. d/	1	100	150	18,000	22,000	14,000	110,000	110,000	40,000	10,000	15,000
	2	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	15,000
	3	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	15,000
	4	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	10,000
	5	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	10,000
	6	100	150	18,000	22,000	14,000	110,000	110,000	40,000	10,000	15,000
S 38° N lat. d/	1	100	150	18,000	22,000	14,000	110,000	110,000	40,000	10,000	40,000
	2	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	40,000
	3	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	40,000
	4	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	40,000
	5	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	40,000
	6	100	150	18,000	22,000	14,000	110,000	110,000	40,000	10,000	40,000

a/ Areas shoreward of the RCA north of Cape Alava are closed.

b/ Splitnose rockfish limits equal to slope rockfish limits.

c/ The seaward RCA boundary is modified to include specified petrale sole fishing areas.

d/ Chilipepper rockfish limits using small footropes are 5,000 lbs/2 months in the south.

Table 4-14b. The predicted total catch (mt) of target and depleted species in the 2009-10 limited entry trawl fishery north and south of 40°10' N latitude under Rebuilding Alternative 4.

Species	Total Catch (mt) by Area		
	North	South	Total
Canary	12.8	2.8	15.5
POP	86.1	0.0	86.1
Darkblotched	195.5	35.7	231.3
Widow	1.8	6.2	8.0
Bocaccio	-	12.3	12.3
Yelloweye	0.7	0.0	0.7
Cowcod	-	1.3	1.3
Sablefish	2,380.1	596.5	2,976.6
Longspine	445.9	338.7	784.6
Shortspine	859.8	284.2	1,144.0
Dover	10,692.6	3,012.3	13,704.9
Arrowtooth	1,836.4	64.0	1,900.4
Petrale	1,951.5	342.6	2,294.1
Other Flatfish	1,571.4	558.5	2,129.9
Slope Rockfish	91.8	185.4	277.2

Table 4-15a. Limited entry trawl trip limits and seasonal RCA configurations designed to optimize fishing opportunities under Rebuilding Alternatives 5a and 5b.

Subarea	Period	RCA Boundaries (fm)		Sablefish	Longspine	Shortspine	Dover Sole	Other Flatfish	Petrale Sole	Arrowtooth Flounder	Slope Rockfish b/
		Shoreward a/	Seaward								
North Large Footrope	1	75	200 c/	20,000	22,000	14,000	100,000	110,000	50,000	150,000	2,000
	2		200	20,000	22,000	14,000	100,000	110,000	30,000	150,000	2,000
	3		150 WA/ 200 OR	20,000	22,000	14,000	100,000	110,000	30,000	150,000	2,000
	4			20,000	22,000	14,000	100,000	110,000	30,000	150,000	2,000
	5		200	20,000	22,000	14,000	100,000	110,000	30,000	150,000	2,000
	6		200 c/	20,000	22,000	14,000	100,000	110,000	50,000	150,000	2,000
North SFFT	1	75	200 c/	5,000	3,000	3,000	40,000	90,000	16,000	90,000	2,000
	2		200	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	3		150 WA/ 200 OR	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	4			8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	5		200	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	6		200 c/	5,000	3,000	3,000	40,000	90,000	16,000	90,000	2,000
38°-40°10' N lat. d/	1	75	150	20,000	22,000	14,000	100,000	110,000	50,000	10,000	15,000
	2	100	150	20,000	22,000	14,000	100,000	110,000	30,000	10,000	15,000
	3	100	150	20,000	22,000	14,000	100,000	110,000	30,000	10,000	15,000
	4	100	150	20,000	22,000	14,000	100,000	110,000	30,000	10,000	10,000
	5	75	150	20,000	22,000	14,000	100,000	110,000	30,000	10,000	10,000
	6	75	150	20,000	22,000	14,000	100,000	110,000	50,000	10,000	15,000
S 38° N lat. d/	1	75	150	20,000	22,000	14,000	100,000	110,000	50,000	10,000	40,000
	2	100	150	20,000	22,000	14,000	100,000	110,000	30,000	10,000	40,000
	3	100	150	20,000	22,000	14,000	100,000	110,000	30,000	10,000	40,000
	4	100	150	20,000	22,000	14,000	100,000	110,000	30,000	10,000	40,000
	5	75	150	20,000	22,000	14,000	100,000	110,000	30,000	10,000	40,000
	6	75	150	20,000	22,000	14,000	100,000	110,000	50,000	10,000	40,000

a/ Areas shoreward of the RCA north of Cape Alava are closed.

b/ Splitnose rockfish limits equal to slope rockfish limits.

c/ The seaward RCA boundary is modified to include specified petrale sole fishing areas.

d/ Chilipepper rockfish limits using small footropes are 5,000 lbs/2 months in the south.

Table 4-15b. The predicted total catch (mt) of target and depleted species in the 2009-10 limited entry trawl fishery north and south of 40°10' N latitude under Rebuilding Alternatives 5a and 5b.

Species	Total Catch (mt) by Area		
	North	South	Total
Canary	12.6	2.7	15.3
POP	83.2	0.0	83.3
Darkblotched	189.8	34.2	224.0
Widow	1.8	5.8	7.6
Bocaccio	-	10.3	10.3
Yelloweye	0.6	0.0	0.7
Cowcod	-	1.0	1.0
Sablefish	2,460.6	614.3	3,074.9
Longspine	445.9	338.7	784.6
Shortspine	859.8	284.0	1,143.8
Dover	9,859.9	2,636.7	12,496.7
Arrowtooth	1,836.4	50.4	1,886.8
Petrale	2,088.0	336.3	2,424.3
Other Flatfish	1,568.2	553.7	2,121.9
Slope Rockfish	91.8	185.4	277.2

Table 4-16a. Example imited entry trawl trip limits and seasonal RCA configurations designed to optimize 2009-10 fishing opportunities under the Final Preferred Rebuilding Alternative (note: while these trip limits meet preferred harvest specification limits, these are not the preferred 2009-10 trawl management measures recommended by the Council. Final preferred trawl management measures are described in Table 2-40a).

Subarea	Period	RCA Boundaries (fm)		Sablefish	Longspine	Shortspine	Dover Sole	Other Flatfish	Petrale Sole	Arrowtooth Flounder	Slope Rockfish b/
		Shoreward a/	Seaward								
North Large Footrope	1	75	200 c/	15,000	22,000	14,000	80,000	110,000	50,000	150,000	2,000
	2	75	200	15,000	22,000	14,000	80,000	110,000	30,000	150,000	2,000
	3	75	150	18,000	22,000	14,000	80,000	110,000	30,000	150,000	2,000
	4	75	WA/ 200 OR	18,000	22,000	14,000	80,000	110,000	30,000	150,000	2,000
	5	75	200	18,000	22,000	14,000	80,000	110,000	30,000	150,000	2,000
	6	75	200 c/	15,000	22,000	14,000	80,000	110,000	50,000	150,000	2,000
North SFFT	1	75	200 c/	5,000	3,000	3,000	40,000	90,000	16,000	90,000	2,000
	2	75	200	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	3	75	150	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	4	75	WA/ 200 OR	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	5	75	200	8,000	3,000	3,000	40,000	90,000	25,000	90,000	2,000
	6	75	200 c/	5,000	3,000	3,000	40,000	90,000	16,000	90,000	2,000
38°-40°10' N lat. d/	1	100	150	18,000	22,000	14,000	110,000	110,000	40,000	10,000	15,000
	2	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	15,000
	3	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	15,000
	4	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	10,000
	5	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	10,000
	6	100	150	18,000	22,000	14,000	110,000	110,000	40,000	10,000	15,000
S 38° N lat. d/	1	100	150	18,000	22,000	14,000	110,000	110,000	40,000	10,000	40,000
	2	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	40,000
	3	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	40,000
	4	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	40,000
	5	100	150	20,000	22,000	14,000	110,000	110,000	30,000	10,000	40,000
	6	100	150	18,000	22,000	14,000	110,000	110,000	40,000	10,000	40,000

a/ Areas shoreward of the RCA north of Cape Alava are closed.
b/ Splitnose rockfish limits equal to slope rockfish limits.
c/ The seaward RCA boundary is modified to include specified petrale sole fishing areas.
d/ Chilipepper rockfish limits using small footropes are 5,000 lbs/2 months in the south.

Table 4-16b. The predicted total catch (mt) of target and depleted species in the 2009-10 limited entry trawl fishery north and south of 40°10' N latitude under the Council's final preferred OYs for depleted species.

Species	Total Catch (mt) by Area		
	North	South	Total
Canary	12.1	2.8	14.9
POP	72.3	0.0	72.3
Darkblotched	165.2	35.7	200.9
Widow	1.6	6.2	7.7
Bocaccio	-	12.3	12.3
Yelloweye	0.6	0.0	0.6
Cowcod	-	1.3	1.3
Sablefish	2,060.1	596.5	2,656.6
Longspine	445.9	338.7	784.6
Shortspine	859.8	284.2	1,144.0
Dover	8,147.0	3,012.3	11,159.2
Arrowtooth	1,836.4	64.0	1,900.4
Petrale	2,088.0	342.6	2,430.6
Other Flatfish	1,568.2	558.5	2,126.7
Slope Rockfish	85.5	185.4	270.9

Limited Entry Whiting Trawl

The Pacific whiting fishery is limited by widow rockfish in all rebuilding species options. This is based on an extension of the linear trend analysis for predicting widow bycatch that the GMT has been using since the start of 2007. Data used to inform this analysis is through 2007, and therefore, the trend is predicting bycatch two years into the future. This creates some substantial uncertainty, so the estimates are best treated as order of magnitude estimates. The implications of this approach means that a widow rockfish OY of 371 mt may limit the whiting fishery to a U.S. OY of slightly under 200,000 mt, while a widow rockfish OY of 522 mt may limit the whiting fishery to a U.S. OY of slightly under 300,000 mt (Table 4-17). See also Section 4.5.2.2

Table 4-17. Predicted impacts of depleted species across a range of whiting OYs.

U.S. OY (mt)	Sector	Sector Allocation	Canary	Darkblotched	POP	Widow	Yelloweye
280,770	Tribal	35,000	1.1	0.0	0.5	2.7	-
	Mothership	58,505	2.2	6.6	1.2	128.7	0.0
	C-P	82,882	0.3	6.5	1.2	157.5	0.0
	Shoreside	102,384	1.7	3.1	0.4	163.8	0.0
	Total	278,770	5.3	16.2	3.3	452.7	0.0
192,014	Tribal	27,500	0.8	0.0	0.4	2.1	-
	Mothership	39,003	1.5	4.4	0.8	85.8	0.0
	C-P	55,255	0.2	4.3	0.8	105.0	0.0
	Shoreside	68,256	1.1	2.0	0.2	109.2	0.0
	Total	190,014	3.6	10.7	2.2	302.1	0.0

Commercial and Recreational Hook-and-Line Fisheries

All the 2009 commercial hook-and-line fisheries (limited entry fixed gear and directed open access), as well as the Washington, Oregon, and California recreational fisheries will be limited by the available yield of yelloweye rockfish and decisions on how to share that available yield.

4.3.2 Precautionary Zone Groundfish Species

4.3.2.1 *Blue Rockfish (in Waters off California)*

The first blue rockfish assessment on the west coast was conducted in 2007 for the portion of the stock occurring in waters off California north of Pt. Conception (Key, MacCall, Field, Aseltine-Neilson, and Lynn 2008). The base model in the assessment estimated spawning stock biomass at 29.7% of initial, unfished biomass in 2007; therefore, the stock is considered in the precautionary zone. There are two 2009-10 OY alternatives that contemplate managing blue rockfish off California with species-specific harvest specifications (OY alternatives 3 and 4) and two OY alternatives that contemplate continuing to manage blue rockfish in the minor nearshore rockfish complexes north and south of 40°10' N latitude (OY alternatives 1 and 2; see section 2.1.4 for a description of these two OY alternatives). All four OY alternatives are based on results from the new assessment.

OY Alternative 3 (207 mt in 2009 and 2010) would apply to the portion of the stock occurring off California and is based on the 40-10 adjusted harvestable yield from the assessment base model using an F50% harvest rate for the assessed portion of the California stock north of Pt. Conception at 34°27' N latitude plus 9 mt for the contribution to the OY south of Pt. Conception. The south of Pt. Conception portion of the OY (9 mt) is a 50% adjustment of the original ABC contribution of blue rockfish to the southern minor nearshore rockfish complex (18 mt), which represents the average 1994-99 harvest of blue rockfish in those waters.

OY Alternative 4 (230 mt in 2009 and 2010) would apply to the portion of the stock occurring off California and is based on setting the north of Pt. Conception OY equal to the ABC using the high productivity model (high natural mortality) from the new assessment as constrained by the base model ABC plus 9 mt for the contribution to the OY south of Pt. Conception. The south of Pt. Conception portion of the OY (9 mt) is a 50% adjustment of the original ABC contribution of blue rockfish to the southern minor nearshore rockfish complex (18 mt), which represents the average 1994-99 harvest of blue rockfish in those waters.

The Council's final preferred alternative for blue rockfish is to manage the stock within the minor nearshore complexes (south of 42° N latitude) with a California statewide harvest guideline of 220 mt. As part of a complex, no Federal or state action is required if catch of blue rockfish exceeds the harvest guideline or blue rockfish's ABC contribution to the combined minor rockfish ABCs. If the adopted harvest guideline is exceeded or projected to be exceeded, California's state regulations (Title 14, California Code of Regulations (CCR)) allow the state to take independent action to ensure the harvest guideline is not exceeded. Action can occur both during and outside the Council process.

Concerns exist regarding California's ability to manage blue rockfish within the minor nearshore complexes north and south of 40°10' N latitude and stay within the statewide harvest guideline chosen by the Council because catch of blue rockfish has been highly variable in recent years. In 2006, landings north of Pt. Conception (Table 4-18) would have exceeded the Council preferred statewide harvest guideline, although past management measures were not specifically designed to stay below a specific harvest limit. Statewide recreational and commercial landings in 2007 were approximately 197 mt (CALCOM, 2008; RecFIN, 2008). Increased commercial landings in 2007 are due in part to a developing fishery for live blue rockfish in northern California (CALCOM, 2008). Projected impacts of California's 2009-10 management measures are designed to stay within the new blue rockfish statewide harvest guideline chosen by the Council.

Table 4-18. Recent landings (mt) of blue rockfish in California, north of Point Conception. Data for 1997-2006 from Key et al. (2007). Data for 2007 from CALCOM (based on actual samples) and RecFIN.

Year	Fishery			
	Recreational	Commercial-HKL	Commercial-Net	Total
1997	296.1	63.7	0	359.8
1998	249.4	47.7	0	297.1
1999	198.6	35.7	0.1	234.4
2000	150.7	15.6	0	166.3
2001	115.6	19.7	0	135.3
2002	148.8	18.5	0	167.3
2003	219.9	9.2	0	229.1
2004	149.9	14.8	0	164.7
2005	162.9	21.7	0	184.6
2006	319.6	21.9	0	341.5
2007	133.1	51.0	0	184.1

Closure of the entire minor nearshore complex would minimize regulatory discards of blue rockfish since minor nearshore rockfishes cannot be harvested independently of blues. Prohibiting or restricting blue rockfish take while allowing fishing on the remainder of the complex is expected to increase regulatory discards particularly in the recreational fishery. Therefore, setting harvest restrictions for blue rockfish could result in a de-facto nearshore rockfish complex harvest restriction.

To ensure the blue rockfish harvest guideline is not exceeded, accurate and timely inseason monitoring of both commercial and recreational landings will need to occur. CDFG currently tracks commercial landings of individual nearshore species inseason. The California recreational fishery also tracks landings by individual species and will be monitored using both inseason weekly catch reporting as well as projected catch estimates using CRFS estimates.

A 20 fm year-round depth restriction in the commercial nearshore fishery between 40°10’ and 43° N latitude) will be implemented on January 1, 2009 to reduce impacts to yelloweye rockfish. WCGOP data indicate that 8% of the total blue rockfish catch north of 40°10’ N latitude occurs at depths greater than 20 fm. Restricting access to these depths should result in less blue rockfish catch and help keep catches within the statewide harvest guideline.

California will consider a variety of routine management measures that could be used inseason to prevent exceeding the statewide harvest guideline if catches are tracking higher than projected impacts. Possible measures include altering depth restrictions, changes to season structures and trip limits, and/or closure of the minor nearshore complex.

If trip limit reductions are necessary north of 40°10' N latitude, California could consider statewide reductions or restructuring the minor nearshore rockfish trip limit between 40°10’ and 42°N latitude. The minor nearshore rockfish trip limit between 40°10’ and 42° N latitude is currently “6,000 lb/2 months, no more than 1,200 lb of which may be species other than black or blue rockfish”. Under this trip limit an individual could potentially take up to 6,000 lb every 2 months of only blue rockfish. If blue rockfish catches are tracking high, California may consider restructuring the minor nearshore rockfish trip limit as follows: “6,000 lb/2 months, no more than 1,200 lb of which may be species other than black rockfish”. This restructured trip limit would reduce the allowable amount of blue rockfish to 1,200 lb per 2-month period.

Commercial trip limits for blue rockfish south of 40°10’ N latitude are part of the deeper nearshore rockfish complex, with separate trip limits north and south of 34° 27’ N latitude ranging from 500 lb/2 months to 700 lb/2 months. Because blue rockfish are included in the deeper nearshore trip limits, any reductions for blue rockfish, if necessary, would be made to the deeper nearshore rockfish complex as a whole.

Because blue rockfish cannot be harvested separately from other nearshore rockfish species, projected exceedance of the harvest guideline for blue rockfish would result in the closure of the minor nearshore rockfish complex. Closure of the entire complex would minimize regulatory discards of blue rockfish since minor nearshore rockfishes cannot be harvested independently of blues. Harvest of black rockfish would still be permitted if the minor nearshore complex is closed because black rockfish can be harvested with minimal blue rockfish bycatch. Further restricting the allowable fishing depths inseason in the recreational fishery is not expected to reduce catches of blue rockfish since they are more likely to be encountered at shallower depths later in the year.

If inseason action is needed to reduce the recreational catches of blue rockfish, a reduced season length for the fishery in the North, North-Central, or South-Central management areas would most likely be the primary measure implemented to keep recreational harvests within the harvest guideline. Reductions to recreational bag limits are not proposed as they are expected to increase discards and minimize overall savings in blue rockfish total mortality. Past attempts to impose a sub-bag limit on nearshore rockfish in

California resulted in increased regulatory discards which resulted in little, if any, reduction in total impacts due to increased high-grading and increased harvest due to lack of understanding of regulations.

For both commercial and recreational fisheries, any reductions to trip limits and/or closure of the minor nearshore complex could result in regulatory discards of blue rockfish. The amount of regulatory discards will be difficult to predict at the start of the year because the amount of discards will change depending on the time of the year inseason action occurs. California will closely monitor blue rockfish landings inseason, as described in Section 4.5.1.9, and include regulatory discards in their projections to stay within the harvest guideline.

4.3.2.2 *Cabezon (in Waters off California)*

All cabezon (*Scorpaenichthys marmoratus*) OY alternatives are based on the most recent cabezon assessment, which was done for the portion of the stock occurring in waters off California in 2005 (Cope and Punt 2006). The assessment stratified analyses for two substocks, north and south of Pt. Conception at 34°27' N latitude, with an estimated spawning output for the northern California substock of $B_{40.1\%}$ and $B_{28.3\%}$ for the southern California substock. Since the two substocks collectively have an estimated spawning output less than $B_{40\%}$, cabezon in waters off California are considered a precautionary zone stock.

OY Alternative 1 (69 mt in 2009 and 2010) is the status quo OY and is based on the average of the 2007 and 2008 OYs projected in the 2005 assessment using an F50% harvest rate with a 60-20 adjustment. The 60-20 adjustment is analogous to the Council's default 40-10 rule, where, in this case, the OY equals the ABC at spawning biomasses ≥60% of initial biomass and sequentially reduced from the ABC until, at 20% of initial biomass, the OY is set to zero.

OY Alternative 2 (74 mt in 2009 and 2010) is based on the average of the 2009 and 2010 OYs projected in the 2005 assessment using an F50% harvest rate with the 60-20 adjustment.

The preliminary preferred OY Alternative is OY Alternative 3 (69 mt in 2009 and 79 mt in 2010), which are the year-specific 2009 and 2010 OYs projected in the 2005 assessment using an F50% harvest rate with the 60-20 adjustment.

4.3.2.3 *Petrale Sole*

The most recent petrale sole (*Eopsetta jordani*) assessment was done in 2005 (Lai, Haltuch, Punt, and Cope 2006). The portion of the stock in the northern assessment area (Columbia and U.S.-Vancouver INPFC areas) had an estimated spawning stock biomass of $B_{34\%}$ in 2005 and the portion of the stock in the southern assessment area (Conception, Monterey, and Eureka INPFC areas) had an estimated spawning stock biomass of $B_{29\%}$ in 2005. Since the stock's spawning biomass is less than $B_{40\%}$, this is considered a precautionary zone stock.

Only one alternative OY alternative was considered for petrale sole for 2009-10. The OY was projected from the 2005 assessment using the same methodology as used for the final preferred OY alternative in 2007-08. The 2009-10 OY (2,433 mt in 2009 and 2,393 mt in 2010) is based on the sum of the 40-10 adjusted northern OY and 75% of the 40-10 adjusted southern OY. The southern OY has a 75% precautionary adjustment due to greater assessment uncertainty.

4.3.2.4 *Sablefish*

All 2009-10 sablefish OY alternatives are based on a new assessment of the coastwide stock conducted in 2007 (Schirripa 2008). While the new assessment indicates stock status has improved since the last assessment in 2005, stock depletion was estimated to be at 38.3% of initial, unfished biomass and still in the precautionary zone. As has been standard practice, all alternatives apportion the coastwide OY north and south of 36° N latitude since all commercial allocations are currently based on the proportion of the harvestable surplus of sablefish north of 36° N latitude.

OY Alternative 1 (9,795 mt coastwide, 9,452 mt north of 36° N latitude, and 343 mt south of 36° N latitude in 2009; and 8,988 mt coastwide, 8,673 mt north of 36° N latitude, and 315 mt south of 36° N latitude in 2010) is based on the 40-10 adjusted yield projected from the base model in the new assessment. The coastwide OY was apportioned north and south of 36° N latitude using the status quo method of applying the average proportion of 2000-01 landings of sablefish north of 36° N latitude (96.5%) and south of 36° N latitude (3.5%).

The final preferred sablefish OY is OY Alternative 2 (8,423 mt coastwide, 7,052 mt north of 36° N latitude, and 1,371 mt south of 36° N latitude in 2009; and 7,729 mt coastwide, 6,471 mt north of 36° N latitude, and 1,258 mt south of 36° N latitude in 2010). OY Alternative 2 is developed starting with the 40-10 adjusted coastwide yield projected from the base model of the new assessment. The coastwide yield is then apportioned north and south of 36° N latitude using the average 2003-06 proportions of the swept-area biomass estimates of sablefish from the NWFSC shelf-slope trawl survey (Table 4-19). The average proportions of sablefish biomass distribution are 72% north of 36° N latitude and 28% in the Conception area south of 36° N latitude. The Conception area OY is then adjusted by 50% to account for greater assessment and survey uncertainty south of 36° N latitude. The northern and southern OYs are then summed to derive the coastwide OY.

Table 4-19. Swept-area sablefish biomass estimates from the NWFSC Shelf-Slope Trawl Survey, 2003-2006.

Year	Sum of Biomass (kg)						
	Vancouver	Columbia	Eureka	Monterey	Conception	Coastwide	Conception %
2003	20,447,961	56,588,162	20,056,170	19,142,018	21,023,894	137,258,205	15%
2004	11,464,607	29,129,020	28,194,388	35,702,436	35,283,014	139,773,464	25%
2005	5,336,756	26,710,615	18,055,534	19,895,829	38,972,171	108,970,905	36%
2006	4,666,495	27,065,009	16,177,190	18,221,394	34,173,714	100,303,804	34%
						2002-06 Average	28%

OY Alternative 3 (6,250 mt coastwide, 5,233 mt north of 36° N latitude, and 1,018 mt south of 36° N latitude in 2009; and 5,777 mt coastwide, 4,837 mt north of 36° N latitude, and 941 mt south of 36° N latitude in 2010) is based on the more conservative low abundance model in the new sablefish assessment with a 40-10 adjustment and the same area apportionment methodology used to derive OY Alternative 2 specifications.

The GMT recommended consideration for the apportionment of the coastwide sablefish biomass north and south of 36° N latitude using the swept-area biomass estimates from the NWFSC trawl survey (Table 4-19) due to concerns that the old apportionment methodology was not based on information related to the biomass distribution. The particularly high northern apportionment under OY Alternative 1 could lead to depletion in the north where the larger fleets targeting sablefish operate. This could lead to a decline in abundance in the north and future hardship for fisheries dependent on this valuable stock. OY alternatives 2 and 3 address the GMT's concern for the northern substock. However, despite a 50% precautionary reduction of the southern OY, the much higher Conception area OY may be a concern since the assessment does not well inform the abundance of the southern substock. The GAP also raised concerns regarding a potentially large effort shift of northern fleets to the Conception area if sablefish trip limits in the south are proportionally increased relative to the change in the OY. The Council may want to consider this potential effect in setting the Conception area OY. Concerns of greater fishing pressure in the Conception area can also be addressed in the 2009-10 management measures decision.

4.3.3 Healthy Groundfish Species

4.3.3.1 *Arrowtooth Flounder*

All arrowtooth flounder OY alternatives are based on a new arrowtooth flounder assessment conducted in 2007 (Kaplan and Helser 2008). The new assessment concluded the west coast arrowtooth flounder stock was healthy with a spawning biomass estimated at 79% of its initial, unfished biomass in 2007.

OY Alternative 1 (5,245 mt in 2009 and in 2010) for arrowtooth flounder is based on the estimated equilibrium MSY under the proxy SPR harvest rate of F40%.

The final preferred OY Alternative is OY Alternative 2 (11,267 in 2009 and 10,112 mt in 2010), which is based on the estimated ABC for the stock. An OY equal to the ABC is allowed under the FMP for healthy stocks, such as arrowtooth flounder when the spawning biomass is equal to or greater than 40% of its initial, unfished level. The new assessment estimated that the spawning biomass of arrowtooth flounder at the beginning of 2007 was 79% of its initial, unfished level.

These alternative OYs compare to the status quo 2007-08 ABC/OY of 5,800 mt.

4.3.3.2 *Black Rockfish (in Waters off Oregon and California)*

All 2009-10 black rockfish (*Sebastes melanops*) harvest specifications are derived using new 2007 assessments. Assessments for the southern portion of the west coast black rockfish stock south of Cape Falcon, Oregon (Sampson 2008) and the northern portion of the west coast black rockfish stock north of Cape Falcon, Oregon (Wallace, Cheng, and Tsou 2008) were used to derive southern harvest specifications for fisheries off Oregon and California and northern harvest specifications for fisheries off Washington. Both assessments indicate a healthy west coast black rockfish resource with the portion of the stock south of Cape Falcon estimated to be at 70% of its initial, unfished biomass and the portion of the stock north of Cape Falcon estimated to be at 53.4% of its initial, unfished biomass. This section describes the OY alternatives for the portion of the stock occurring in waters off Oregon and California.

OY Alternative 1 (920 mt in 2009 and 831 mt in 2010) is based on results under the low productivity model in the southern assessment for the portion of the stock south of Cape Falcon. An additional yield for the portion of the stock occurring in Oregon waters north of Cape Falcon is added to the OY using 3% of the northern black rockfish OY from the base model of the northern assessment. The 3% apportionment is based on the estimated proportion of catch from waters off Oregon north of Cape Falcon relative to the entire area between Cape Falcon and the U.S.-Canada border.

The final preferred OY alternative is OY Alternative 2 (1,000 mt in 2009 and 2010). Alternative projections using constant catch scenarios of 800 mt; 1,000 mt; and 1,200 mt were requested by the GMT to better inform a low OY alternative. Of these, the GMT recommended analysis of the 1,000 mt constant catch scenario since projected stock depletion under that scenario was intermediate to the low and base case OY alternatives in the assessment's decision table.

OY Alternative 3 (1,469 mt in 2009 and 1,317 mt in 2010) is based on the medium productivity base case model in the southern assessment with the same apportionment methodology to account for the portion of the stock in Oregon waters north of Cape Falcon as described under OY Alternative 1.

4.3.3.3 *Black Rockfish (in Waters off Washington)*

All 2009-10 black rockfish (*Sebastes melanops*) harvest specifications are derived using new 2007 assessments. Assessments for the southern portion of the west coast black rockfish stock south of Cape Falcon, Oregon (Sampson 2008) and the northern portion of the west coast black rockfish stock north of Cape Falcon, Oregon (Wallace, Cheng, and Tsou 2008) were used to derive southern harvest specifications for fisheries off Oregon and California and northern harvest specifications for fisheries off Washington. Both assessments indicate a healthy west coast black rockfish resource with the portion of the stock south of Cape Falcon estimated to be at 70% of its initial, unfished biomass and the portion of the stock north of Cape Falcon, Oregon estimated to be at 53.4% of its initial, unfished biomass. This section describes the OY alternatives for the portion of the stock occurring in waters off Washington.

Only one OY alternative is considered for the black rockfish stock occurring in waters off Washington; therefore, OY Alternative 1 (490 mt in 2009 and 464 mt in 2010) is the Council's preliminary preferred OY alternative. This OY is based on the base model from the northern assessment, which assumes medium productivity (natural mortality (M) for males = 0.16 and M for females = 0.24). The OY is reduced by 3% to account for the portion of the assessed northern stock occurring in waters of Oregon north of Cape Falcon.

Only the Washington recreational fishery targets northern black rockfish. It is unlikely the fishery will be constrained by this OY or attain a total catch close to the OY given constraints imposed by canary and yelloweye rockfish. There is little risk of overfishing this stock.

4.3.3.4 *California Scorpionfish*

All 2009-10 California scorpionfish (*Scorpaena guttata*) harvest specifications are based on the only assessment done for this stock in 2005 (Maunder, Barnes, Aseltine-Neilson, and MacCall 2006). This assessment indicated the California scorpionfish stock was healthy with an estimated spawning stock biomass of 79.8% of its initial, unfished biomass in 2005.

The California scorpionfish assessment used a recreational catch data stream based upon Commercial Passenger Fishing Vessel (CPFV) logbook data expanded to total recreational catch using a proportion of CPFV to total recreational catch (based upon MRFSS catch history). The SSC approved this assessment with the caveat that the ABC/OY from this assessment could only be related to recreational catch calculated in the same manner as this catch stream. CPFV logbook data, while valuable for stock assessment analyses, are not collected in as timely a manner as needed for inseason monitoring. Consequently, a method was derived with the assistance of the primary stock assessment author to modify the ABC/OY from the assessment so that it could be tracked using CRFS catch estimates. This method takes the recreational portion of the stock assessment ABC/OY, multiplies it by the CPFV proportion calculated from the MRFSS data (53 percent), and then divides it using the proportion of CPFV catch observed in the 2004 CRFS data (88 percent). The stock was pulled from the southern minor nearshore rockfish complex and managed with its own ABC/OY beginning in 2007. Two 2009-10 OY alternatives using projections from the 2005 assessment for California scorpionfish were considered for analysis.

OY Alternative 1 (111 mt in 2009 and 99 mt in 2010) is based on projecting the results of the 2005 assessment modified to incorporate CRFS monitoring data for the CPFV component as described above.

The final preferred OY alternative for California scorpionfish is OY Alternative 2 (175 mt in 2009 and 155 mt in 2010). This OY alternative is the status quo OY and is based on a yield between 137 mt (2007-08 OY as modified by the CPFV modification described above) and 219 mt (2007-08 OY from the base model without the CPFV modification). The 2009 OY under this alternative also equals the projected ABC from the base model in the 2005 assessment. The 2010 OY is limited to the projected 2010 ABC from the base model in the 2005 assessment.

4.3.3.5 *Chilipepper Rockfish*

All 2009-10 chilipepper rockfish (*Sebastes goodei*) OY alternatives are derived from a new assessment conducted in 2007 (Field 2008). The 2007 assessment indicated the stock was healthy with a spawning stock biomass estimated to be at 70% of its initial, unfished biomass in 2006.

OY Alternative 1 (2,000 mt in 2009 and 2010) is the status quo 2007-08 OY and was specifically set lower than the estimated ABC, even though the stock was considered healthy, as a precautionary mechanism to be reduce the bycatch of co-occurring bocaccio.

OY Alternative 2 (2,099 mt in 2009 and 2010) is based on the estimated long term equilibrium MSY at an F50% SPR harvest rate from the 2007 assessment.

OY Alternative 3 (3,037 mt in 2009 and 2,576 mt in 2010) is based on the ABC/OY projections from the base model in the 2007 assessment.

The final preferred OY Alternative (2,885 mt in 2009 and 2,447 mt in 2010) is based on the ABC/OY projections from the base model in the 2007 assessment with a 5% reduction to buffer the ABC and thereby reduce potential risk of overfishing.

4.3.3.6 *Dover Sole*

All 2009-10 Dover sole (*Microstomus pacificus*) harvest specifications are derived using projections from the most recent assessment conducted in 2005 (Sampson 2006). The 2005 assessment results indicated the coastwide Dover sole stock was healthy with an estimated spawning stock biomass at 63% of its initial, unfished biomass in 2005.

Only one OY alternative is considered for Dover sole; therefore, OY Alternative 1 (16,500 mt in 2009 and 2010) is the Council's preliminary preferred OY alternative. This OY is the status quo OY and is based on the estimated long term equilibrium MSY at an SPR harvest rate of F40% from the 2005 assessment.

4.3.3.7 *English Sole*

All 2009-10 English sole (*Parophrys vetulus*) harvest specifications are based on a new assessment in 2007 (Stewart 2008c), which was an update of the last full assessment in 2005 (Stewart 2006). The updated assessment results indicated the stock is healthy with an estimated spawning stock biomass estimated to be at 116% of its initial, unfished biomass in 2007.

Only one OY alternative is considered for English sole; therefore, OY Alternative 1 (14,326 mt in 2009 and 9,745 mt in 2010) is the Council's preliminary preferred OY alternative. This OY is based on the ABC/OY projected from the base model in the 2007 updated assessment.

4.3.3.8 *Lingcod*

All 2009-10 lingcod (*Ophiodon elongatus*) OY alternatives are derived from projections in the most recent assessment done in 2005 (Jagielo and Wallace 2006). The 2005 assessment results indicated the stock was healthy with an estimated coastwide spawning stock biomass estimated to be at 60% of its initial, unfished biomass in 2005.

OY Alternative 1 (5,205 mt in 2009 and 4,785 mt in 2010) is based on sum of the projected ABC/OY from the 2005 assessment for the northern substock (north of 43° N latitude; Columbia and U.S.-Vancouver INPFC areas) and the status quo OY for the southern substock (south of 43° N latitude; Conception, Monterey, and Eureka INPFC areas). The coastwide OY is apportioned north and south of the Oregon-California border at 42° N latitude (4,593 mt in 2009 and 4,173 mt in 2010 for north of 42° N latitude; and 612 mt in 2009 and 2010 for south of 42° N latitude) to derive recreational harvest guidelines in California where relatively lower spawning stock abundance is still a concern (estimated spawning biomass for the southern substock was 24% of its initial, unfished biomass in 2005). The apportionment was done using status quo methodology as follows: the percentage of the 2005-06 OY estimated for the area between 42° and 43° N latitude was derived using the proportional lingcod landings in this area relative to landings further south (107 mt/719 mt) and applied this proportion to the estimated OY south of 43° N latitude to determine an estimated OY for the area between 42° and 43° N latitude. This was added to the projected OY for north of 43° N latitude to determine an appropriate OY for north of 42° N latitude.

The final preferred OY is OY Alternative 2 (5,278 mt in 2009 and 4,829 mt in 2010). This OY alternative is based on the sum of the projected ABC/OY for the northern substock and the projected 40-10 adjusted OY for the southern substock. The 2009-10 coastwide OYs were apportioned north and south of the Oregon-California border using the same methodology described under OY Alternative 1 to derive northern and southern OY components (4,593 mt in 2009 and 4,173 mt in 2010 for north of 42° N latitude; and 685 mt in 2009 and 656 mt in 2010 for south of 42° N latitude).

4.3.3.9 *Longnose Skate*

All 2009-10 longnose skate (*Raja rhina*) OY alternatives are based on a new assessment conducted in 2007 (Gertseva and Schirripa 2008). The 2007 assessment, which is the first one done for this species on the west coast, indicated the stock is healthy with an estimated spawning stock biomass of 66% of its initial, unfished biomass in 2007. The Council will decide in June 2008 whether to use the 2007 assessment results to adjust the 2009-10 harvest specifications for the Other Fish complex, which longnose skate was one of the component species, or to establish separate species-specific specifications for longnose skate and adjust the Other Fish specifications accordingly.

OY Alternative 1 (901 mt in 2009 and 902 mt in 2010) is based on the projected OYs from the 2007 assessment using the current estimated exploitation rate.

The final preferred OY alternative for longnose skate is OY Alternative 2 (1,349 mt in 2009 and 2010); although, as stated above, the Council has not decided whether to continue to manage longnose skate separately from the Other Fish complex. This OY alternative is based on a 50% increase in the average landings and discard mortality relative to the base model in the 2007 assessment.

OY Alternative 3 (3,428 mt in 2009 and 3,269 mt in 2010) is based on the ABC/OY projected from the 2007 assessment using the base model and the proxy SPR harvest rate of F45%.

4.3.3.10 *Longspine Thornyhead*

All 2009-10 longspine thornyhead (*Sebastolobus altivelis*) harvest specifications were derived from the most recent assessment done in 2005 (Fay 2006). The results of the 2005 coastwide assessment indicated the longspine thornyhead stock was healthy with an estimated spawning stock biomass at 71% of its initial, unfished biomass in 2005. The Council has managed longspine thornyhead with separate OYs north and south of Pt. Conception at 34°27' N latitude since 2007. The status quo 2007-08 specifications for longspine were an OY of 2,220 mt for north of Pt. Conception and an OY of 476 mt for south of Pt. Conception.

Only one OY alternative is considered for longspine thornyhead; therefore, OY Alternative 1 (north of Pt. Conception: 2,231 mt in 2009 and 2,175 mt in 2010; south of Pt. Conception: 395 mt in 2009 and 385 mt in 2010) is the Council’s preliminary preferred OY alternative. This OY alternative is based on projected harvestable yields from the 2005 assessment using status quo methodology for apportioning the coastwide harvestable surplus north and south of Pt. Conception to specify area-specific OYs. The apportionment methodology assumed constant density throughout the Conception area and estimated 79% of the assessed coastwide biomass occurs north of Pt. Conception. The northern OY was then reduced by 25% to account for relatively high assessment uncertainty. The southern OY was reduced by 50% to account for relatively high assessment uncertainty and a paucity of survey data for the Conception area.

4.3.3.11 *Pacific Whiting*

Pacific whiting (*Merluccius productus*) are managed based on an annual assessment prepared jointly by U.S. and Canadian scientists. The most recent assessment, conducted in 2008 (Helser, Stewart, and Hamel 2008), estimated the stock’s spawning biomass at 42.9% of its unfished spawning biomass at the beginning of 2008 and therefore healthy. Pacific whiting harvest specifications are based on these annual assessments and are only analyzed in this EIS to understand the potential bycatch implications of future whiting fisheries. The 2009 ABC and OY will presumably be considered and adopted by a new international Pacific whiting commission in accordance with the recently ratified Pacific Whiting treaty between the U.S. and Canada. The Council is still anticipated to set annual management measures for Pacific whiting fisheries. The analysis and discussion of the bycatch implications of future whiting fisheries in this EIS will serve to better understand effective management strategies to consider for future whiting fisheries (see section 2.2.4.2 and 4.5.2.1 for a description of whiting fishery management measure alternatives).

As placeholders, the Council specified a range of U.S. OY alternatives for analysis as follows: OY Alternative 1 (134,773 mt) is an OY half that specified in 2008, OY Alternative 2 (269,545 mt) is the status quo 2008 OY, and OY Alternative 3 (404,318 mt) is 150% of the status quo OY.

4.3.3.12 *Shortbelly Rockfish*

A new shortbelly rockfish (*Sebastes jordani*) was done as an academic exercise in 2007 to understand the potential environmental determinants of fluctuations in the recruitment and abundance of an unexploited rockfish population in the California Current ecosystem (Field, Dick, and MacCall 2008). While the 2007 assessment did not go through the Council’s STAR process, it was peer reviewed in a similar process and reviewed by the SSC in 2007 at the request of the SWFSC. The SSC noted the assessment did not fully satisfy the Council terms of reference for groundfish stock assessments. However, they concluded the assessment represents improved knowledge about shortbelly rockfish and might be suitable for management purposes in place of inferences from the hydroacoustic surveys conducted during 1977 and 1980, which formed the basis of the status quo ABC/OY of 13,900 mt. Based on this advice, the Council decided to use the assessment to consider alternative 2009-10 harvest specifications for shortbelly rockfish. The 2007 assessment results indicated the shortbelly stock was healthy with an estimated spawning stock biomass at 67% of its initial, unfished biomass in 2005.

OY Alternative 1 (3,475 mt in 2009 and 2010) is 25% of the status quo ABC/OY. The assessment author advised the Council that the stock would be expected to increase in abundance under this harvest rate.

The final preferred OY alternative is OY Alternative 2 (6,950 mt in 2009 and 2010), which is 50% of the status quo ABC/OY. The assessment author advised the Council that the stock would be expected to remain in its current equilibrium under this harvest rate.

4.3.3.13 *Shortspine Thornyhead*

All 2009-10 shortspine thornyhead (*Sebastolobus alascanus*) harvest specifications were derived from the most recent assessment done in 2005 (Hamel 2006). The results of the 2005 coastwide assessment indicated the shortspine thornyhead stock was healthy with an estimated spawning stock biomass at 62.9% of its initial, unfished biomass in 2005. The Council has managed shortspine thornyhead with separate OYs north and south of Pt. Conception at 34°27' N latitude since 2007. The status quo 2007-08 specifications for shortspine were an OY of 1,634 mt for north of Pt. Conception and an OY of 421 mt for south of Pt. Conception.

Only one OY alternative is considered for shortspine thornyhead; therefore, OY Alternative 1 (north of Pt. Conception: 1,608 mt in 2009 and 1,591 mt in 2010; south of Pt. Conception: 414 mt in 2009 and 410 mt in 2010) is the Council's preliminary preferred OY alternative. This OY alternative is based on projected harvestable yields from the 2005 assessment using status quo methodology for apportioning the coastwide harvestable surplus north and south of Pt. Conception to specify area-specific OYs. The apportionment methodology assumed constant density throughout the Conception area and estimated 66% of the assessed coastwide biomass occurs north of Pt. Conception. The southern OY was reduced by 50% to account for relatively high assessment uncertainty due to a paucity of survey data for the Conception area.

4.3.3.14 *Splitnose Rockfish*

A 1994 splitnose rockfish (*Sebastes diploproa*) assessment (Rogers 1994) forms the basis for status quo and proposed 2009-10 harvest specifications for this stock. As in 2007-08, the ABC of 615 mt is reduced to an OY of 461 mt based on the Council's policy of making a 25% precautionary OY adjustment for species with less rigorous stock assessments. These harvest specifications are for south of 40°10' N latitude since splitnose rockfish are managed as part of the northern Minor Slope Rockfish complex north of 40°10' N latitude.

The Council chose the status quo harvest specifications of 615 mt and 461 mt as the final preferred 2009-10 ABC and OY, respectively for splitnose rockfish south of 40°10' N latitude.

4.3.3.15 *Starry Flounder*

All 2009-10 starry flounder (*Platichthys stellatus*) harvest specifications were derived from the most recent assessment done in 2005 (Ralston 2006). The results of the 2005 coastwide assessment indicated the starry flounder stock was healthy with an estimated spawning stock biomass at 44% and 62% of its initial, unfished biomass in Washington-Oregon and California, respectively in 2005. The Council started managing starry flounder with its own ABC/OY separate from the Other Flatfish complex since 2007. The status quo 2007-08 OY for starry flounder was 890 mt.

Only one OY alternative is considered for starry flounder; therefore, OY Alternative 1 (1,004 mt in 2009 and 1,077 mt in 2010) is the Council's preliminary preferred OY alternative. These OYs were projected from the base model in the 2005 assessment with a 25% precautionary reduction since this was considered a data-poor assessment.

4.3.3.16 *Yellowtail Rockfish*

All 2009-10 yellowtail rockfish (*Sebastes flavidus*) harvest specifications were derived from the most recent updated assessment done in 2005 (Wallace and Lai 2006). The last full assessment of the northern stock areas was conducted in 2000 (Tagart, Wallace, and Ianelli 2000), and it was then updated in 2003 (Lai, Tagart, Ianelli, and Wallace 2003). The results of the 2005 updated assessment indicated the yellowtail rockfish stock was healthy with an estimated spawning stock biomass at 55% of its initial, unfished biomass in 2005. The status quo 2007-08 ABC/OY for yellowtail rockfish was 4,548 mt.

Only one OY alternative is considered for yellowtail rockfish; therefore, OY Alternative 1 (4,562 mt in 2009 and 2010) is the Council's preliminary preferred OY alternative. This is the projected ABC/OY from the base model in the 2005 updated assessment.

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

4.3.4.1 *Minor Rockfish South*

All changes to the Minor Rockfish South complex are driven by decisions on how to manage blue rockfish given the new assessment results. Potential changes to complex specifications are described in Chapter 2 and in the section that follows.

Southern Minor Nearshore Rockfish Species

Changes to the southern minor nearshore rockfish OY that are considered in this EIS relate to changes to the blue rockfish contribution to the complex.

OY Alternative 1 (630 mt in 2009 and 2010) contemplates continuing to manage blue rockfish stock within the complex. The OY under this alternative is determined by first subtracting the status quo OY contribution of blue rockfish (116 mt) from the status quo OY of 564 mt. Then the OY contribution of blue rockfish from the new assessment (182 mt for the portion of the assessed stock south of 40°10' N latitude) is added back to derive the 630 mt OY. The blue rockfish OY contribution from the 2007 assessment is based on the OY projected using the base case, medium productivity model.

The final OY alternative for the southern minor nearshore rockfish complex is OY Alternative 2 (650 mt in 2009 and 2010), which contemplates continuing to manage blue rockfish within the complex. The OY adjustment for the complex is the same as described under OY Alternative 1, except the new blue rockfish OY contribution is 202 mt and is based on the projected OY from the high productivity model in the 2007 assessment as capped by the base model ABC. The preferred alternative also specifies a 220 mt California harvest guideline for blue rockfish that would be used to manage all California nearshore recreational and commercial fisheries in 2009-10.

OY Alternative 3 (448 mt in 2009 and 2010) contemplates removing blue rockfish from the southern minor nearshore rockfish complex and managing blue rockfish under their own harvest specifications. The OY under this alternative is derived by removing the old blue rockfish OY contribution of 116 mt from the status quo OY of 564 mt.

The SSC recommended that species like blue rockfish should be managed “at a level concordant with stock assessments, not based on an assemblage aggregate”. OY Alternative 3 would be consistent with that recommendation.

Southern Minor Shelf Rockfish Species

Access to southern shelf species has been substantially limited since the implementation of RCAs in 2003 under permanent regulations to reduce catch of depleted species, particularly bocaccio and canary rockfish. As a result, catch of species in the southern minor shelf rockfish complex has been minimal. The Council identified the status quo OY of 714 mt as the only alternative to be analyzed for this complex during the 2009-10 management cycle and selected this as the final Council-preferred alternative.

Managing Bronzespotted Rockfish

The Council’s preferred alternative management measures include a no retention measure for bronzespotted rockfish. Bronzespotted rockfish (*Sebastes gilli*) are a large, relatively rare rockfish species that occur primarily in Southern California waters, in deep rocky habitats similar to those for cowcod. The spatial distribution is described as ranging from Monterey Bay, CA to Punta Colnett (northern Baja California), although the species is rare north of Point Conception (Love et al. 2002). The depth distribution is described as 75 to 413 meters, with most animals observed deeper than 200 m., including the few juveniles that have been observed in ROVs. Based on a sample of 119 otoliths, the maximum observed age was estimated at 89 years. The age and length data suggest very slow growth and high longevity, a life history pattern similar to cowcod and commonly associated with high vulnerability to fishing. In his comprehensive review of the life history characteristics for ten species of commercially important or abundant California rockfish, Phillips (1964) cited both cowcod and bronzespotted as two of the species of commercial importance that should be the subject of future studies.

Commercial landings of bronzespotted rockfish dropped rapidly in the late 1980s and remained at very low levels from 1990 to the present. When plotted relative to the minor shelf south complex within which this species is managed, this suggests that the decline in landings of bronzespotted preceded the decline in both minor shelf and overall landings of rockfish over recent decades as a result of increasingly restrictive management measures (Figure 4-12). While the hook and line fishery has traditionally accounted for most landings, the rapid growth of the Southern California gillnet fishery in the early 1980s accounted for most of the mortality during the period of apparent decline, consistent with the movement of effort to deeper and rockier habitats in that fishery.

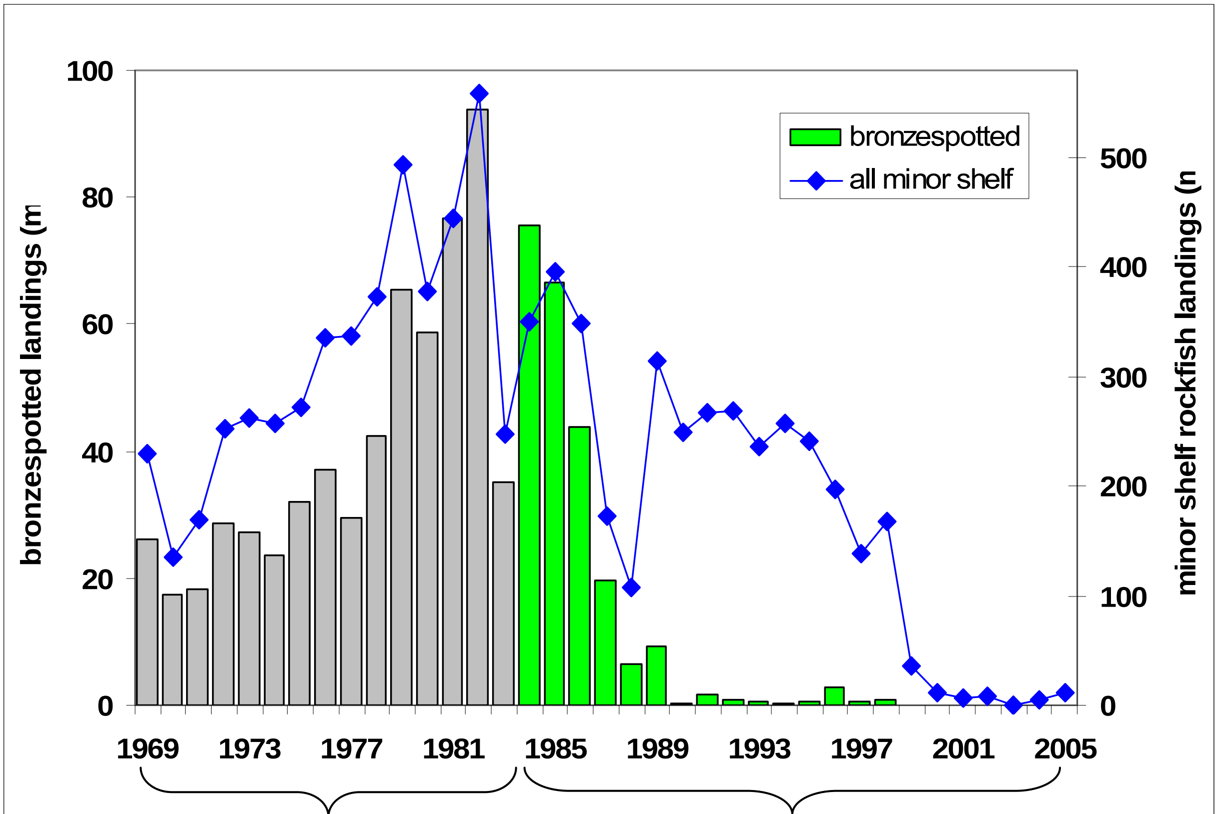


Figure 4-12. Estimates of commercial landings of bronzespotted rockfish relative to landings of all minor shelf rockfish in the San Diego, Los Angeles and Santa Barbara port groups (CalCOM, January 2007).

Although pre-1984 estimates of landings are based on ratio estimators from data collected in later years, the confidence in landings estimates for the 1984-1990 period is high, due to effective port sampling data, the ease of identification, the relatively small number of market categories in which bronzespotted occur, and other factors. While the catch history for bronzespotted since 1983 is fairly reliable, the determination of meaningful catch limits for this otherwise data-poor species will be difficult. Yet such limits will be even more difficult to derive for those species for which even the catch histories are unreliable; which includes as many as 27 rarely or infrequently encountered *Sebastes* species in California waters (Pearson et al. 2008).

The limited information for recreational fisheries suggests that bronzespotted are infrequently encountered, but that most of the historical recreational catch was from rare trips that caught moderate to large numbers of this species. Trips that encountered bronzespotted typically encountered cowcod as well, often in relatively large numbers.

Recent catch has been very low due to existing depth restrictions and establishment of the Cowcod Conservation Areas. Observer data from recent years suggest that under current management measures the recreational fisheries rarely encounter this species. It is difficult to reliably estimate the reduction in catch that would result from a no-retention policy, although it is reasonable to assume that total reduction would be small. Therefore, it is unlikely that a no-retention policy would restrict activities of either the commercial or recreational fisheries. Since this species is known to occupy similar depths and habitats as cowcod, a no-retention policy should encourage vessels that encounter this species to move, potentially reducing harvest of both bronzespotted and cowcod.

Southern Minor Slope Rockfish Species

Access to southern slope rockfish will be partially limited in 2009-10 between 38° and 40°10' N latitude by constraints imposed to quickly rebuild darkblotched rockfish. Since there is no new information available to inform new specifications for the southern minor slope rockfish complex, the Council is recommending the status quo OY of 626 mt for 2009-10.

4.3.4.2 *Minor Rockfish North*

All changes to the Minor Rockfish North complex are driven by decisions on how to manage blue rockfish given the new assessment results. Potential changes to complex specifications are described in Chapter 2 (Tables 2-1a and 2-1b) and in the section that follows.

Northern Minor Nearshore Rockfish Species

Changes to the northern minor nearshore rockfish OY that are considered in this EIS relate to changes to the blue rockfish contribution to the complex.

OY Alternative 1 (152 mt in 2009 and 2010) contemplates continuing to manage blue rockfish stock within the complex. The OY under this alternative is determined by first subtracting the status quo OY contribution of blue rockfish (15 mt) from the status quo OY of 142 mt. Then the OY contribution of blue rockfish from the new assessment (25 mt for the portion of the assessed stock north of 40°10' N latitude) is added back to derive the 152 mt OY. The blue rockfish OY contribution from the 2007 assessment is based on the OY projected using the base case, medium productivity model.

The preferred OY alternative for the northern minor nearshore rockfish complex is OY Alternative 2 (155 mt in 2009 and 2010), which contemplates continuing to manage blue rockfish within the complex. The OY adjustment for the complex is the same as described under OY Alternative 1, except the new blue rockfish OY contribution is 28 mt and is based on the projected OY from the high productivity model in the 2007 assessment as capped by the base model ABC. The preferred alternative also specifies a 220 mt California harvest guideline for blue rockfish that would be used to manage all California nearshore recreational and commercial fisheries in 2009-10.

OY Alternative 3 (127 mt in 2009 and 2010) contemplates removing blue rockfish from the northern minor nearshore rockfish complex and managing blue rockfish under their own harvest specifications. The OY under this alternative is derived by removing the old blue rockfish OY contribution of 15 mt from the status quo OY of 142 mt.

The SSC recommended that species like blue rockfish should be managed “at a level concordant with stock assessments, not based on an assemblage aggregate”. OY Alternative 3 would be consistent with that recommendation.

Northern Minor Shelf Rockfish Species

Access to northern shelf species has been substantially limited since the implementation of RCAs in 2003 under permanent regulations largely to reduce mortalities of canary and yelloweye rockfish. As a result, catch of species in the Minor Shelf Rockfish North complex has been minimal. The Council identified the status quo OY of 968 mt as the only alternative to be analyzed for this complex during the 2000-10 management cycle and selected this as the final Council-preferred alternative.

Northern Minor Slope Rockfish Species

Impacts of species comprising the northern minor slope rockfish complex are managed through commercial RCAs and trip limits, most notably those management measures specified for the trawl sector where most of the northern slope rockfish species are caught. Trawl trip limits and RCA configurations are based on constraints imposed by the depleted slope species, darkblotched rockfish and Pacific ocean perch. No change from status quo is identified by the Council for analysis; therefore, the status quo alternative for the Minor Slope Rockfish North complex, 1,160 mt, is recommended under the final Council-preferred alternative for 2009-10 (Tables 2-1a and 2-1b).

4.3.4.3 *Pacific Cod*

Pacific cod is a transboundary stock with most of the biomass distributed north of the U.S.-Canada border. They are harvested primarily in the limited entry trawl fishery north of 40°10' N latitude. Pacific cod have never been formally assessed on the U.S. west coast. The status quo ABC and OY for Pacific cod is recommended for 2007–08 fisheries. The ABC of 3,200 mt is based on historical landings and the OY of 1,600 mt is based on the 50 percent precautionary reduction for unassessed stocks as recommended by Restrepo *et al.* (1998). Prior to 2006, allowable landings of Pacific cod were not limited. Harvests in recent years were under the status quo (and proposed) OY of 1,600 mt, but in 2004, total catch approached this harvest level. Therefore, limited entry trawl and limited entry and open access fixed gear trip limits were specified beginning in period 2 of the 2006 fishery to alleviate potential overfishing concerns. These same management measures are recommended for the 2009-10 management period, which should maintain total catches well below the Council-preferred OY.

4.3.4.4 *Other Fish*

Development of Harvest Specifications for the Other Fish Complex

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

When the Groundfish FMP was first implemented in September 1982, the Other Fish complex also contained arrowtooth flounder (*Atheresthes stomias*), but did not include cabezon or kelp greenling. The species comprising the complex were considered under-harvested or not utilized by the commercial or recreational fishery and were characterized as having “low or no economic value”. The 1982 FMP explicitly stated that the decision for annual harvest limits must take into account MSY, the current status of stocks, and environmental conditions. It was also stated in the initial FMP that data were lacking to determine an accurate estimate of MSY for the species in the Other Fish complex. Therefore, the ABC for the Other Fish complex was set at a level that would “minimize disruption of existing fisheries.” The original ABC for the complex was 16,000 mt apportioned by INPFC area as follows: 3,000 mt for the U.S-Vancouver area; 7,000 mt for the Columbia area; 2,000 mt for the Eureka area; 2,000 for the Monterey area; and 2,000 mt for the Conception area. The Other Fish OY was non-numerical[7] and defined as "all that are landed under regulations adopted by the Council". Within this management framework, a "point of concern" mechanism was adopted that would require the GMT to evaluate relevant data if an ABC was projected to be exceeded to determine if there are signs of stock "stress". If stock stress was so determined, prescriptive management measures to slow or stop the catch would be recommended. A point of concern mechanism was never triggered for the Other Fish complex because landings never exceeded specified ABCs.

In 1984, the Other Fish ABC was reduced from 16,000 mt to 14,700 mt. The area-specific ABCs were changed from 3,000 mt to 2,500 mt in the U.S.-Vancouver area and from 2,000 mt to 1,200 mt in the Eureka area. Cabezon and kelp greenling were added to the FMP under the Other Fish complex with the implementation of Amendment 1 to the Groundfish FMP in July 1984. The Other Fish ABC of 14,700 mt was not modified as a result of adding these two species. Arrowtooth flounder was removed from the Other Fish complex in 1991 and managed under the Other Flatfish complex specifications. Pacific cod caught south of 43° N latitude were also included in the Other Fish complex for convenience, although only trace amounts of Pacific cod have been caught this far south.

The 14,700 mt ABC for the Other Fish complex was re-specified annually from 1984 through 2004. A new cabezon assessment for the portion of the coastwide population occurring in California waters was conducted in 2004. An ABC of 103 mt was specified for California cabezon in 2005 and 100 mt was accordingly deducted from the Other Fish ABC. An OY of 7,300 mt for the Other Fish complex or half the 14,600 mt ABC was specified in 2005 on a GMT recommendation to take a precautionary approach for this assemblage of unassessed stocks. The 14,600 mt ABC and 7,300 mt OY have been re-specified every year since then.

Considerations for Deciding 2009-10 Harvest Specifications for the Other Fish Complex

A new assessment for longnose skate was conducted in 2007 and recommended by a STAR panel and the Council's SSC for management use. The assessment indicated the stock was at healthy abundance, although it was acknowledged as a data-poor assessment with the major uncertainties being the catch history, since most skates are discarded in trawl fisheries, and the NMFS NWFSC trawl survey catchability coefficient (q). The GMT recommended in November 2007 that longnose skate continue to be managed within the Other Fish complex due to relatively high assessment uncertainty. They recommended the alternative OYs derived from the assessment be used to establish a point of concern for longnose skate. In April 2008, the Council was advised by NOAA General Counsel to establish a harvest guideline if the stock is managed within a complex rather than use the point of concern mechanism, since a point of concern has not been used in groundfish management for many years. The Council decided to adopt a 1,349 mt OY for longnose skate in 2009 and 2010 but deferred a decision on whether to manage this species with its own harvest specifications or within the Other Fish complex until June 2008.

The SSC recommended in April 2008 "that the Council manage fisheries based on stock targets and thresholds that are defined at a level concordant with stock assessments, not based on an assemblage aggregate[8]." Given that harvest specifications for the Other Fish complex were developed by setting ABCs well above the historical catch of all the species in the complex, there is no quantitative basis for the ABC, nor is there a breakdown of ABCs for the species comprising the complex. Furthermore,

[7] Numerical OYs were specified as landed catch quotas that required automatic actions to prohibit landings if attained inseason. The only numerical OYs specified in 1982 were those for Pacific whiting, sablefish, widow rockfish, shortbelly rockfish, and Pacific ocean perch.

[8] They made this recommendation generally, but specifically recommended species-specific harvest specifications be decided for blue rockfish and longnose skate.

harvest specifications for the complex have not been changed even when significant changes were made to the complex, such as removing arrowtooth flounder.

The alternatives at this point are to recommend the longnose skate ABC and OY and make a reasonable adjustment to the Other Fish specifications or to manage longnose skate within the complex and specify a harvest guideline of 1,349 mt for this species. If the Council were to choose to remove longnose skate from the Other Fish complex, it may make sense to recommend 3,400 mt be removed from the Other Fish ABC to account for the "contribution" of longnose skate to derive a value of 11,200 mt. For consistency, an OY of 5,600 mt might be recommended for the Other Fish complex since the same 50% precautionary reduction to the ABC is recommended for unassessed stocks. This is particularly prudent given that the Other Fish harvest specifications are not based on historical catches, but have been well above historical catches given the original FMP objective to set the ABC at a level to "minimize disruption of existing fisheries."

It should also be noted that catches of species in the Other Fish complex have been well below 5,600 mt and rarely greater than 4,000 mt. However, in 2003, the total catch of Other Fish species was 6,557.9 mt. From the longnose skate assessment, the total catch of longnose skate in 2003 was 1,323 mt. Therefore, in this peak year of catch for species in the Other Fish complex, the catch of species other than longnose skate totaled just over 5,200 mt. In other years, the longnose skate catch has exceeded 2,000 mt.

The decision on how to manage longnose skate should therefore consider prudent measures for longnose skate, as well as the other species comprising the Other Fish complex. Longnose skate management would certainly benefit from a species-specific ABC and OY, since harvests for the species would then be tracked inseason against a biologically based OY. This could also be accomplished with a mandatory sorting requirement for skate species and the addition of these species in the QSM tracking system, even if longnose skate are managed within the Other Fish complex. If the species is managed with its own OY, then this is a quota which would require specific action to stay within the OY. If the species is managed within the Other Fish complex, there needs to be specific actions recommended for premature attainment of the longnose skate harvest guideline. Protection of the species would therefore depend on the effectiveness of the automatic actions, so this detail needs to be deliberated.

The other elasmobranchs in the Other Fish complex (big skate, California skate, spiny dogfish, leopard shark, and soupfin shark) are generally a concern for management given their relatively late maturation and low fecundity. Concerns for species in the Other Fish complex will unlikely be addressed in the short term by any measures considered for the 2009-10 management cycle. The SSC remarked in April 2008 that specifications for the Other Fish complex should be re-evaluated in the next management cycle (for management decision-making in 2011-12) since the current specifications are archaic. While the SSC will generally explore assessment options for groundfish complexes, the GMT should consider alternative catch-based specifications for the Other Fish complex if assessment-based specifications are not developed. There should also be consideration for a 2009 assessment of spiny dogfish, which is a candidate stock for a full assessment. This decision will also be made in June 2008.

4.3.4.5 *Other Flatfish*

For sanddabs and rex sole, the available trawl survey data, along with the sizes of selectivity and maturity leads to the recommendation to continue with a data-moderate OY reduction of 25 percent for calculating the contribution of these species to the Other Flatfish OY. The Council believes that it is reasonable to assume that the stocks are above B_{MSY} based on the survey and fisheries information available for these stocks. This recommendation is consistent with Restrepo *et al.* (1998) recommendations for stocks in a data-poor situation that are not depleted, yet below B_{MSY}. The Council does not have information to conclude that these stocks are below B_{MSY}, but takes this precautionary approach in order to acknowledge a lack of data. The remaining species in the group are also likely to begin reproduction prior to retention by trawl gear, and two of the three states restrict access of trawlers to the primary depth distribution of sand sole, the remaining stock in the complex (other than the starry flounder stock that is recommended for removal from the complex) that contributes the bulk of landings among the remaining species. However, environmental factors, such as estuarine and nearshore water quality, may also play an important role in the current status of sand sole. The GMT believes it prudent to use a 50 percent precautionary reduction when calculating the OY component for these species. Survey and fisheries information on these species is less abundant than on rex sole and sanddabs. Thus, the Council recommendation is to continue to specify a 50 percent OY reduction for these species.

Since there is no new information available to inform new specifications for the Other Flatfish complex, the Council is recommending the status quo specifications for 2009-10.

4.3.5 Non-Groundfish Species

4.3.5.1 *Salmon*

See chapter 5 for a description and analysis of salmon bycatch in groundfish fisheries.

4.3.5.2 *Pacific Halibut*

The Pacific halibut fishery is affected by RCA depth restrictions because commercial halibut fishing is prohibited within the non-trawl RCA. Additionally, the alternative YRCAs under the action alternatives will restrict impacts since yelloweye and Pacific halibut tend to co-occur. Action Alternative 1 would have the least commercial impact on Pacific halibut because the seaward boundary is specified at 150 fm north of 40°10' N latitude; Action Alternative 2 would be intermediate with a seaward boundary at 125 fm in the north; and the greatest impact under Action Alternative 3 and the No Action Alternative with a seaward boundary at 100 fm in the north. The alternative YRCA closures north of 40°10' N latitude will also limit recreational Pacific halibut catch. Under the final Council-preferred alternative, Pacific halibut catch is somewhat greater than under the other action alternatives since the non-trawl RCA is not as extensive and fewer YRCAs are recommended for implementation in 2009-10.

4.3.5.3 *Coastal Pelagic Species*

CPS are taken incidentally in the groundfish fishery. Incidental take is well documented in the at-sea and shorebased whiting fishery. Preliminary data for 2001 indicates 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.

4.3.5.4 *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.

4.3.5.5 *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 has been noted in pot and trap fisheries, including those targeting Dungeness crab. It is not anticipated this fishery would need to be constrained or modified to rebuild any of the depleted west coast groundfish species of concern.

One potential consideration in adjusting the trawl RCA to depths shallower than 75 fm during the summer months is that smaller vessels would be forced to fish shoreward of the RCA. Concentrating vessel effort in shallow water affects Dungeness crab in the north because they are less likely to survive discard during their summer molting season.

There may be a need for a section 7 ESA consultation to prosecute 2009-10 Dungeness crab fisheries in waters off California and Oregon due to recent "takes" of humpback whales by float lines in crab and sablefish pot/trap fisheries. See Chapter 5 for more details.

4.3.5.6 *Greenlings (Other than Kelp Greenling), Ocean Whitefish, and California Sheephead*

Greenlings of the genus *Hexagrammos* (except kelp greenling), ocean whitefish, and California sheephead are managed by the state of California. Due to their co-occurrence with groundfish and their popularity as recreational target species, California often takes state regulatory action for these species when recreational fisheries for federal groundfish fisheries are closed or limited. Therefore, any of the groundfish actions anticipated for constraining groundfish species are likely to constrain impacts for these species as well.

4.3.5.7 *Pink Shrimp*

The pink shrimp fishery is managed by the states of Washington, Oregon, and California. The season runs from April 1 through October 31, and 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 a minimum mesh size of one inch to three eighths inch between the knots. In some years, prior to finfish excluder requirements, the pink shrimp trawl fishery has accounted for a significant share of canary rockfish incidental catch. Beginning in 2002, finfish excluders in the pink shrimp fisheries were mandatory in California, Oregon, and Washington.

The pink shrimp trawl fishery is exempted from RCA boundaries because of state required bycatch excluders that effectively reduce rockfish bycatch. Other regulatory provisions including groundfish landing restrictions do not differ between the action alternatives, the final Council-preferred alternative, or the No Action alternative.

4.3.5.8 *California Halibut*

California halibut are primarily caught in open access exempt trawl fisheries south of Pt. Arena, California and by the California recreational fishery. Since the advent of depth based management of west coast groundfish fisheries in late 2002, exempt trawl fisheries have been subject to the depth/area restrictions imposed with the establishment of the trawl RCA. Therefore, in addition to reduced incidental groundfish landing allowances, limited access to traditional commercial fishing areas for California halibut under changing trawl RCA configurations may be a significant impact.

There has been a significant amount of mixed target fishing for groundfish species and California halibut in some exempt trawl trips as evidenced by fish ticket landing receipts. The new mandate requiring VMS on open access vessels intending to land groundfish may reduce the groundfish impacts in the commercial California halibut fishery and, at the very least, will enforce the integrity of the trawl RCA restriction on this fleet.

A significant increase in California halibut impacts is not anticipated under any of the action alternatives analyzed in this EIS.

4.3.5.9 *Ridgeback and Spot Prawns*

The ridgeback prawn fishery is managed by the state of California and is prosecuted using exempted trawl gear under the federal open access regulations. Continuing the exemption to RCA restrictions south of 34°27' N latitude is proposed under the final Council-preferred alternative to allow the ridgeback prawn trawl fishery to operate within the trawl RCA to 100 fm when the shoreward boundary of the trawl RCA is at 75 fm. The ridgeback prawn fishery operates primarily between 35 fm and 90 fm, with an average fishing depth of 75 fm. Trawl log data show that 99 percent of ridgeback prawns are caught in depths of 101 fm or less. Therefore, when the shoreward boundary of the trawl RCA is at 100 fm, the fishery will be able to continue operating over traditional fishing grounds. However, the fishery may be significantly impacted when the shoreward boundary of the trawl RCA is at 75 fm. Trawl data evaluated from 2001 showed that 40 percent of the annual catch occurred in depths of 75 fm to 100 fm. An exemption to the RCA closure between 75 fm and 100 fm will allow the fishery to continue fishing operations in traditional fishing grounds in sandy habitats without impact to the depleted rockfish stocks the RCA is intended to protect.

The spot prawn fishery is managed by the states and, since 2003, only fixed gears (pots and traps) are allowed in the fishery. Prior to 2003, exempt trawls were allowed for targeting spot prawns, but the fishery occurred primarily over rocky substrates and the rockfish bycatch was at times excessive. Therefore, spot prawn trawling was prohibited under state and federal regulations beginning in 2003. None of the actions alternatives analyzed in this EIS are anticipated to significantly impact spot prawns.

4.3.5.10 *Sea Cucumbers*

The sea cucumber fishery is managed by the state of California and is prosecuted using exempted trawl gear under the federal open access regulations. Since the advent of depth based management of west coast groundfish fisheries in late 2002, exempt trawl fisheries have been subject to the depth/area restrictions imposed with the establishment of the trawl RCA. Therefore, in addition to reduced incidental groundfish landing allowances, limited access to traditional commercial fishing areas for sea cucumbers under changing trawl RCA configurations may be a significant impact.

A significant increase in sea cucumber impacts is not anticipated under any of the action alternatives analyzed in this EIS.

4.4 Discussion of Cumulative Impacts

A number of natural and human-induced factors affect the status of a stock. Through data such as commercial and recreational catch estimates, length at age distributions, and larval distribution and abundance, past effects on a stock’s productivity and mortality are incorporated into stock assessments and their associated rebuilding analyses. That is, a final estimate of a stock’s biomass reflects the wide number of human and natural effects on the stock, both in the past and at the present time, even if these factors are not estimated explicitly in the model. (Although uncertainty with respect to the estimates in the assessments (see Section 4.2) and only nascent understanding of the relationship between environmental conditions and stock status increases an assessment’s overall uncertainty.) Given that the findings from a stock assessment provide the scientific basis upon which harvest specification decisions are made, it is assumed here that that the impacts of the effects found within stock assessment models are already adequately accounted for within the analysis of this action. This section, therefore, addresses factors that may impact affected species, but which are not explicitly accounted for in the stock assessments. These factors may affect a species in a number of ways, including contributing to the uncertainty that a harvest specification will maintain or rebuild the affected species' population levels and changing the genetic structure of a stock.

The actions discussed below are divided into two categories, *internal* and *external*. *Internal* refers to actions implemented as part of the management regime, while *external* refers to actions of other agencies, organizations and individuals, including broad natural or socioeconomic effects.

4.4.1 Internal Factors

4.4.1.1 *Changes to the Management Regime: Open Access Sector License Limitation and Trawl Rationalization System*

The Council is currently considering alternatives that would establish a Trawl Rationalization program, with an expected implementation date of 2011. In a related action, the Council is considering transitioning the open access directed groundfish sector into a permit system for landing groundfish. Both changes to the west coast groundfish management structure are expected to improve the accounting of fishing mortality to assure that catches do not exceed harvest specifications. More accurate catch data also would be expected to bring about improvements to stock assessments by reducing the uncertainty surrounding catch data.

4.4.1.2 *Area restrictions*

Since 1998, progressively restrictive depth-based and area closures (most notably RCAs) have constrained fishing activity within smaller areas of state and federal waters. Though these closures are considered to be effective tools in limiting fishing interactions with depleted species, they are also responsible for shifting additional fishing pressure into other areas and onto other species.

For example, the Oregon recreational groundfish fishery has been closed offshore of 40-fm from June through September since 2004. It is likely that due to these closures, most anglers who would have fished offshore during the closure periods instead relocated their activities inshore. The effort shift onto nearshore species that resulted contributed to the early attainment of the black rockfish harvest cap in 2004 and 2005 and to the early closure of the recreational fishery in both years. A similar effect is noted in the California recreational fishery, in which the combined effects of Federal RCAs and state marine protected areas have increased the pressure on nearshore stocks. For many of these nearshore stocks, there is little data to support an assessment of its stock status, suggesting that the effect of this effort shift is difficult to monitor.

It is expected that the effects of area restrictions will persist into the future; the effects may also become more acute if depleted species' OYs are further reduced in order to rebuild the species as quickly as possible. Furthermore, in addition to the possible future expansion of RCAs, the implementation of Amendment 19 Essential Fish Habitat (EFH) brought about other area closures in order to protect sensitive habitat from fishing impacts. For Washington recreational fisheries, for example, a closure of fisheries seaward of a 20-fathom closure would reduce the area inside 60 fm by 74 percent. Allowing fishing only in these smaller areas could reduce the ability of anglers to target healthy fish stocks in traditional fishing areas. Analogously, fishing pressure on groundfish stocks that may have previously been spread over a broad area could become more concentrated, increasing the potential for localized depletion of some species.

4.4.2 External Factors

4.4.2.1 *Short-term and Long-term Climate Variability: ENSO (El Niño) and PDO*

Most commercially important fish and shellfish stocks in the California Current system, including many groundfish, are widely acknowledged to experience moderate to substantial variability in year-to-year recruitment success. Nearly all of these stocks (particularly those of winter-spawning shelf species) experienced high (positive) recruitment anomalies in 1999, and a great many of these stocks experienced high recruitment in 2000 as well. For many stocks, these year classes are a primary factor behind the increased abundance trends. For example, the 1999 bocaccio year class was the largest since 1989, resulting in a near doubling of stock spawning biomass between 1999 and 2005.

Similarly, many stocks also demonstrated strong recruitment in 1970, 1980, 1984 and 1990, with weak year classes tending to occur in 1976, 1982-83, 1992-93 and 1997. Multivariate analysis of the stocks' recruitment deviations suggests that a significant amount of the observed variability in recruitment for West Coast groundfish can be explained by environmental conditions that have a very similar impact to a broad range of species across a fairly broad spatial scale. Such a conclusion is also supported by survey data; for example, the Southwest Fisheries Science Center's rockfish pre-recruit survey (1983-2005) detected a strong degree of covariance in the relative abundance of pelagic juvenile rockfish from 1983 through 2005. Although this survey failed to detect the magnitude of the 1999 year class, it does show strong interannual variability throughout the 1980s, followed by a precipitous decline in relative juvenile abundance through most of the 1990s, followed in turn by a return to highly variable (but often strong) recruitment in the post-1999 era.

The timing of these recruitment synchrony events maps well onto short-term and long-term changes in ocean conditions. Following an intensive 1997-1998 El Nino event, ocean conditions changed dramatically, and 1999 has been described as a year of transition in long-term (decadal scale, as associated with the Pacific Decadal Oscillation (PDO)) ocean conditions by climatologists (Peterson and Schwing 2003). The mechanisms by which climate affects recruitment are not known with certainty; however, strong recruitment years are generally associated with high southward transport in the winter period, low ocean temperatures, and high zooplankton production; these conditions parallel those present in 1999 and the years that immediately followed. Indeed, the connection between productivity and transport has long been recognized (e.g., Chelton et al. 1982); recent observations are consistent with this finding; for example, Swartzman and Hickey (2003) describe an increase in euphausiid biomass following the 1999 shift in much of the California Current (generally south of Cape Blanco), and Feinberg and Peterson (Feinberg and Peterson 2003) describe a dramatic increase in the duration and intensity of euphausiid spawning off Oregon between 1996 and 2001.

In that stock assessments estimate spawning biomass of a stock over time, it is reasonable to conclude that the effects of climatological events, such as El Nino and PDO, on groundfish species are accounted for within the analyses. However, with one exception, current stock assessments do not explicitly account for their effect on stock status, such as changes in fishing mortality. Only Schirripa (2008) has integrated relative sea level (a proxy for transport) into the sablefish stock assessment as an environmental factor related to recruitment variability.

Future effects of ocean conditions on the status of affected species, on the other hand, are not encompassed within the analysis of the present action. Most notably, the criteria used to analyze impacts on depleted species, such as the time to rebuild under a constant harvest rate and the probability of successfully rebuilding the stock by T_{MAX}, do not account explicitly for the effects of climatological events. Indeed, although the development of statistical indices of climate variability across multiple time scales has improved our understanding of how climate has affected North Pacific ecosystems and productivity in the past, the future remains subject to poor predictability. Such uncertainty, with respect how fish productivity and the climate regime interact and with respect what and when short- and long-term climate changes will occur, brings about greater uncertainty surrounding stock assessment projections of future biomass: since predictions about future productivity are based on past relationships, between stock size and recruitment for example, if underlying conditions change, these predictions may under- or over-estimate population growth and sustainable fishery removals. For depleted species in particular, errors in prediction may lead to the need to decrease fishing effort below levels specified in the rebuilding plan in order to achieve a rebuilt stock by the target date. On the other hand, unanticipated increases in recruitment strength may allow for a quicker time to rebuild. In either case, amendments to the stock's rebuilding plan may be necessary. This environmentally-related uncertainty pertains more specifically to some depleted species (such as bocaccio, explained above) rather than to others; for species such as cowcod and widow rockfish, recruitment trends are better explained by the deterministic stock-recruitment relationship that is modeled within a stock assessment.

4.4.2.2 *Spatial Effects*

Under the current groundfish FMP, most stocks are managed under a coastwide OY. However, there is increasing evidence that for some stocks, a greater consideration of spatial dynamics could be appropriate, particularly with respect to minimizing the potential for localized depletion.

Berkeley et al. (2004a) review examples of complex population structure in rockfish populations that suggests that only a small fraction of the spawners in a given stock contribute to successful recruitment. This can be attributed to high temporal and spatial variability in the coastal ocean that provides only limited opportunities for optimal environmental conditions that are required for successful recruitment for those species for which recruitment variability is high. Consequently, there could be increased recruitment variability, or some potential for recruitment failure, if the most reproductively important elements of a stock are depleted below target levels.

Similarly, for stocks with limited genetic exchange, overfishing of isolated population units could be possible where current stock assessments do not take such population structure into account. For example, Miller et al. (Miller, Banks, Gomez-Uchida, and Shanks 2005) found significant genetic differences among black rockfish adults collected 340–460 km apart, despite the assumption that prolonged larval duration led to widespread dispersal and minimal population structure in this species.

The risk to a species of reduced reproductive success or the depletion of genetic sub-populations is likely to increase with higher levels of fishing mortality. In addition, alternative management measures may contribute to adverse spatial effects for a given species, as these could change the spatial and/or temporal concentration of catch (at a local and a coastwide scale) from that observed under current conditions. In all alternatives, however, the low OYs for depleted species constrain the catch of many healthy stocks to levels below their OYs, bringing about a reduction in the risk of adverse spatial effects for healthy stocks.

Many Pacific groundfish harvest specifications are structured following biogeographic zones (such as north-south divisions at Cape Mendocino and at Point Conception). However there is not yet the science available to support spatial management at the resolution that may be necessary to reduce the risks discussed above; data limitations for stock assessment models preclude such advancement for most, if not all, west coast groundfish species in the near term. Pelletier and Mahevas (2005) compiled a comprehensive review of fisheries and marine ecosystem simulation models and approaches that incorporated spatial dynamics, and rated the potential for each approach to address a range of ecological and fisheries related effects described as important elements of the success (or lack thereof) of implementing spatial management measures. These included restoring spawning biomass within closed areas, restoring demographic structure, increasing fecundity, enhancing fisheries yield, improving population stability and resilience, protecting biodiversity, and effecting changes in community structure. Such issues will be integral elements of fisheries science and management in the future, and advances in both assessment methods and simulation techniques should provide the means to better cope with the challenges of incorporating such complexity in the face of changing management regimes.

4.5 Summary of Impacts

4.5.1 Documentation of Impact Analysis Modeling

4.5.1.1 *Limited Entry Non-Whiting Trawl*

The limited entry non-whiting trawl fishery is modeled using several different data sources that are compiled into a framework often described as the “trawl bycatch model”. The WCGOP provides discard estimates for target and rebuilding species by several different depth and latitudinal strata and these data are used to estimate discards of select species depending on where fishing is estimated to be taking place. In addition to discard rate estimates, staff at the WCGOP develop bycatch rates for rebuilding species that estimate the total catch of rebuilding species (landings and discard) based on a rate of rebuilding species catch to retained target species catch. These rates are used to estimate the catch of rebuilding species based on an estimated retained catch amount of target species in various locations.

The location of fishing effort and catch is informed by logbook information. Logbooks record several pieces of information including the latitude, longitude, depth, month, species, and pounds of retained catch on a vessel by vessel basis. This information is used to indicate the productive potential of each vessel at various locations on a species by species basis. Logbooks do not, however, capture 100 percent of the landed catch that the limited entry trawl fleet generates. In order to develop spatial target species catch estimates that are reflective of all trawl landings, the weight of catch in logbook records are expanded up to the amount recorded on fish tickets from the three west coast states. In this exercise, the spatial distribution of catch recorded in logbooks is maintained, but the total amount is increased.

Discard, bycatch rate, and logbook information is compiled into matrices stratified by bi-monthly period, 3 latitudinal strata, and 7 different depth strata. The interface of the model selects for particular depth and latitudinal strata by imposing a distinct set of RCA boundaries within each of 3 latitudinal areas. For example, if RCA boundaries are set at 75 fm to 200 fm north of 40°10' N latitude, the model selects records that are both deeper and shallower than the area between 75 fm and 200 fm. The model then estimates a depth preference for each active vessel based on logbook information and the established set of RCA boundaries. Logbook data indicates clear depth preferences and fishing success for individual vessels. Based on the set of RCAs imposed on the fishery, the model estimates whether a vessel will tend to fish deeper or shallower than the trawl RCA based on the preference of each vessel to fish in areas that remain open, and then selects the retained catch associated with that vessel from the depth strata where the vessel is estimated to be fishing.

In addition to RCA boundaries, the model interfaces controls for retained catch quantities by species and bi-monthly period. Historic records of vessel catch are matched up with historic catch limits. It is assumed that those vessels that have attained their trip limits in the past would catch their trip limits if those limits are increased. An increase in a trip limit therefore results in an increase in predicted catch only in cases where particular vessels have historically attained their trip limit. It is assumed that those vessels that have not attained their trip limit will not do so if the limit is raised. Inversely, as trip limits are reduced, the catch of each vessel is constrained, but only if the limit is less than their historic catch of a particular species. If a limit is reduced, some vessels may not be constrained by that limit because their historic catch levels have been relatively small.

After calculating retained catch on a vessel by vessel basis, and the location of that catch, the model estimates the catch of rebuilding species. This is done by aggregating the amount of target species predicted to be caught by various depth and latitudinal strata and multiplying those retained target species tonnages by the bycatch rates of rebuilding species that have been observed in the WCGOP. The result is then aggregated for each rebuilding species to derive an estimated annual catch of rebuilding species in the limited entry non-whiting trawl fishery.

Beginning in 2007, bycatch rates from the WCGOP were stratified in a more refined manner to accommodate more spatially refined management. This was done to more precisely manage the impacts of rebuilding species in the non-whiting trawl fishery. Data provided by the WCGOP included bycatch rates of rebuilding species in 8 sub-areas north of 40°10' N latitude. This stratification allowed for analysis of more refined/focused spatial restrictions. This more refined bycatch data allows analysts to estimate an aggregate bycatch rate in areas north of 40°10' N latitude that is based on a series of various depth restrictions in one or more of the eight subareas. For example, if an area off northern Washington is closed, analysts can re-estimate an aggregate bycatch rate for the areas remaining open and incorporate this new bycatch rate into the trawl model. The trawl model then uses this new bycatch rate to estimate the catch of rebuilding species that would be associated with a fishery that is closed off northern Washington. Bycatch rates used to project depleted species impacts in the fishery north of 40°10' N latitude and shoreward of the RCA (using selective flatfish trawls) are average annual rates from that last two years of WCGOP observations weighted equally by depth, area, and season (Table 4-20a). Bycatch rates used to project depleted species impacts in the fishery north of 40°10' N latitude and seaward of the RCA are weighted average annual rates[9] from that last four years of WCGOP observations and are modeled by depth and bi-monthly period (Table 4-20b).

[9] Annual bycatch rate weighting = 0.5*BCrate Year-1 + 0.25* BCrate Year-2 + 0.167* BCrate Year-3 + 0.083 BCrate Year-4, where year-1 is the most recent year.

Table 4-20a. Bycatch rates of depleted species used to model impacts shoreward of the trawl Rockfish Conservation Area by depth, area, and season in the limited entry non-whiting trawl fishery north of 40°10' N latitude.

Depth	Area	Trawl Bycatch Rates North of 40°10' N latitude Seaward of the RCA									
		Summer					Winter				
		Widow	Canary	Y'eye	POP	Drkbltch	Widow	Canary	Y'eye	POP	Drkbltch
100 fm	Alava to Queets	0.002	0.006	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000
	Arago to Humbug	0.000	0.004	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000
	Cascade head to Arago	0.000	0.002	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000
	Col River to Cascad Head	0.000	0.001	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000
	Humbug to 40°10' N lat	0.000	0.003	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000
	Leadbtr to Col River	0.001	0.001	0.000	0.002	0.011	0.000	0.000	0.000	0.000	0.000
	North of Cp Alava	0.000	0.007	0.000	0.003	0.002	0.000	0.009	0.000	0.000	0.000
	Queets to Leadbetter	0.000	0.004	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000
50 fm	Alava to Queets	0.000	0.001	0.001	0.000	0.002	0.000	0.001	0.000	0.000	0.000
	Arago to Humbug	0.000	0.065	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Cascade head to Arago	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Col River to Cascad Head	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000
	Humbug to 40°10' N lat	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Leadbtr to Col River	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	North of Cp Alava	0.000	0.023	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000
	Queets to Leadbetter	0.000	0.010	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60 fm	Alava to Queets	0.000	0.005	0.000	0.000	0.000	0.000	0.024	0.000	0.000	0.000
	Arago to Humbug	0.000	0.045	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Cascade head to Arago	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Col River to Cascad Head	0.000	0.002	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000
	Humbug to 40°10' N lat	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Leadbtr to Col River	0.000	0.001	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000
	North of Cp Alava	0.000	0.009	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	Queets to Leadbetter	0.000	0.002	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
75 fm	Alava to Queets	0.000	0.005	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
	Arago to Humbug	0.000	0.037	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000
	Cascade head to Arago	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Col River to Cascad Head	0.000	0.002	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000
	Humbug to 40°10' N lat	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Leadbtr to Col River	0.000	0.008	0.000	0.000	0.006	0.000	0.001	0.000	0.000	0.000
	North of Cp Alava	0.000	0.004	0.001	0.001	0.000	0.000	0.007	0.000	0.000	0.000
	Queets to Leadbetter	0.000	0.002	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000

Table 4-20b. Bycatch rates of depleted species used to model impacts seaward of the trawl Rockfish Conservation Area by depth and bi-monthly period in the limited entry non-whiting trawl fishery north of 40°10' N latitude.

Species	Depth (fm)	Trawl Bycatch Rates North of 40°10' N latitude Seaward of the RCA					
		1	2	3	4	5	6
Bocaccio	150	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	180	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	250	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Canary	150	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	180	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	250	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cowcod	150	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	180	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	250	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Darkblotched	150	0.0198	0.0081	0.0139	0.0139	0.0081	0.0198
	180	0.0194	0.0075	0.0123	0.0123	0.0075	0.0194
	200	0.0129	0.0063	0.0126	0.0126	0.0063	0.0129
	250	0.0070	0.0041	0.0072	0.0072	0.0041	0.0070
POP	150	0.0076	0.0058	0.0068	0.0068	0.0058	0.0076
	180	0.0065	0.0055	0.0054	0.0054	0.0055	0.0065
	200	0.0043	0.0041	0.0042	0.0042	0.0041	0.0043
	250	0.0012	0.0021	0.0008	0.0008	0.0021	0.0012
Widow	150	0.0003	0.0001	0.0000	0.0000	0.0001	0.0003
	180	0.0002	0.0000	0.0000	0.0000	0.0000	0.0002
	200	0.0001	0.0000	0.0000	0.0000	0.0000	0.0001
	250	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Yelloweye	150	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	180	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	250	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Bycatch rates south of 40°10' N latitude are not stratified at the same resolution, partially because there are fewer observations in the south. Tables 4-21a and 4-21b illustrate the bycatch rates used for modeling impacts in the south shoreward and seaward of the RCA, respectively. These rates are weighted average annual rates from that last four years of WCGOP observations using the same weighting scheme as those used to model impacts north of 40°10' N latitude and seaward of the RCA and are modeled by depth, area, and bi-monthly period.

Table 4-21a. Bycatch rates of depleted species used to model impacts shoreward of the trawl Rockfish Conservation Area by depth and bi-monthly period in the limited entry trawl fishery south of 40°10' N latitude.

Species	Depth	Shoreward											
		38° - 40°10' N Lat.						South of 38° N Lat.					
		1	2	3	4	5	6	1	2	3	4	5	6
Bocaccio	50	0.000	0.000	0.015	0.015	0.015	0.000	0.000	0.000	0.015	0.015	0.015	0.000
	60	0.006	0.006	0.010	0.010	0.010	0.006	0.006	0.006	0.010	0.010	0.010	0.006
	75	0.013	0.013	0.014	0.014	0.014	0.013	0.013	0.013	0.014	0.014	0.014	0.013
	100	0.013	0.013	0.024	0.024	0.024	0.013	0.013	0.013	0.024	0.024	0.024	0.013
Canary	50	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.001
	60	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.001
	75	0.018	0.018	0.001	0.001	0.001	0.018	0.018	0.018	0.001	0.001	0.001	0.018
	100	0.018	0.018	0.001	0.001	0.001	0.018	0.018	0.018	0.001	0.001	0.001	0.018
Cowcod	50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	60	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	75	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.000
	100	0.001	0.001	0.002	0.002	0.002	0.001	0.001	0.001	0.002	0.002	0.002	0.001
Darkblotched	50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	60	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	75	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	100	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
POP	50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	60	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	75	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Widow	50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	60	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.001
	75	0.006	0.006	0.001	0.001	0.001	0.006	0.006	0.006	0.001	0.001	0.001	0.006
	100	0.006	0.006	0.001	0.001	0.001	0.006	0.006	0.006	0.001	0.001	0.001	0.006
Yelloweye	50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	60	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	75	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 4-21b. Bycatch rates of depleted species used to model impacts seaward of the trawl Rockfish Conservation Area by depth and bi-monthly period in the limited entry trawl fishery south of 40°10' N latitude.

Species	Depth	Seaward											
		38° - 40°10' N Lat.						South of 38° N Lat.					
		1	2	3	4	5	6	1	2	3	4	5	6
Bocaccio	150	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000
	180	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Canary	150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	180	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cowcod	150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	180	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Darkblotched	150	0.020	0.007	0.014	0.014	0.007	0.020	0.009	0.000	0.007	0.007	0.000	0.009
	180	0.020	0.006	0.013	0.013	0.006	0.020	0.008	0.001	0.006	0.006	0.001	0.008
	200	0.015	0.005	0.013	0.013	0.005	0.015	0.007	0.001	0.005	0.005	0.001	0.007
	250	0.008	0.003	0.007	0.007	0.003	0.008	0.002	0.000	0.006	0.006	0.000	0.002
POP	150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	180	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Widow	150	0.000	0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.004	0.004	0.000	0.000
	180	0.000	0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.004	0.004	0.000	0.000
	200	0.000	0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.004	0.004	0.000	0.000
	250	0.000	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.002	0.002	0.000	0.000
Yelloweye	150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	180	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

4.5.1.2 *Limited Entry Whiting Trawl*

The Council's Groundfish Management Team utilizes a model for assessing bycatch impacts in the Pacific whiting fishery. This model estimates the catch of depleted species based on a rate of depleted species catch per unit of Pacific whiting catch in each sector. This model is used to help inform appropriate bycatch limits for the Pacific whiting fishery given a particular Pacific whiting OY.

Bycatch rates in the Pacific whiting fishery model are calculated for each year and non-tribal whiting sector. The rates are estimated as the metric tons of each depleted species per metric ton of whiting. The model uses the four years immediately prior to the existing year and combines those years through the use of a weighted average formula indicated below:

$$\text{Weighted Bycatch Rate} = 0.4*\text{BCrate}_{\text{Year-1}} + 0.3*\text{BCrate}_{\text{Year-2}} + 0.2*\text{BCrate}_{\text{Year-3}} + 0.1*\text{BCrate}_{\text{Year-4}}$$

This weighted average approach is taken because it is believed that the prior year is more reflective of potential bycatch patterns in the current year. This is believed to be the case in the Pacific whiting fishery because the relative abundance of species caught in the Pacific whiting fishery can vary substantially from year to year. This is particularly the case because Pacific whiting is a highly variable stock, and variations in Pacific whiting stock abundance should have an impact on the bycatch rate of non-target stocks as those stocks become more or less relatively abundant to Pacific whiting. The bycatch rates used for estimating depleted species catch in the 2009 fishery (except for widow rockfish) are illustrated in Table 4-22.

Table 4-22. Bycatch rates of depleted species used to model impacts in the 2009 Pacific whiting trawl fishery.

Sector	Canary	Darkblotched	POP	Yelloweye
Mothership	0.0000382	0.0001127	0.0000202	0.0000001
CP	0.0000033	0.0000782	0.0000147	0.0000001
Shoreside	0.0000167	0.0000300	0.0000036	0.0000003

One exception to the weighted average approach described above is widow rockfish. The bycatch rate of widow rockfish has been increasing year over year in all non-tribal sectors of the Pacific whiting fishery. Due to this clear trend of increasing bycatch rates, widow rockfish bycatch rates are estimated with a linear regression analysis that uses the prior four years to estimate bycatch rates in the future. This is done on a sector by sector basis. Figure 4-8 illustrates the bycatch rate of widow rockfish by sector from 2004 to 2007.

4.5.1.3 *Limited Entry Fixed Gear*

Two major strategies for the limited entry fixed gear fleet are targeting of nearshore groundfish species and targeting sablefish in both the primary fishery and the daily-trip-limit (DTL) fishery. Nearshore impact modeling methodology is described in Section 4.5.1.4. Impacts in the sablefish targeting strategies are modeled as follows.

The sablefish OY north of 36° N latitude is apportioned according to the formal intersector allocations shown in Figure 4-13. It is assumed in the analysis that the annual sablefish allocation will be attained by the fixed gear fleets. Fleetwide discard estimates associated with fixed gear sablefish fishing are derived from WCGOP observer data and fish ticket data obtained from PacFIN. WCGOP observation of fixed-gear vessels targeting sablefish began in 2002 and has focused on those participating in the limited-entry primary fishery. However, data from those observations in the open access daily-trip-limit sablefish fishery also inform the impact model.

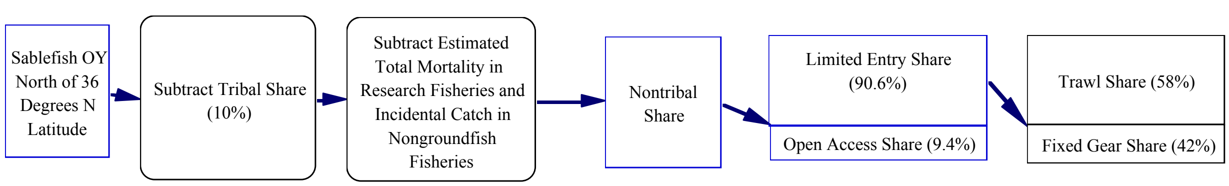


Figure 4-13. The formal intersector allocations of sablefish north of 36° N latitude.

Observations from the fixed gear sablefish fishery north and south of 40°10' N latitude were pooled for all years of data (2002-2006), with no differential weighting applied to catch from different years. This level of data aggregation enables reporting of retained and discarded catch of groundfish species by gear type at a finer latitudinal and depth scale than has been done in previous specifications and management measure analyses. Data summarizing observed retained and discarded catch from fishing efforts north of 40°10' N latitude were stratified by gear type (longline and pot/trap) and three alternative depth ranges that are used to evaluate different seaward boundaries of the non-trawl RCA. Although the range of depths recorded for an individual fixed gear set by observers is commonly much smaller than for observed trawl tows, it may not be possible to accurately assign the catch and discard of many sets to a specific 25 fm interval. For this exercise, the average of the beginning and ending depths of each set was used to represent the depth at which all fish on the set were caught.

The distribution of observed bycatch of canary and yelloweye were evaluated to determine the potential latitudinal boundaries for subareas north of 40°10' N latitude that could be used to segregate areas of higher bycatch of these species and allow for specification of differential seaward RCA boundaries that would promote bycatch reduction with the least disruption of overall fleet fishing practices. This review led to the definition of four subareas for which sablefish catch and discard of other species are summarized. These subareas are bounded by: Cape Mendocino at 40°10' N latitude, the boundary of the Columbia and Eureka INPFC areas (43°10' N latitude), Cascade Head (45.064°10' N latitude), Point Chehalis (46.888°10' N latitude), and the U.S.-Canada border. Several alternative boundaries were evaluated, but those listed above provided the greatest contrast between areas of high and low yelloweye bycatch. In particular, splitting the northernmost subarea, using one of the available management lines, simply created two areas with relatively high yelloweye bycatch from the existing one. Since rockfish bycatch in the pot gear fleet is very small and there are very limited numbers of pot gear observations in some areas, results for this group are summarized with respect to depth only (without subareas).

Tables 4-23, 4-24, and 4-25 report catch and discard data collected from depths greater than 100 fm, 125 fm, and 150 fm, respectively. Discard rates for each subarea and depth are calculated by dividing each discard weight by the weight of retained sablefish, and are provided in Tables 4-26 to 4-28. Since the seaward boundary of the non-trawl RCA south of 40°10' N latitude has always been 150 fm, no data were collected in the sablefish fishery shallower than 150 fm, and hence all of the new columns for each gear type in the southern area contain the same values as reported in the greater than 150 fm depth category.

The highest amounts and rates of yelloweye bycatch in this fishery have been observed north of Point Chehalis. Table 4-24 provides additional information intended to aid the use of these discard rates to project overall northern area impacts associated with implementing differing seaward RCA boundaries across subareas. The upper two panels in Table 4-24 report the distribution of 2002-2006 observed sablefish landings among the four catch subareas and four port groups. The bottom two panels of Table 4-24 report the annual distributions of total fixed-gear sablefish landings (based on fish tickets) among the four port groups. The middle panel of Table 4-24 reports estimates of the distribution of fleet-wide, northern-area landings among catch areas, which area based on the other data presented in Table 4-24. Although the annual results presented in the middle panel are all based on the average port group catch area distributions for the 2002-2006 period, they do illustrate the variability in the proportions of sablefish attributed to each catch area as a result of annual changes in the port groups where sablefish are landed.

In evaluating the overall effect of alternative RCA specifications, a column from Table 4-26, 4-27, or 4-28 may be selected to represent each of the four areas. The discard rates associated with the depth range selected for each area can then be multiplied by the row from the middle panel of Table 4-24 which is judged to be most representative (Tables 4-30 to 4-32). Summing these results across the entire area north of 40°10' N latitude yields weighted-average discard rates that can be used directly in the existing spreadsheet model used to evaluate impacts in this fishery.

In this analysis, observations from the primary fishery are assumed to be representative of bycatch and discard occurrences associated with all fixed gear sablefish fishing north of 36° N latitude. Since only a fraction of discards die, an assumed mortality percentage is applied. In accordance with the rate of survival assumed by the GMT, 20% of the discarded poundage of sablefish is assumed to represent mortality. For rebuilding species, observed discard ratios relative to retained sablefish, are then used to calculate estimated amounts of mortality for each.

Table 4-23. Amounts of species discard observed on fixed-gear sablefish sets deeper than 100 fm, stratified north and south of 40°10' N latitude, including four subareas for longline catch north of 40°10' N latitude.

	All observations recorded as being deeper than 100 fm							
	Longline						Pot	
	36° - 40°10' N lat	North of 40°10' N lat	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°	36° - 40°10' N lat	North of 40°10' N lat
Observed sablefish pounds								
retained	141,939	2,643,162	379,834	584,656	411,205	1,267,467	207,178	1,548,261
discarded	64,449	357,465	54,360	137,272	79,756	86,078	96,335	319,949
Number of observed sets								
total	138	1,902	222	353	235	1,092	94	1,445
with yelloweye	0	127	7	23	4	93	0	2
% of total	0%	7%	3%	7%	2%	9%	0%	0%
with canary	0	113	5	17	18	73	0	0
% of total	0%	6%	2%	5%	8%	7%	0%	0%
Discarded pounds of species								
Canary rockfish	**0**	**1,166**	**36**	**172**	**120**	**838**	**0**	**0**
Widow rockfish	0	10	0	0	10	0	0	5
Yelloweye rockfish	**0**	**1,741**	**194**	**403**	**68**	**1,075**	**0**	**7**
Bocaccio rockfish	0	0	0	0	0	0	0	0
Cowcod rockfish	0	0	0	0	0	0	0	0
Pacific ocean perch	0	243	14	0	16	213	2	3
Darkblotched rockfish	53	466	211	55	16	183	32	114
Pacific whiting/hake	52	593	118	200	153	122	0	54
Shortspine thornyhead	437	1,752	177	66	312	1,198	1	77
Longspine thornyhead	120	10	0	2	3	5	0	11
Dover sole	519	4,778	125	221	2,507	1,925	63	1,087
Arrowtooth flounder	6	97,097	134	2,745	4,728	89,490	23	2,775
Petrale sole	1	84	0	10	8	66	7	0
English sole	0	0	0	0	0	0	0	0
Other flatfish	0	674	0	597	51	26	0	5
Yellowtail rockfish	0	675	0	0	14	661	0	0
Chilipepper rockfish	0	0	0	0	0	0	0	0
Other shelf rockfish	65	13,237	1,329	931	1,108	9,869	24	103
Blackgill rockfish	569	0	0	0	0	0	69	0
Splitnose rockfish	45	0	0	0	0	0	19	0
Other slope rockfish	2,691	14,920	1,803	794	2,324	9,999	6	137
Lingcod	20	19,276	582	2,709	1,123	14,863	2,736	6,365
Pacific cod	0	3,038	0	22	54	2,962	0	6
Spiny dogfish	6,375	368,177	12,512	6,511	54,529	294,625	6	661
Longnose skate	6,038	87,767	8,478	13,301	12,120	53,867	0	0
Big skate	31	27,649	1,475	579	189	25,406	0	0
Unspecified skate	1,839	41,664	2,550	8,289	6,052	24,775	0	0

Other groundfish	3,536	6,244	2,279	1,155	351	2,460	11	3,761
Pacific Halibut	13	637,029	6,247	69,377	21,263	540,142	0	27,208
Other non-groundfish	7,600	88,593	5,917	19,223	17,013	46,440	32	8,290

Table 4-24. Amounts of species discard observed on fixed-gear sablefish sets deeper than 125 fm, stratified north and south of 40°10' N latitude, including four subareas for longline catch north of 40°10' N latitude.

	All observations recorded as being deeper than 125 fm							
	Longline						Pot	
	36° - 40°10' N lat	North of 40°10' N lat	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°	36° - 40°10' N lat	North of 40°10' N lat
Observed sablefish pounds								
retained	141,939	2,011,574	334,560	442,757	232,204	1,002,053	207,178	1,437,897
discarded	64,449	267,854	50,829	107,519	44,074	65,431	96,335	303,092
Number of observed sets								
total	138	1,423	199	262	161	801	94	1,373
with yelloweye	0	60	5	6	3	46	0	0
% of total	0%	4%	3%	2%	2%	6%	0%	0%
with canary	0	39	2	4	4	29	0	0
% of total	0%	3%	1%	2%	2%	4%	0%	0%
Discarded pounds of species								
Canary rockfish	**0**	**516**	**10**	**99**	**8**	**398**	**0**	**0**
Widow rockfish	0	0	0	0	0	0	0	5
Yelloweye rockfish	**0**	**859**	**178**	**37**	**63**	**583**	**0**	**0**
Bocaccio rockfish	0	0	0	0	0	0	0	0
Cowcod rockfish	0	0	0	0	0	0	0	0
Pacific ocean perch	0	160	0	0	16	144	2	3
Darkblotched rockfish	53	417	184	54	16	163	32	114
Pacific whiting/hake	52	507	118	157	147	85	0	54
Shortspine thornyhead	437	1,643	177	60	288	1,118	1	77
Longspine thornyhead	120	7	0	2	1	3	0	11
Dover sole	519	1,985	113	155	150	1,567	63	1,078
Arrowtooth flounder	6	75,876	79	2,224	4,115	69,458	23	2,714
Petrale sole	1	18	0	3	0	15	7	0
English sole	0	0	0	0	0	0	0	0
Other flatfish	0	542	0	525	0	17	0	5
Yellowtail rockfish	0	430	0	0	0	430	0	0
Chilipepper rockfish	0	0	0	0	0	0	0	0
Other shelf rockfish	65	9,229	1,084	523	497	7,124	24	91
Blackgill rockfish	569	0	0	0	0	0	69	0
Splitnose rockfish	45	0	0	0	0	0	19	0
Other slope rockfish	2,691	14,407	1,792	483	2,258	9,875	6	137
Lingcod	20	11,000	390	2,358	103	8,148	2,736	5,347
Pacific cod	0	1,225	0	0	43	1,182	0	6
Spiny dogfish	6,375	275,549	11,291	3,849	36,518	223,890	6	346
Longnose skate	6,038	64,142	8,107	11,671	5,061	39,302	0	0
Big skate	31	15,814	647	324	89	14,754	0	0
Unspecified skate	1,839	26,404	2,061	5,279	2,601	16,463	0	0

Other groundfish	3,536	5,236	2,167	896	186	1,987	11	3,726
Pacific Halibut	13	385,424	3,653	55,551	14,171	312,049	0	24,242
Other non-groundfish	7,600	61,233	5,618	15,261	6,863	33,491	32	8,063

Table 4-25. Amounts of species discard observed on fixed-gear sablefish sets deeper than 150 fm, stratified north and south of 40°10' N latitude, including four subareas for longline catch north of 40°10' N latitude.

	All observations recorded as being deeper than 150 fm							
	Longline						Pot	
	36° - 40°10' N lat	North of 40°10' N lat	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°	36° - 40°10' N lat	North of 40°10' N lat
Observed sablefish pounds								
retained	141,939	1,400,373	259,771	253,782	153,026	733,794	207,178	1,381,297
discarded	64,449	177,749	44,890	62,210	26,600	44,050	96,335	296,434
Number of observed sets								
total	138	1,026	160	164	117	585	94	1,313
with yelloweye	0	22	1	2	3	16	0	0
% of total	0%	2%	1%	1%	3%	3%	0%	0%
with canary	0	13	0	2	1	10	0	0
% of total	0%	1%	0%	1%	1%	2%	0%	0%
Discarded pounds of species								
Canary rockfish	**0**	**102**	**0**	**49**	**0**	**53**	**0**	**0**
Widow rockfish	0	0	0	0	0	0	0	5
Yelloweye rockfish	**0**	**359**	**8**	**28**	**63**	**261**	**0**	**0**
Bocaccio rockfish	0	0	0	0	0	0	0	0
Cowcod rockfish	0	0	0	0	0	0	0	0
Pacific ocean perch	0	75	0	0	16	59	2	2
Darkblotched rockfish	53	273	94	40	15	124	32	114
Pacific whiting/hake	52	288	42	116	55	74	0	54
Shortspine thornyhead	437	1,396	163	50	209	974	1	77
Longspine thornyhead	120	7	0	2	1	3	0	11
Dover sole	519	1,198	100	99	123	875	63	1,060
Arrowtooth flounder	6	47,968	28	1,150	3,325	43,466	23	2,449
Petrale sole	1	3	0	0	0	3	7	0
English sole	0	0	0	0	0	0	0	0
Other flatfish	0	93	0	76	0	17	0	5
Yellowtail rockfish	0	228	0	0	0	228	0	0
Chilipepper rockfish	0	0	0	0	0	0	0	0
Other shelf rockfish	65	3,537	193	388	263	2,693	24	85
Blackgill rockfish	569	0	0	0	0	0	69	0
Splitnose rockfish	45	0	0	0	0	0	19	0
Other slope rockfish	2,691	13,163	863	477	2,117	9,706	6	132
Lingcod	20	3,869	214	815	68	2,773	2,736	3,762
Pacific cod	0	568	0	0	33	535	0	6
Spiny dogfish	6,375	208,686	9,381	1,971	22,653	174,681	6	311

Longnose skate	6,038	38,710	7,050	4,303	4,058	23,299	0	0
Big skate	31	5,724	10	93	89	5,532	0	0
Unspecified skate	1,839	16,330	1,470	3,851	1,635	9,374	0	0
Other groundfish	3,536	3,985	2,047	439	94	1,405	11	3,694
Pacific Halibut	13	165,671	2,512	11,521	12,098	139,541	0	21,204
Other non-groundfish	7,600	47,383	5,132	9,487	5,673	27,091	32	8,005

Table 4-26. Rates of species discard, relative to retained sablefish, observed on fixed gear sablefish sets deeper than 100 fm, stratified by area.

Species	All observations recorded as being deeper than 100 fm							
	Longline						Pot	
	36° - 40°10' N lat	North of 40°10' N lat	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°	36° - 40°10' N lat	North of 40°10' N lat
Discarded ratios for species, relative to retained sablefish								
Sablefish	45.4%	13.5%	14.3%	23.5%	19.4%	6.8%	46.5%	20.7%
Canary rockfish	**0.000%**	**0.044%**	**0.010%**	**0.029%**	**0.029%**	**0.066%**	**0.000%**	**0.000%**
Widow rockfish	0.000%	0.000%	0.000%	0.000%	0.002%	0.000%	0.000%	0.000%
Yelloweye rockfish	**0.000%**	**0.066%**	**0.051%**	**0.069%**	**0.017%**	**0.085%**	**0.000%**	**0.000%**
Bocaccio rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Cowcod rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Pacific ocean perch	0.000%	0.009%	0.004%	0.000%	0.004%	0.017%	0.001%	0.000%
Darkblotched rockfish	0.038%	0.018%	0.056%	0.009%	0.004%	0.014%	0.016%	0.007%
Pacific whiting/hake	0.036%	0.022%	0.031%	0.034%	0.037%	0.010%	0.000%	0.003%
Shortspine thornyhead	0.308%	0.066%	0.047%	0.011%	0.076%	0.095%	0.000%	0.005%
Longspine thornyhead	0.085%	0.000%	0.000%	0.000%	0.001%	0.000%	0.000%	0.001%
Dover sole	0.365%	0.181%	0.033%	0.038%	0.610%	0.152%	0.030%	0.070%
Arrowtooth flounder	0.004%	3.674%	0.035%	0.470%	1.150%	7.061%	0.011%	0.179%
Petrale sole	0.001%	0.003%	0.000%	0.002%	0.002%	0.005%	0.003%	0.000%
English sole	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Other flatfish	0.000%	0.025%	0.000%	0.102%	0.012%	0.002%	0.000%	0.000%
Yellowtail rockfish	0.000%	0.026%	0.000%	0.000%	0.003%	0.052%	0.000%	0.000%
Chilipepper rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Other shelf rockfish	0.046%	0.501%	0.350%	0.159%	0.269%	0.779%	0.012%	0.007%
Blackgill rockfish	0.401%	0.000%	0.000%	0.000%	0.000%	0.000%	0.033%	0.000%
Splitnose rockfish	0.032%	0.000%	0.000%	0.000%	0.000%	0.000%	0.009%	0.000%
Other slope rockfish	1.896%	0.564%	0.475%	0.136%	0.565%	0.789%	0.003%	0.009%
Lingcod	0.014%	0.729%	0.153%	0.463%	0.273%	1.173%	1.321%	0.411%
Pacific cod	0.000%	0.115%	0.000%	0.004%	0.013%	0.234%	0.000%	0.000%
Spiny dogfish	4.491%	13.929%	3.294%	1.114%	13.261%	23.245%	0.003%	0.043%
Longnose skate	4.254%	3.321%	2.232%	2.275%	2.948%	4.250%	0.000%	0.000%
Big skate	0.022%	1.046%	0.388%	0.099%	0.046%	2.004%	0.000%	0.000%
Unspecified skate	1.296%	1.576%	0.671%	1.418%	1.472%	1.955%	0.000%	0.000%
Other groundfish	2.491%	0.236%	0.600%	0.198%	0.085%	0.194%	0.005%	0.243%
Pacific Halibut	0.009%	24.101%	1.645%	11.866%	5.171%	42.616%	0.000%	1.757%
Other non-groundfish	5.354%	3.352%	1.558%	3.288%	4.137%	3.664%	0.016%	0.535%

Table 4-27. Rates of species discard, relative to retained sablefish, observed on fixed gear sablefish sets deeper than 125 fm, stratified by area.

Species	All observations recorded as being deeper than 125 fm							
	Longline						Pot	
	36° - 40°10' N lat	North of 40°10' N lat	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°	36° - 40°10' N lat	North of 40°10' N lat
Discarded ratios for species, relative to retained sablefish								
Sablefish	45.4%	13.3%	15.2%	24.3%	19.0%	6.5%	46.5%	21.1%
Canary rockfish	**0.000%**	**0.026%**	**0.003%**	**0.022%**	**0.004%**	**0.040%**	**0.000%**	**0.000%**
Widow rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Yelloweye rockfish	**0.000%**	**0.043%**	**0.053%**	**0.008%**	**0.027%**	**0.058%**	**0.000%**	**0.000%**
Bocaccio rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Cowcod rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Pacific ocean perch	0.000%	0.008%	0.000%	0.000%	0.007%	0.014%	0.001%	0.000%
Darkblotched rockfish	0.038%	0.021%	0.055%	0.012%	0.007%	0.016%	0.016%	0.008%
Pacific whiting/hake	0.036%	0.025%	0.035%	0.035%	0.063%	0.008%	0.000%	0.004%
Shortspine thornyhead	0.308%	0.082%	0.053%	0.014%	0.124%	0.112%	0.000%	0.005%
Longspine thornyhead	0.085%	0.000%	0.000%	0.000%	0.001%	0.000%	0.000%	0.001%
Dover sole	0.365%	0.099%	0.034%	0.035%	0.064%	0.156%	0.030%	0.075%
Arrowtooth flounder	0.004%	3.772%	0.024%	0.502%	1.772%	6.932%	0.011%	0.189%
Petrale sole	0.001%	0.001%	0.000%	0.001%	0.000%	0.001%	0.003%	0.000%
English sole	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Other flatfish	0.000%	0.027%	0.000%	0.119%	0.000%	0.002%	0.000%	0.000%
Yellowtail rockfish	0.000%	0.021%	0.000%	0.000%	0.000%	0.043%	0.000%	0.000%
Chilipepper rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Other shelf rockfish	0.046%	0.459%	0.324%	0.118%	0.214%	0.711%	0.012%	0.006%
Blackgill rockfish	0.401%	0.000%	0.000%	0.000%	0.000%	0.000%	0.033%	0.000%
Splitnose rockfish	0.032%	0.000%	0.000%	0.000%	0.000%	0.000%	0.009%	0.000%
Other slope rockfish	1.896%	0.716%	0.536%	0.109%	0.972%	0.985%	0.003%	0.010%
Lingcod	0.014%	0.547%	0.117%	0.533%	0.044%	0.813%	1.321%	0.372%
Pacific cod	0.000%	0.061%	0.000%	0.000%	0.019%	0.118%	0.000%	0.000%
Spiny dogfish	4.491%	13.698%	3.375%	0.869%	15.727%	22.343%	0.003%	0.024%
Longnose skate	4.254%	3.189%	2.423%	2.636%	2.180%	3.922%	0.000%	0.000%
Big skate	0.022%	0.786%	0.193%	0.073%	0.038%	1.472%	0.000%	0.000%
Unspecified skate	1.296%	1.313%	0.616%	1.192%	1.120%	1.643%	0.000%	0.000%
Other groundfish	2.491%	0.260%	0.648%	0.202%	0.080%	0.198%	0.005%	0.259%
Pacific Halibut	0.009%	19.160%	1.092%	12.547%	6.103%	31.141%	0.000%	1.686%
Other non-groundfish	5.354%	3.044%	1.679%	3.447%	2.955%	3.342%	0.016%	0.561%

Table 4-28. Rates of species discard, relative to retained sablefish, observed on fixed gear sablefish sets deeper than 150 fm, stratified by area.

Species	All observations recorded as being deeper than 150 fm							
	Longline						Pot	
	36° - 40°10' N lat	North of 40°10' N lat	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°	36° - 40°10' N lat	North of 40°10' N lat
Discarded ratios for species, relative to retained sablefish								
Sablefish	45.4%	12.7%	17.3%	24.5%	17.4%	6.0%	46.5%	21.5%
Canary rockfish	**0.000%**	**0.007%**	**0.000%**	**0.019%**	**0.000%**	**0.007%**	**0.000%**	**0.000%**
Widow rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Yelloweye rockfish	**0.000%**	**0.026%**	**0.003%**	**0.011%**	**0.041%**	**0.036%**	**0.000%**	**0.000%**
Bocaccio rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Cowcod rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Pacific ocean perch	0.000%	0.005%	0.000%	0.000%	0.010%	0.008%	0.001%	0.000%
Darkblotched rockfish	0.038%	0.020%	0.036%	0.016%	0.010%	0.017%	0.016%	0.008%
Pacific whiting/hake	0.036%	0.021%	0.016%	0.046%	0.036%	0.010%	0.000%	0.004%
Shortspine thornyhead	0.308%	0.100%	0.063%	0.020%	0.137%	0.133%	0.000%	0.006%
Longspine thornyhead	0.085%	0.000%	0.000%	0.001%	0.001%	0.000%	0.000%	0.001%
Dover sole	0.365%	0.086%	0.038%	0.039%	0.081%	0.119%	0.030%	0.077%
Arrowtooth flounder	0.004%	3.425%	0.011%	0.453%	2.173%	5.923%	0.011%	0.177%
Petrale sole	0.001%	0.000%	0.000%	0.000%	0.000%	0.000%	0.003%	0.000%
English sole	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Other flatfish	0.000%	0.007%	0.000%	0.030%	0.000%	0.002%	0.000%	0.000%
Yellowtail rockfish	0.000%	0.016%	0.000%	0.000%	0.000%	0.031%	0.000%	0.000%
Chilipepper rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Other shelf rockfish	0.046%	0.253%	0.074%	0.153%	0.172%	0.367%	0.012%	0.006%
Blackgill rockfish	0.401%	0.000%	0.000%	0.000%	0.000%	0.000%	0.033%	0.000%
Splitnose rockfish	0.032%	0.000%	0.000%	0.000%	0.000%	0.000%	0.009%	0.000%
Other slope rockfish	1.896%	0.940%	0.332%	0.188%	1.384%	1.323%	0.003%	0.010%
Lingcod	0.014%	0.276%	0.082%	0.321%	0.044%	0.378%	1.321%	0.272%
Pacific cod	0.000%	0.041%	0.000%	0.000%	0.021%	0.073%	0.000%	0.000%
Spiny dogfish	4.491%	14.902%	3.611%	0.777%	14.804%	23.805%	0.003%	0.023%
Longnose skate	4.254%	2.764%	2.714%	1.696%	2.652%	3.175%	0.000%	0.000%
Big skate	0.022%	0.409%	0.004%	0.037%	0.058%	0.754%	0.000%	0.000%
Unspecified skate	1.296%	1.166%	0.566%	1.518%	1.068%	1.277%	0.000%	0.000%
Other groundfish	2.491%	0.285%	0.788%	0.173%	0.061%	0.191%	0.005%	0.267%
Pacific Halibut	0.009%	11.831%	0.967%	4.540%	7.906%	19.016%	0.000%	1.535%
Other non-groundfish	5.354%	3.384%	1.976%	3.738%	3.707%	3.692%	0.016%	0.580%

Table 4-29. Apportionment of observed and fleet longline landings of sablefish among port groups and catch areas.

Port group	Longline				
	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°	North of 40°10' N lat
Observed sablefish poundage, by area of catch and port group of landing, 2002-2006					
Westport and north	0	22,994	69,517	1,248,592	1,341,104
Astoria and SW Wash.	0	106,394	293,232	18,875	418,500
Coos Bay to Tillamook	23,287	417,946	48,456	0	489,689
Eureka to Bandon	270,610	35,544	0	0	306,155
Percentage of observed port-group sablefish landings attributable to each catch area, 2002-2006					
Westport and north	0.0%	1.7%	5.2%	93.1%	100.0%
Astoria and SW Wash.	0.0%	25.4%	70.1%	4.5%	100.0%
Coos Bay to Tillamook	4.8%	85.3%	9.9%	0.0%	100.0%
Eureka to Bandon	88.4%	11.6%	0.0%	0.0%	100.0%
Estimated distribution of fleet-wide northern longline landings among catch areas, by year (for use in weighting Table 4-26, 4-27, or 4-28 discard rates to obtain northern area weighted averages)					
2002	18%	21%	12%	49%	100%
2003	21%	24%	10%	45%	100%
2004	14%	22%	13%	51%	100%
2005	22%	23%	13%	41%	100%
2006	22%	23%	13%	42%	100%
2002-2006	20%	23%	12%	45%	100%
Distribution of longline fleet landings of sablefish among port groups by year, 2002-2006					
	2002	2003	2004	2005	2006
Metric tons					
Westport and north	484	616	792	780	747
Astoria and SW Wash.	102	97	172	224	220
Coos Bay to Tillamook	161	273	280	348	309
Eureka to Bandon	185	287	214	422	395
North of 40°10'	932	1,274	1,457	1,774	1,671
Port group percentage					
Westport and north	52%	48%	54%	44%	45%
Astoria and SW Wash.	11%	8%	12%	13%	13%
Coos Bay to Tillamook	17%	21%	19%	20%	18%
Eureka to Bandon	20%	23%	15%	24%	24%

Table 4-30. Rates of species discard, relative to retained sablefish, weighted by the 2002-06 average estimated distribution of fleetwide northern longline landings among catch areas north of 40°10' N latitude, observed on fixed-gear sablefish sets deeper than 100 fm, stratified by area. Discard rates north of 40°10' N latitude are the sum of the northern subareas. Discard rates south of 40°10' N latitude are the same as in Table 4-26.

Species	All observations recorded as being deeper than 100 fm							
	Longline						Pot	
	36° - 40°10' N lat	North of 40°10' N lat	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°	36° - 40°10' N lat	North of 40°10' N lat
Discarded ratios for species, relative to retained sablefish								
Sablefish	45.4%	13.6%	2.8%	5.3%	2.4%	3.1%	46.5%	20.7%
Canary rockfish	**0.000%**	**0.042%**	**0.002%**	**0.007%**	**0.004%**	**0.030%**	**0.000%**	**0.000%**
Widow rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Yelloweye rockfish	**0.000%**	**0.066%**	**0.010%**	**0.016%**	**0.002%**	**0.038%**	**0.000%**	**0.000%**
Bocaccio rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Cowcod rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Pacific ocean perch	0.000%	0.009%	0.001%	0.000%	0.000%	0.008%	0.001%	0.000%
Darkblotched rockfish	0.038%	0.020%	0.011%	0.002%	0.000%	0.007%	0.016%	0.007%
Pacific whiting/hake	0.036%	0.023%	0.006%	0.008%	0.005%	0.004%	0.000%	0.003%
Shortspine thornyhead	0.308%	0.064%	0.009%	0.003%	0.009%	0.043%	0.000%	0.005%
Longspine thornyhead	0.085%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.001%
Dover sole	0.365%	0.160%	0.006%	0.009%	0.076%	0.069%	0.030%	0.070%
Arrowtooth flounder	0.004%	3.454%	0.007%	0.106%	0.143%	3.198%	0.011%	0.179%
Petrale sole	0.001%	0.003%	0.000%	0.000%	0.000%	0.002%	0.003%	0.000%
English sole	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Other flatfish	0.000%	0.026%	0.000%	0.023%	0.002%	0.001%	0.000%	0.000%
Yellowtail rockfish	0.000%	0.024%	0.000%	0.000%	0.000%	0.024%	0.000%	0.000%
Chilipepper rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Other shelf rockfish	0.046%	0.491%	0.069%	0.036%	0.034%	0.353%	0.012%	0.007%
Blackgill rockfish	0.401%	0.000%	0.000%	0.000%	0.000%	0.000%	0.033%	0.000%
Splitnose rockfish	0.032%	0.000%	0.000%	0.000%	0.000%	0.000%	0.009%	0.000%
Other slope rockfish	1.896%	0.551%	0.093%	0.031%	0.070%	0.357%	0.003%	0.009%
Lingcod	0.014%	0.700%	0.030%	0.105%	0.034%	0.531%	1.321%	0.411%
Pacific cod	0.000%	0.108%	0.000%	0.001%	0.002%	0.106%	0.000%	0.000%
Spiny dogfish	4.491%	13.076%	0.646%	0.252%	1.649%	10.529%	0.003%	0.043%
Longnose skate	4.254%	3.245%	0.437%	0.516%	0.367%	1.925%	0.000%	0.000%
Big skate	0.022%	1.012%	0.076%	0.022%	0.006%	0.908%	0.000%	0.000%
Unspecified skate	1.296%	1.521%	0.132%	0.321%	0.183%	0.885%	0.000%	0.000%
Other groundfish	2.491%	0.261%	0.118%	0.045%	0.011%	0.088%	0.005%	0.243%
Pacific Halibut	0.009%	22.959%	0.322%	2.690%	0.643%	19.303%	0.000%	1.757%
Other non-groundfish	5.354%	3.225%	0.305%	0.745%	0.515%	1.660%	0.016%	0.535%

Table 4-31. Rates of species discard, relative to retained sablefish, weighted by the 2002-06 average estimated distribution of fleetwide northern longline landings among catch areas north of 40°10' N latitude, observed on fixed-gear sablefish sets deeper than 125 fm, stratified by area. Discard rates north of 40°10' N latitude are the sum of the northern subareas. Discard rates south of 40°10' N latitude are the same as in Table 4-27.

Species	All observations recorded as being deeper than 125 fm							
	Longline						Pot	
	36° - 40°10' N lat	North of 40°10' N lat	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°	36° - 40°10' N lat	North of 40°10' N lat
Discarded ratios for species, relative to retained sablefish								
Sablefish	45.4%	13.8%	3.0%	5.5%	2.4%	3.0%	46.5%	21.1%
Canary rockfish	**0.000%**	**0.024%**	**0.001%**	**0.005%**	**0.000%**	**0.018%**	**0.000%**	**0.000%**
Widow rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Yelloweye rockfish	**0.000%**	**0.042%**	**0.010%**	**0.002%**	**0.003%**	**0.026%**	**0.000%**	**0.000%**
Bocaccio rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Cowcod rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Pacific ocean perch	0.000%	0.007%	0.000%	0.000%	0.001%	0.007%	0.001%	0.000%
Darkblotched rockfish	0.038%	0.022%	0.011%	0.003%	0.001%	0.007%	0.016%	0.008%
Pacific whiting/hake	0.036%	0.027%	0.007%	0.008%	0.008%	0.004%	0.000%	0.004%
Shortspine thornyhead	0.308%	0.079%	0.010%	0.003%	0.015%	0.051%	0.000%	0.005%
Longspine thornyhead	0.085%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.001%
Dover sole	0.365%	0.093%	0.007%	0.008%	0.008%	0.071%	0.030%	0.075%
Arrowtooth flounder	0.004%	3.479%	0.005%	0.114%	0.220%	3.140%	0.011%	0.189%
Petrale sole	0.001%	0.001%	0.000%	0.000%	0.000%	0.001%	0.003%	0.000%
English sole	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Other flatfish	0.000%	0.028%	0.000%	0.027%	0.000%	0.001%	0.000%	0.000%
Yellowtail rockfish	0.000%	0.019%	0.000%	0.000%	0.000%	0.019%	0.000%	0.000%
Chilipepper rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Other shelf rockfish	0.046%	0.439%	0.064%	0.027%	0.027%	0.322%	0.012%	0.006%
Blackgill rockfish	0.401%	0.000%	0.000%	0.000%	0.000%	0.000%	0.033%	0.000%
Splitnose rockfish	0.032%	0.000%	0.000%	0.000%	0.000%	0.000%	0.009%	0.000%
Other slope rockfish	1.896%	0.697%	0.105%	0.025%	0.121%	0.446%	0.003%	0.010%
Lingcod	0.014%	0.517%	0.023%	0.121%	0.006%	0.368%	1.321%	0.372%
Pacific cod	0.000%	0.056%	0.000%	0.000%	0.002%	0.053%	0.000%	0.000%
Spiny dogfish	4.491%	12.935%	0.661%	0.197%	1.956%	10.120%	0.003%	0.024%
Longnose skate	4.254%	3.120%	0.475%	0.598%	0.271%	1.777%	0.000%	0.000%
Big skate	0.022%	0.726%	0.038%	0.017%	0.005%	0.667%	0.000%	0.000%
Unspecified skate	1.296%	1.275%	0.121%	0.270%	0.139%	0.744%	0.000%	0.000%
Other groundfish	2.491%	0.273%	0.127%	0.046%	0.010%	0.090%	0.005%	0.259%
Pacific Halibut	0.009%	17.923%	0.214%	2.844%	0.759%	14.105%	0.000%	1.686%
Other non-groundfish	5.354%	2.992%	0.329%	0.781%	0.368%	1.514%	0.016%	0.561%

Table 4-32. Rates of species discard, relative to retained sablefish, weighted by the 2002-06 average estimated distribution of fleetwide northern longline landings among catch areas north of 40°10' N latitude, observed on fixed-gear sablefish sets deeper than 150 fm, stratified by area. Discard rates north of 40°10' N latitude are the sum of the northern subareas. Discard rates south of 40°10' N latitude are the same as in Table 4-28.

Species	All observations recorded as being deeper than 150 fm							
	Longline						Pot	
	36° - 40°10' N lat	North of 40°10' N lat	40°10' - Col./Eur. line 43°	Col./Eur. line 43° - Cascade Head 45.064°	Cascade Head 45.064° - Pt. Chehalis 46.888°	North of Pt. Chehalis 46.888°	36° - 40°10' N lat	North of 40°10' N lat
Discarded ratios for species, relative to retained sablefish								
Sablefish	45.4%	12.7%	3.4%	5.6%	2.2%	2.7%	46.5%	21.5%
Canary rockfish	**0.000%**	**0.007%**	**0.000%**	**0.004%**	**0.000%**	**0.003%**	**0.000%**	**0.000%**
Widow rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Yelloweye rockfish	**0.000%**	**0.026%**	**0.001%**	**0.003%**	**0.005%**	**0.016%**	**0.000%**	**0.000%**
Bocaccio rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Cowcod rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Pacific ocean perch	0.000%	0.005%	0.000%	0.000%	0.001%	0.004%	0.001%	0.000%
Darkblotched rockfish	0.000%	0.020%	0.007%	0.004%	0.001%	0.008%	0.016%	0.008%
Pacific whiting/hake	0.000%	0.021%	0.003%	0.010%	0.004%	0.005%	0.000%	0.004%
Shortspine thornyhead	0.000%	0.100%	0.012%	0.004%	0.017%	0.060%	0.000%	0.006%
Longspine thornyhead	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.001%
Dover sole	0.000%	0.086%	0.008%	0.009%	0.010%	0.054%	0.030%	0.077%
Arrowtooth flounder	0.000%	3.425%	0.002%	0.103%	0.270%	2.683%	0.011%	0.177%
Petrale sole	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.003%	0.000%
English sole	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Other flatfish	0.000%	0.007%	0.000%	0.007%	0.000%	0.001%	0.000%	0.000%
Yellowtail rockfish	0.000%	0.016%	0.000%	0.000%	0.000%	0.014%	0.000%	0.000%
Chilipepper rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Other shelf rockfish	0.000%	0.253%	0.015%	0.035%	0.021%	0.166%	0.012%	0.006%
Blackgill rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.033%	0.000%
Splitnose rockfish	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.009%	0.000%
Other slope rockfish	0.000%	0.940%	0.065%	0.043%	0.172%	0.599%	0.003%	0.010%
Lingcod	0.000%	0.276%	0.016%	0.073%	0.006%	0.171%	1.321%	0.272%
Pacific cod	0.000%	0.041%	0.000%	0.000%	0.003%	0.033%	0.000%	0.000%
Spiny dogfish	0.000%	14.902%	0.708%	0.176%	1.841%	10.783%	0.003%	0.023%
Longnose skate	0.000%	2.764%	0.532%	0.384%	0.330%	1.438%	0.000%	0.000%
Big skate	0.000%	0.409%	0.001%	0.008%	0.007%	0.341%	0.000%	0.000%
Unspecified skate	0.000%	1.166%	0.111%	0.344%	0.133%	0.579%	0.000%	0.000%
Other groundfish	0.000%	0.285%	0.154%	0.039%	0.008%	0.087%	0.005%	0.267%
Pacific Halibut	0.000%	11.831%	0.189%	1.029%	0.983%	8.614%	0.000%	1.535%
Other non-groundfish	0.000%	3.384%	0.387%	0.847%	0.461%	1.672%	0.016%	0.580%

4.5.1.4 *Directed Open Access*

Impacts associated with the directed open access daily-trip-limit fishery targeting sablefish are modeled using the primary sablefish model described above. Nearshore commercial fisheries in waters off Oregon and California are modeled separately from offshore efforts targeting sablefish.

Modeling Impacts in Commercial Nearshore Fisheries

The nearshore commercial model incorporates fleet-wide discard estimates by depth from WCGOP data, landings data from fish tickets obtained from PacFIN, and estimates of discard mortality by depth, derived by the GMT. The WCGOP began pilot coverage of vessels targeting nearshore rockfish and associated species, such as cabezon and kelp greenling, in January 2003 for the California nearshore fishery and in May 2004 for the Oregon nearshore/rockfish fisheries. Data from these vessel observations from January 2003-December 2006 have been averaged for analyses. Although the number of observed trips has increased since the WCGOP began monitoring the fleet, coverage levels are still lower than for other fleets and thus greater uncertainty in estimating discard relationships exists (Table 4-33). Table 4-34 summarizes the amounts of catch and discard reported for each of the three depth intervals (0-10 fm, 11-20 fm, and 21-50 fm) used to model impacts in nearshore commercial fisheries, along with the percentage of each species' (or group's) catch that was discarded.

Table 4-33. Number of nearshore trips and sets by port group and gear with associated retained weight observed in depths less than 50 fm from 2003-06 by the West Coast Groundfish Observer Program.

Port Group	Hook and Line a/		Pot a/	
	Number of Trips b/	Retained Weight (mt) b/	Number of Trips b/	Retained Weight (mt) b/
Astoria	96	6.6	10 + c/	c/
S Oregon	356	34		
Crescent City / Eureka	209	30.9		
Fort Bragg	34	1.2	14	0.3 +c/
San Francisco/Monterey	80	4.4	2	c/
Morro Bay - Los Angeles	203	8.5	82	7.8 + c/
ALL PORTS	978	85.6	108 + c/	8.1 + c/

a/ Since both gear groups were used on some trips, the total number of observed trips is less than the sum of the numbers shown for each gear group in this table.

b/ Data values from 2003-06 combined.

c/ Data not reported because of confidentiality issues.

Table 4-34. Summary of observed catch and discard of important groundfish species or species groups in nearshore, fixed gear fisheries conducted from January 2003 through December 2006.

Species	0 - 10 fm				11 - 20 fm				21 - 50 fm			
	Observed lbs.		Discard % a/	Discard Rate b/	Observed lbs.		Discard % a/	Discard Rate b/	Observed lbs.		Discard % a/	Discard Rate b/
	Catch	Discard			Catch	Discard			Catch	Discard		
North of 40°10' N lat												
Black rockfish	51,777	1,446	2.79%		47,163	1,640	3.48%		2,555	31	1.20%	
Blue rockfish	6,028	1,151	19.09%		11,219	2,120	18.90%		1,555	161	10.33%	
Other minor nearshore rockfish	3,892	153	3.92%		6,675	201	3.01%		2,053	40	1.97%	
Cabezon	4,787	754	15.75%		11,553	1,237	10.71%		482	50	10.47%	
Kelp greenling	4,377	710	16.21%		5,839	1,144	19.59%		223	57	25.54%	
Lingcod	12,161	5,559	45.71%		19,992	8,224	41.14%		3,246	469	14.44%	
Sum of target species	83,021	9,772	11.77%		102,439	14,565	14.22%		10,115	808	7.99%	
Canary rockfish	301	301	100.00%	0.41%	927	924	99.76%	1.05%	290	290	100.00%	3.12%
Widow rockfish	4	0	0.00%	0.00%	74	22	29.13%	0.02%	17	7	39.09%	0.07%
Yelloweye rockfish	82	82	100.00%	0.11%	451	450	99.60%	0.51%	411	411	100.00%	4.41%
Yellowtail rockfish	230	73	31.52%	0.10%	617	243	39.34%	0.28%	278	49	17.67%	0.53%
Minor Shelf rockfish	812	61	7.49%	0.08%	1,811	70	3.86%	0.08%	490	22	4.47%	0.24%
South of 40°10' N lat												
Shallow nearshore rockfish	6,491	1,388	21.39%		2,053	785	38.25%		370	112	30.34%	
Black rockfish	604	126	20.81%		728	166	22.75%		3	3	100.00%	
Blue rockfish	1,073	368	34.36%		1,096	579	52.83%		386	348	90.14%	
Other deeper nearshore rockfish	3,217	259	8.04%		4,926	351	7.12%		269	56	20.77%	
Cabezon	13,585	4,273	31.46%		568	415	73.18%		165	42	25.34%	
Kelp greenling	1,877	1,156	61.58%		150	139	92.34%		111	111	100.00%	
Lingcod	6,472	2,864	44.25%		4,169	2,017	48.38%		396	164	41.52%	
California sheephead	26,039	9,043	34.73%		0	0			0	0		
Sum of target species	59,357	19,477	32.81%		13,691	4,452	32.52%		1,700	837	49.23%	
Bocaccio					4	3	76.47%	0.04%	77	2	2.91%	0.26%
Canary rockfish	23	23	100.00%	0.06%	413	413	100.00%	4.47%	101	101	100.00%	11.71%
Widow rockfish					2	1	26.09%	0.01%				
Yelloweye rockfish					10	10	100.00%	0.10%	12	12	100.00%	1.36%
Minor Shelf rockfish	615	51	8.29%	0.13%	1,331	39	2.93%	0.42%	1,026	51	4.99%	5.93%

[a/] The discard percentage is calculated as the observed discard pounds divided by the observed total catch for each species or species group.

[b/] The discard rate for bycatch species is calculated as the observed discard pounds for a species/group divided by the observed landed catch of all target species combined.

Estimates of discard mortality used to inform previous nearshore models were based on survival assumptions used in modeling recreational fisheries and tagging research which used “conventional sport rod and reel” (Albin and Karpov 1996) and “traditional sport fishing techniques: hook and line with either lures or bait” (Lea et al. 1999). Research on barotrauma in rockfish has greatly expanded since the initial development of mortality rates and the GMT thought it prudent to revisit the rates.

The Council tasked the GMT with developing a matrix describing mortality by species and depth in the recreational fishery. The GMT analyzed available data sets and published literature to estimate species-specific depth dependent mortality rates for the recreational fishery (see section 4.5.1.6). Initially, the GMT considered using a similar process to develop a discard mortality rate matrix for nearshore commercial fisheries. However, in the commercial fishery, there is no at-sea discard information recorded on the disposition of the fish. The GMT discussed the similarities and differences between the recreational and commercial methodologies, specifically as they related to depth distributions, gear, and handling techniques. Recreational regulations in Oregon and California (north of 37°11’ N latitude) allow fishing between 0 and 40 fm. Data from the WCGOP (2004-06) reveals that approximately 70 percent of nearshore landings occur from 0-10 fm south of 40°10' N latitude and 44 percent north of 40°10' N latitude. Approximately 26 percent of the landings come from 11-20 fm south of 40°10' N latitude and 52 percent north of 40°10' N latitude. Five percent or less of the commercial nearshore landings, both north and south of 40°10' N latitude, are deeper than 21 fm. In the recreational fisheries, the primary gear type is rod and reel. Based on available data, the primary nearshore commercial gear is jig gear (also called rod-and-reel or pole gear).

The GMT discussed the use of recreational-based mortality estimates for the commercial fishery and determined it was appropriate to use these estimates for jig gear only because soak times (or wet gear hours) between the two fisheries are similar using jig gear. In both fisheries when a fish is hooked on jig gear, it is immediately brought to the surface, whereas, with other commercial gear (longline, pot, etc.) gear soaks for a longer period of time before being retrieved. Therefore, the GMT concluded recreational mortality estimates should only be applied to the proportion of catch taken with jig gear.

Although similarities exist among gear, depths, and soak times, there are still differences in the handling/discard behavior between the two fisheries once the fish reaches the deck. The GMT discussed potential reasons for these differences (longer/shorter deck times, handling expertise, use of venting/release devices, etc.) but could not quantify additional mortality or savings that could be attributed due to lack of available data. Research on release devices or venting techniques may provide information on survivability that could be incorporated into future models. Also, recording frequency of use of such devices in the WCGOP would also help inform future analyses.

Oregon nearshore logbook data from 2004-06 was analyzed to determine the proportion of gear used in the nearshore commercial fishery. Anecdotal evidence suggests that the proportion of “other gear” at shallower depths in California may be higher than Oregon. These differences cannot be quantified because California does not have a mandatory nearshore logbook program and it is impossible to identify the various “hook-and-line” gears reported under the generic hook-and-line category that is commonly used. Therefore, the same proportions used for Oregon are also assumed for California. Gear was summarized into “*recreational like*” (e.g., jig, rod-and-reel, or pole gear) and “*non-recreational like”* (all other gear) by depth (Table 4-35).

Table 4-35. Summary of 2004-06 Oregon nearshore logbook data (by gear and depth).

Gear Type	Depth Bin (fm) 0-10	11-20	>21	Total
Recreational-like gear (jig)	86.6%	72.3%	60.7%	80.2%
Other gear	13.4%	27.7%	39.3%	19.8%
Total	100%	100%	100%	100%

The GMT assumed that the mortality rate using jig gear would be similar between both the recreational and commercial fisheries; therefore, the mortality rate calculated for the recreational fishery could be applied. Other non-recreational like gear was assumed to have 100% mortality based on longer soak times and predation. The GMT also noted different handling behavior between the two fisheries, with the use of descending devices in the recreational fishery and venting techniques in the commercial fishery, but could not quantify any savings or additional mortality as a result of these techniques.

Depth dependent mortality estimates were calculated for each species or species groups as follows:

Total Mortality = (Proportion of jig gear x recreational discard mortality estimate) + (proportion of other gear x 100% mortality).

Modeling Impacts in the Offshore Sablefish Daily-Trip-Limit Fishery

Bycatch impacts in the open access daily-trip-limit (DTL) sablefish fishery are modeled using the limited entry fixed gear impact model. It is assumed that the directed open access sector will take their entire allocation of sablefish (Figure 4-13). The discard rates used to model bycatch impacts in the primary limited entry fixed sablefish gear fishery are also assumed in the analysis of impacts in the open access DTL fishery. The data informing the fixed gear sablefish bycatch impact model are aggregated across the limited entry and open access fixed gear fleets and are therefore used to model impacts in both fleets.

Description of the Open Access Sablefish Daily Trip Limit Fishery Regression Model Used for Inseason Adjustments of Trip Limits

The open access sablefish daily trip limit (DTL) model can be described as the product of two multivariable linear regressions. These regressions predict number of vessels landing open access sablefish in a two-month period and average catch per vessel in a two-month period. The explanatory variables in each regression are: season; the daily limit; the weekly limit; and the monthly limit.

The seasonality variable is included because it appears that fishing effort and success is determined to a large degree by weather. This variable is constructed by assuming that period 4 is the period of highest effort and catch (all else being equal), and that catch and effort decline in a linear fashion if one goes earlier or later in the year. This approach means (if everything else is equal) that period 3 and 5 would be the second highest period of catch and effort, period 2 and 6 would be the third highest period of catch and effort, and period 1 would be the period of lowest catch and effort. This approach essentially creates a triangular distribution between average vessel catch and season.

The daily, weekly, and bimonthly limits are included in the model because these limits directly affect the opportunities available to harvesters. Changes in fishing opportunities in an open access fishery should be expected to change effort in the fishery. In addition, changes in fishing opportunities should also be expected to change the average catch per vessel.

Season and historic DTL regulations on historic levels of effort and on average vessel catch were regressed to construct this model. Daily, weekly, and bimonthly limits for each two month period from 2003 through 2007 were used in the regression analysis. Figure 4-14 shows the accuracy of using the models to predict average catch and effort relative to what actually occurred.

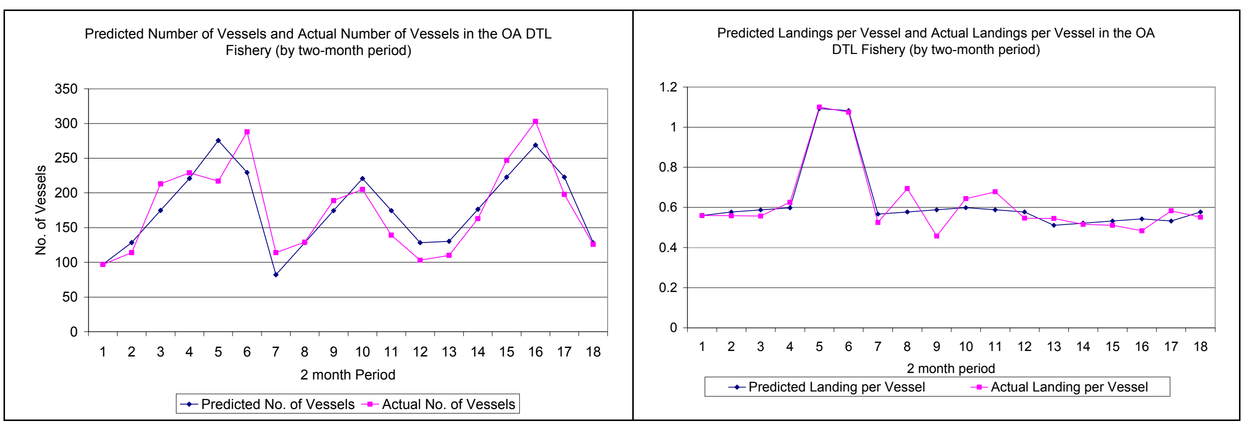


Figure 4-14. Predicted number of vessels versus the actual number of vessels (A) and predicted landings per vessel versus actual landings per vessel (B) in the open access daily-trip-limit fishery by two month period.

By multiplying each of these models by one another we can predict aggregate landings in this fishery for a year or for a given two-month period. Figure 4-15 shows the accuracy of this approach for predicting aggregate landings in this fishery.

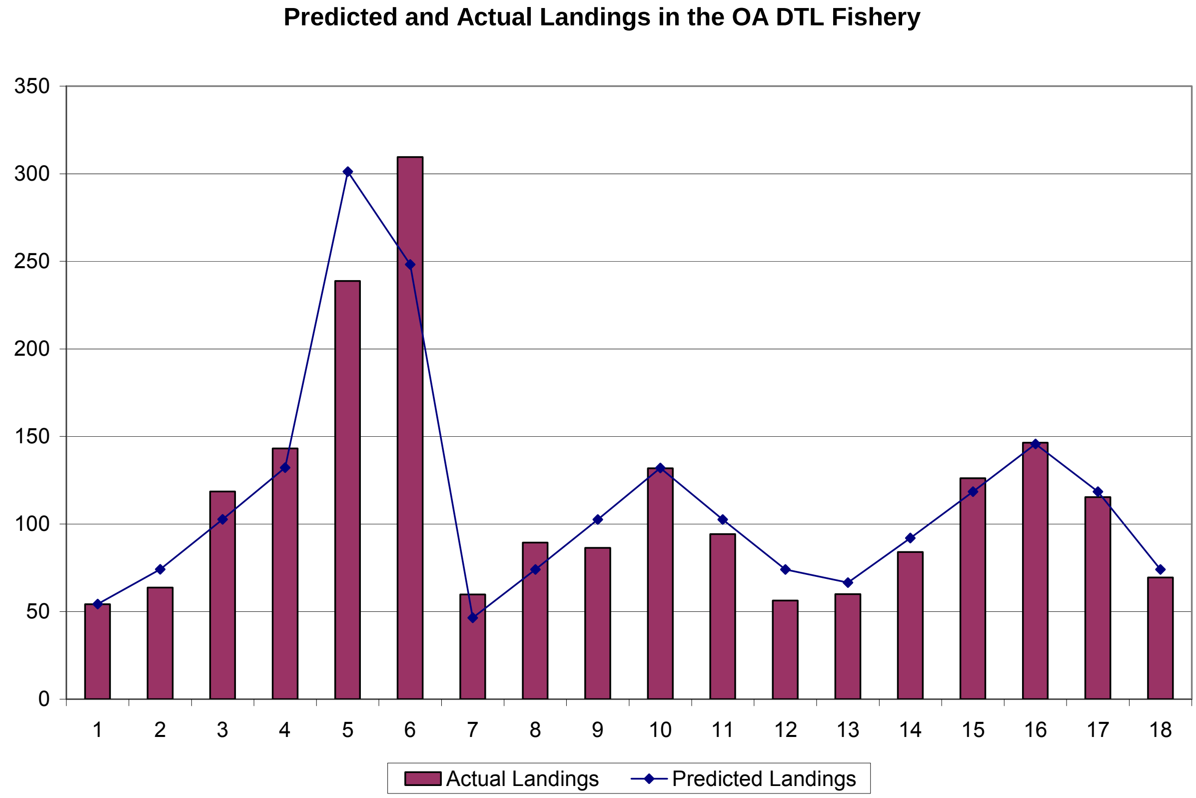


Figure 4-15. Predicted versus actual landings in the open access daily-trip-limit fishery.

Tables 4-36 and 4-37 show the statistical results of each regression. These results show that both models have a high degree of "fit" to the actual data, but some of the parameters are unexpected. In particular, the fact that the weekly limit has a negative coefficient (in the effort model) is unexpected since an increase in fishing opportunity should be expected to result in an increase in effort. A more in-depth look at the information shows that this unexpected sign can be explained because of the high degree of correlation between the weekly limit and the 2-month limit (Pearson correlation = 0.99). In other words, management has historically varied the 2-month limit and the weekly limit in concert, and therefore the regression technique cannot easily untangle the effect of the weekly limit from the 2-month limit on effort. This has implications for possible future management approaches if there is a potential for the weekly and 2-month limit to diverge. If these two limits diverge, the model's capacity to estimate catch levels will almost certainly be diminished.

Table 4-36. Statistical results for the catch per vessel regression analysis.

Regression Statistics	
Multiple R	0.947096565
R Square	0.896991904
Adjusted R Square	0.875531884
Standard Error	0.112296262
Observations	30

ANOVA

	df	*SS*	*MS*	*F*
Regression	5	2.635475653	0.527095131	41.79828
Residual	24	0.302650813	0.012610451	
Total	29	2.938126466		

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.130945908	0.133635926	0.979870548	0.3369
Bad Slmn opp	-0.03110317	0.081522276	-0.38152964	0.7062
minus peak (period)	-0.00198886	0.022626666	-0.08789879	0.9307
day	0.000195027	0.001399768	0.139328226	0.8904
2 month	0.000150027	2.79878E-05	5.36045618	0.0000
week	0.000116645	0.000470168	0.248091019	0.8062

Table 4-37. Statistical results for the number of vessels regression analysis.

Regression Statistics	
Multiple R	0.921265839
R Square	0.848730747
Adjusted R Square	0.824527666
Standard Error	22.0232807
Observations	30

ANOVA

	df	*SS*	*MS*	*F*
Regression	4	68033.57768	17008	35.06705
Residual	25	12125.62232	485	
Total	29	80159.2		

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	19.24193388	25.81139002	0.745	0.4629
Bad Slmn opp	62.35301892	11.48884052	5.427	0.0000
minus peak (period)	34.68262233	4.436273736	7.818	0.0000
day	0.556008406	0.116219706	4.784	0.0001
2 month	-0.00933888	0.004831928	-1.933	0.0647

4.5.1.5 *Tribal*

Tribal directed groundfish fisheries are subject to full retention requirements. As such, there are no regulatory discards in treaty groundfish fisheries. 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, Pacific cod, flatfishes, and yellowtail rockfish. These trip limits are intended to constrain direct catches while allowing for small incidental catches. Trip limits of 300 pounds each exist for canary rockfish, minor shelf rockfish, and minor slope rockfish. Yelloweye rockfish are subject to a 100 pound per trip limit. For all other species, limited entry trip limits apply. 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 pounds of canary rockfish, 713 pounds of darkblotched rockfish, and 212 pounds of widow rockfish). The only trip limit overage in 2003 was also from the midwater yellowtail fishery (3,889 pounds of yellowtail rockfish). In 2004 the midwater yellowtail fishery had overages of 5,178 lbs of yellowtail, 253 lbs of widow, and 48 lbs of minor shelf rockfishes; confiscations from the bottom trawl fishery totaled 971 lbs of yellowtail and 953 lbs of POP; the longline fishery saw overages of 164 lbs of sablefish. In 2005 the midwater yellowtail fishery had overages of 2,041 lbs of minor shelf, 4,826 lbs of widow, and 5,827 lbs of yellowtail rockfishes; the bottom trawl fishery had overages of 478 lbs of shortspine thornyheads and 1,232 lbs of sablefish; and the longline fishery had overages of 1,339 lbs of sablefish. In 2006 the midwater fishery had overages of 58 lbs of canary, 3,360 lbs of minor shelf, 982 lbs of widow, and 1,081 lbs of yellowtail rockfishes. The bottom trawl fishery in 2006 had overages totaling 4,890 lbs of yellowtail rockfish, 129 lbs of sablefish, 314 lbs of lingcod, and 718 lbs of shortspine thornyhead, while the longline fishery had 711 lbs of sablefish overages. In 2007 the overages in the bottom trawl fishery were 477 lbs of minor shelf rockfish, 378 lbs of widow, 288 lbs of yellowtail, and 162 lbs of lingcod. Longline fisheries in 2007 had 1,209 lbs of sablefish overages. Rockfish trip limits do not apply 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.

Estimated groundfish bycatch in Makah trawl and troll fisheries in recent years is depicted in Table 4-38. Among the depleted species, the table shows some bycatch of widow rockfish and canary rockfish in midwater and bottom trawl as well as salmon troll fisheries. Estimated bycatch in all tribal longline fisheries in recent years is shown in Table 4-39. Table 4-39 shows some bycatch of lingcod, canary rockfish, and yelloweye rockfish in tribal halibut and sablefish fisheries.

Table 4-38. Groundfish bycatch (lbs) in Makah trawl and troll fisheries, 2000-2007.

				Midwater Trawl				
Species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
black	0	0	0	0	0	0	0	0
lingcod	0	6	215	66	1,131	695	2,920	142
canary	306	1,366	3,151	895	2,400	4,096	1944	6
yelloweye	0	0	53	0	0	0	0	0
widow	2,036	11,549	27,639	20,516	46,852	56,518	20274	1,179
yellowtail	67,872	190,494	577,510	548,664	689,498	1,058,316	245,165	16,019
POP	0	0	0	0	0	0	0	0
darkblotched	0	102	2,898	32	0	0	144	0
sp thornyhead	0	0	0	0	48	0	0	388
				Bottom Trawl				
Species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
black	0	53	0	23	160	279	0	0
lingcod	7	508	9,603	29,544	33,472	37,353	35,457	67,382
canary	24	0	1,068	624	1,729	1,699	1,158	1,708
yelloweye	0	0	0	0	33	0	0	0
widow	0	0	0	3	125	1,425	39	540
yellowtail	563	505	5,909	30,153	25,657	29,950	36,970	31,045
POP	0	0	0	0	8,153	7,160	8,228	4,009
darkblotched	0	0	0	0	0	0	260	200
sp thornyhead	0	0	283	1,364	3,682	13,926	32,995	69,645
				Salmon Troll				
Species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
black	0	0	0	84	48	322	0	0
lingcod	1,958	773	2,006	2,131	4,688	20,201	25,294	9,679
canary	381	607	1,189	753	1,039	1,219	387	161
yelloweye	988	43	83	0	58	364	236	211
widow	0	32	0	5	15	0	49	0
yellowtail	8,948	7,060	7,071	17,994	27,351	29,598	30,774	7,218
POP	0	0	0	0	0	0	17	0
darkblotched	0	0	0	0	0	0	0	0
sp thornyhead	0	0	0	0	375	42	0	0

Table 4-39. Target species catch (lbs) and associated groundfish bycatch (lbs) in tribal longline fisheries for halibut and sablefish by year and tribe, 2000-07.

Target Species	Associated Bycatch Species	2000	2001	2002	2003	2004	2005	2006	2007
				Quinault					
Halibut		85,252	85,644	104,191	25,023	119,995	105,414	86,554	76,321
Sablefish		309,762	288,511	114,269	253,412	302,268	240,696	319,039	179,204
	black	NA	0	0	0	0	0	0	0
	lingcod	NA	0	0	225	475	328	609	378
	canary	NA	0	4	0	100	3	0	0
	yelloweye	NA	0	10	0	14	17	18	31
	yellowtail	NA	0	4	0	0	40	18	24
	widow	NA	0	0	0	0	50	0	0
	POP	NA	0	0	0	0	0	18	24
	darkblotched	NA	0	0	0	158	0	214	49
	sp thornyheads	NA	542	570	197	237	1,414	1,053	1,974
				Quileute					
Halibut		42,666	45,034	67,290	28,737	51,965	40,788	38,337	53,782
Sablefish		164,016	143,591	92,438	76,352	155,164	72,184	71,437	69,152
	black	30	0	0	0	0	0	0	0
	lingcod	144	1,599	1,074	119	365	500	4,555	5,792
	canary	74	25	117	20	588	80	23	56
	yelloweye	2,365	4,224	3,287	520	1,326	561	409	380
	yellowtail	63	19	74	154	2,324	144	603	151
	widow	0	0	0	0	0	0	0	0
	POP	0	0	0	0	0	0	0	0
	darkblotched	0	0	0	0	0	0	0	0
	sp thornyheads	624	482	91	137	286	335	230	257
				Makah					
Halibut		151,268	270,365	294,618	405,020	330,776	330,776	284,780	257,786
Sablefish		490,229	464,723	227,740	493,616	512,907	659,507	534,159	453,392
	black	0	0	0	0	2	150	0	0
	lingcod	3,434	6,138	10,793	16,150	10,379	6,460	16,774	11,898
	canary	19,547	2,330	597	999	384	365	412	37
	yelloweye	523	2,075	1,819	0	283	854	403	281
	yellowtail	0	382	235	690	384	243	0	98
	widow	3	19	0	0	0	239	22	20
	POP	0	0	0	0	0	0	0	0
	darkblotched	0	0	0	0	0	0	0	0
	sp thornyheads	7,662	10,081	9,229	11,531	8,778	6,907	12,157	13,212

Discard and Retention in Tribal Sablefish Fisheries

The tribal sablefish allocation is 10% of the OY for the area north of 36° N latitude. This amount is reduced by about 1.6% to account for discard mortality. The tribal sablefish fishery is primarily a longline fishery. The discard mortality rate is estimated as the difference in the ratio of small (<3 pounds) versus large (>3 pounds) fish found in the landings of the competitive portion of the fishery (approximately 1/3 of the tribal allocation) compared to the noncompetitive tribal longline fisheries (approximately 2/3 of the tribal allocation) averaged over the past seven years (Table 4-40). This difference is then applied to the noncompetitive fishery allocation share (2/3) to get the rate of discards, and multiplied by 20% to get the estimated sablefish mortality rate due to discards.[10] This calculation does not account for the increase in larger fish closer to shore as the season progresses, and so may overestimate actual discard and mortality. 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 - 33,858 pounds in 2004, 84,292 pounds in 2005, 81,827 pounds in 2006, and 63,447 pounds (dressed weight) - is subject to full retention requirements. At the end of the season, most trawl vessels make one or two directed sablefish tows to take the remainder of their allowance. All overages are forfeited to the tribe. The lack of discard in the tribal trawl fishery does not significantly affect the overall rate of 1.6% applied to tribal sablefish fisheries.

[10] Northwest Fisheries Science Center estimate of mortality as a share of total sablefish discards is 20%.

Table 4-40. Calculation of sablefish discard mortality in tribal longline fisheries.

Year	Fishery	Pounds of Sablefish by Market Size Category								
		<2 lb	2-3 lb	3-4 lb	4-5 lb	5-7 lb	>7 lb	Total	% >3 lb	difference
2001	Competitive	22,673	67,786	79,515	57,836	36,608	7,829	272,247	66.77%	-
	Noncompetitive	18,616	92,475	111,587	106,734	115,006	34,788	479,206	76.82%	10.04%
2002	Competitive	28,005	56,255	52,910	37,824	26,307	3,710	205,011	58.90%	
	Noncompetitive	16,078	52,816	60,262	47,543	56,071	18,206	250,976	72.55%	13.65%
2003	Competitive	51,952	140,467	49,847	25,420	25,918	7,857	301,461	36.17%	
	Noncompetitive	36,452	103,777	81,568	56,473	70,502	33,588	382,360	63.33%	27.15%
2004	Competitive	42,556	156,187	107,438	33,185	16,602	5,801	361,769	45.06%	
	Noncompetitive	38,757	175,244	145,979	76,893	62,886	23,264	523,023	59.08%	14.02%
2005	Competitive	11,315	81,743	109,237	64,471	24,878	4,226	295,870	68.55%	
	Noncompetitive	18,148	126,973	191,364	134,564	93,428	24,963	589,440	75.38%	6.83%
2006	Competitive	16,890	69,262	98,647	67,620	34,159	7,517	294,095	70.71%	
	Noncompetitive	25,507	120,739	148,894	111,003	98,244	37,798	542,185	73.03%	2.32%
2007	Competitive	13,238	52,597	71,856	57,866	39,221	7,419	242,196	72.82%	
	Noncompetitive	11,430	62,023	96,250	94,340	104,367	27,816	396,224	81.46%	8.64%

Calculations

Year	Discard Rate[a/]	Mortality Rate[b/]
2001	0.0672981	0.013460
2002	0.0914537	0.0182907
2003	0.1819333	0.0363867
2004	0.0939366	0.0187873
2005	0.0457756	0.0091551
2006	0.0155473	0.0031095
2007	0.0579153	0.0115831
Average	0.0791228	0.0158246

a/ Difference between "% >3 lb" in noncompetitive fishery and competitive fishery x .67 (allocation to noncompetitive fishery).
b/ Discard rate x 20% (Northwest Fisheries Science Center estimate of mortality as a share of total sablefish

discards).

Makah Trawl Observations

Makah trawl fisheries pursue two basic strategies – bottom trawl and midwater trawl. In an agreement with the National Marine Fisheries Service and the Pacific Fishery Management Council, the Tribe has had an observer program in place since 2003 to monitor maximum retention. Maximum retention is defined as retention of all marketable species and all depleted species. The program has a target observation rate of approximately 15% of all trawl trips in a given year. Management is focused on avoidance of two depleted species: canary rockfish in both strategies and widow rockfish in midwater trawls. Makah Fisheries Management combines their maximum retention policy with an observer program to verify the accuracy of bycatch accounting (i.e., if observed bycatch rates are not significantly different than unobserved bycatch rates, managers are reasonably certain that landings reflect total mortality for depleted species).

Comparisons of bycatch rates in observed versus unobserved landings by year (2003-07) were conducted for bottom trawl to test for differences in retention of canary rockfish (Tables 4-41 and 4-42). Midwater trawl fisheries were analyzed in 2003-05 for differences in retention of both canary and widow rockfish, as either may be constraining (Tables 4-43 and 4-44). No midwater analysis was conducted for 2006 or 2007 due to limited or no prosecution of the fishery in those years. Separate analyses (paired *t* tests) were performed for vessels that carried an observer and all vessels combined (i.e., including those vessels that had no observer coverage during the year). Bycatch rates were also compared for two separate target strategies in bottom trawl (primary flatfish targets and Pacific cod) to examine whether bycatch was more prevalent in one strategy than the other. Primary flatfish target species were Dover sole, petrale sole, English sole, and arrowtooth flounder. Two-tailed paired *t* tests found no significant difference between observed and unobserved trips for vessels that carried an observer during the season in any year. Likewise, no significant difference was measured between all observed and unobserved trips for any given year; however, one comparison was borderline significant (Table 4-44). This was likely due to an increase of higher-bycatch exploratory trips – which are used to verify low bycatch areas for midwater trawl – in that year. Bycatch was not predominantly associated with either target strategy for bottom trawl.

Table 4-41. Yearly comparisons of canary rockfish bycatch rates (measured as pounds of canary rockfish divided by pounds of target species by category) for bottom trawl vessels that carried an observer at least once during a season.

Year	Target Species	Mean Bycatch Rates		d.f.	*t*	*p*
		Observed	Unobserved			
2003	Primary flatfish	0.00121	0.00198	6	0.79	0.46
	Pacific cod	0.00202	0.00344	6	-0.6	0.57
	All Targets	0.00059	0.00113	6	-0.89	0.41
2004	Primary flatfish	0.00772	0.00343	5	0.79	0.47
	Pacific cod	0.03807	0.00312	5	1.19	0.29
	All Targets	0.00619	0.00127	5	1.15	0.3
2005	Primary flatfish	0.0047	0.00154	5	1.22	0.28
	Pacific cod	0.05022	0.00566	5	1.03	0.35
	All Targets	0.00265	0.00108	5	1.06	0.34
2006	Primary flatfish	0.00154	0.0017	5	-0.18	0.86
	Pacific cod	0.0152	0.011	5	0.52	0.63
	All Targets	0.00122	0.00106	5	0.39	0.78
2007	Primary flatfish	0.00096	0.00142	7	-1.21	0.26
	Pacific cod	0.03536	0.03191	7	0.22	0.83
	All Targets	0.00092	0.00134	7	-1.17	0.28

Table 4-42. Yearly comparisons of canary rockfish bycatch rates (measured as pounds of canary rockfish divided by pounds of target species category) for all observed and unobserved bottom trawl vessels.

Year	Target Species	Mean Bycatch Rates		d.f.	*t*	*p*
		Observed	Unobserved			
2003	Primary flatfish	0.00106	0.00143	16	-0.43	0.67
	Pacific cod	0.00176	0.00245	16	-0.38	0.71
	All Targets	0.00052	0.00085	16	-0.68	0.5
2004	Primary flatfish	0.00772	0.0075	14	0.03	0.98
	Pacific cod	0.03807	0.00663	5	1.07	0.33
	All Targets	0.00619	0.0033	14	0.64	0.53
2005	Primary flatfish	0.0047	0.00166	5	1.23	0.27
	Pacific cod	0.05022	0.00669	5	1.02	0.36
	All Targets	0.00265	0.00118	6	1.01	0.35
2006	Primary flatfish	0.00154	0.00085	16	0.74	0.47
	Pacific cod	0.0152	0.0055	16	1.56	0.14
	All Targets	0.00122	0.00053	16	1.24	0.23
2007	Primary flatfish	0.00096	0.00114	16	-0.21	0.84
	Pacific cod	0.03536	0.02553	16	0.41	0.69
	All Targets	0.00092	0.00107	16	-0.19	0.85

Table 4-43. Yearly comparisons of canary and widow rockfish bycatch rates (measured as pounds of bycatch divided by pounds of yellowtail) for midwater trawl vessels that carried an observer at least once during a season.

Year	Species	Mean Bycatch Rates		d.f.	t	p
		Observed	Unobserved			
2003	Canary	0.00351	0.00289	2	0.27	0.81
	Widow	0.05353	0.03335	2	0.6	0.61
2004	Canary	0.00651	0.00213	5	1.81	0.13
	Widow	0.07209	0.06719	2	0.3	0.78
2005	Canary	0.0103	0.00312	5	1.26	0.26
	Widow	0.08868	0.04733	5	1.62	0.17

Table 4-44. Yearly comparisons of canary and widow rockfish bycatch rates (measured as pounds of bycatch divided by pounds of yellowtail) for all observed and unobserved midwater trawl vessels.

Year	Species	Mean Bycatch Rates		d.f.	t	p
		Observed	Unobserved			
2003	Canary	0.00351	0.00124	2	0.72	0.55
	Widow	0.05353	0.07671	9	-0.39	0.7
2004	Canary	0.00651	0.00175	6	2.13	0.08[a/]
	Widow	0.07209	0.05421	15	1.16	0.26
2005	Canary	0.0103	0.00503	6	0.87	0.42
	Widow	0.08868	0.04398	6	1.7	0.14
a/ Difference in canary bycatch rates in 2004 was of borderline significance.						

4.5.1.6 *Recreational Discard Mortality*

In June 2007, the Council endorsed the RecFIN Technical Committee's recommendation to apply mortality rates by species and depth to the estimates of total discards in order to estimate total mortalities for discarded fish. This method of accounting for discards is intended to assure that discard mortalities are determined in a consistent manner in all three states. The Council tasked the GMT with developing a matrix describing mortality by species and depth ("discard mortality matrix") in time to be analyzed in this EIS. The methods for estimating discard mortality rates were reviewed by the SSC during the April 2008 Council meeting, and their suggestions were incorporated into the results presented here.

Methods and Results

The GMT's review and discussion of the state of knowledge on discard mortality identified three categories of mortality. First, the team considered "surface" mortality, i.e. mortality that is observable when a fish is brought to the surface, handled on deck, and thrown back. Second, the team considered short-term, below-surface mortality that has been documented in research trials to a limited extent using underwater cameras or divers. Lastly, the team took into consideration longer-term, below-surface mortality that is essentially unobservable in the field and for which there is little, if any, information available in the literature. During subsequent biennial specification processes, the team will review the latest research and data available and determine whether they can be incorporated into the discard mortality matrix.

Estimates of Surface Mortality

Estimates of surface mortality were created in a two-step analysis. First, the GMT performed a generalized linear model (GLM) analysis of species disposition by depth on a data set created from observations of discarded fish taken onboard recreational charter boats. Second, to account for species for which insufficient observer data were available, the team performed a guild-based GLM analysis that compared mortality rates among groups of species with similar depth distribution and vertical orientation in the water column.

Description of Available Data on Surface Mortality

The GMT analyzed three data sets with information on the disposition of discarded fish (live or dead) by species and capture depth (10-fm increments) from the California Recreational Fishery Survey (CRFS), the California Department of Fish and Game (CDFG) Commercial Passenger Fishing Vessel Onboard Observer Program, and the Oregon Department of Fish and Wildlife (ODFW) Onboard Observation Program.

The first data set combined observations from the CDFG CPFV Onboard Observer Program from Point Conception to Fort Bragg from 1987 to 1998 and the CRFS CPFV Onboard Observer Program/ODFW Onboard Recreational Boat Sampling (ORBS) data from the Oregon/Washington border to Mexico from 2005 to 2007. Observers recorded the disposition of discarded catch for a subset of anglers onboard the boat. Observers either watched a fish as it was discarded or asked the angler whether the fish was bleeding from the gills or floated away (dead) as opposed to swimming back down (alive). The second data set was constructed from the CRFS/ORBS Onboard Observer Program Sampler Examined Discards collected from Mexico to the Oregon/Washington border between 2003 and 2007 ("Type 3d"). The onboard sampler recorded the condition of the discarded fish after taking length measurements and discarding the fish.

The California data sets are not independent of one another because the Type 3d data are a subset of the tallied fish from the combined CRFS-CPFV data. The team discussed the relative merits of the two data sets and the GMT concluded that the combined CRFS-CPFV data had the advantage of a larger sample size and greater range of encounter depths. However, the team concluded that the Type 3d data set was more reliable because of the direct observation of the discarded fish by the sampler and the greater sample size for depleted species such as yelloweye rockfish. Thus the Type 3d sampler-examined discard was used in the GLM analyses.

Average bottom depth over a drift was used to approximate the depth at the location of capture. Semi-pelagic and pelagic species may have ascended from mid-water when caught and therefore the recorded bottom depth is not necessarily the depth of capture. Recorded depth should be regarded as ascribing mortality to fish caught while fishing in or around a given depth bin.

GLM Model Description and Results

The proportion of fish released dead (the "mortality rate") as recorded in the Type 3d data set, π, was modeled using a quasi-binomial generalized linear model (GLM) with a logit link function (McCullagh and Nelder 1989).

$$\log\left(\frac{\pi_i}{1-\pi_i}\right) = x_i^T \beta \qquad [1]$$

This model is similar to a binomial GLM in that $E[Y_i | X_i] = n_i \pi_i$, but it includes an "overdispersion" parameter, ϕ, in the variance function: $V[Y_i | X_i] = \phi n_i \pi_i (1-\pi_i)$. Overdispersion can be the result of dependence between trials or unexplained heterogeneity within a group. An error in the structural form of the model can also give the appearance of overdispersion. Although overdispersion was detected for these data, the relative contribution of these effects is unknown.

Species and depth (by 10-fm bin) were included in the model as categorical variables. Due to smaller sample sizes, depths greater than 50 fm were excluded. Species with small sample sizes (*S. chrysomelas, S. nebulosus, S. maliger* and *S. rastrelliger*) were excluded to stabilize the parameter estimation procedure. Discard mortality estimates for these four species are based on the by-guild GLM analysis.

The observed and predicted proportions of fish released dead are plotted by species and depth in Figure 4-16. Table 4-45 reports sample sizes by species and depth bin. Observations based on less than 5 fish were excluded from Figure 4-16.

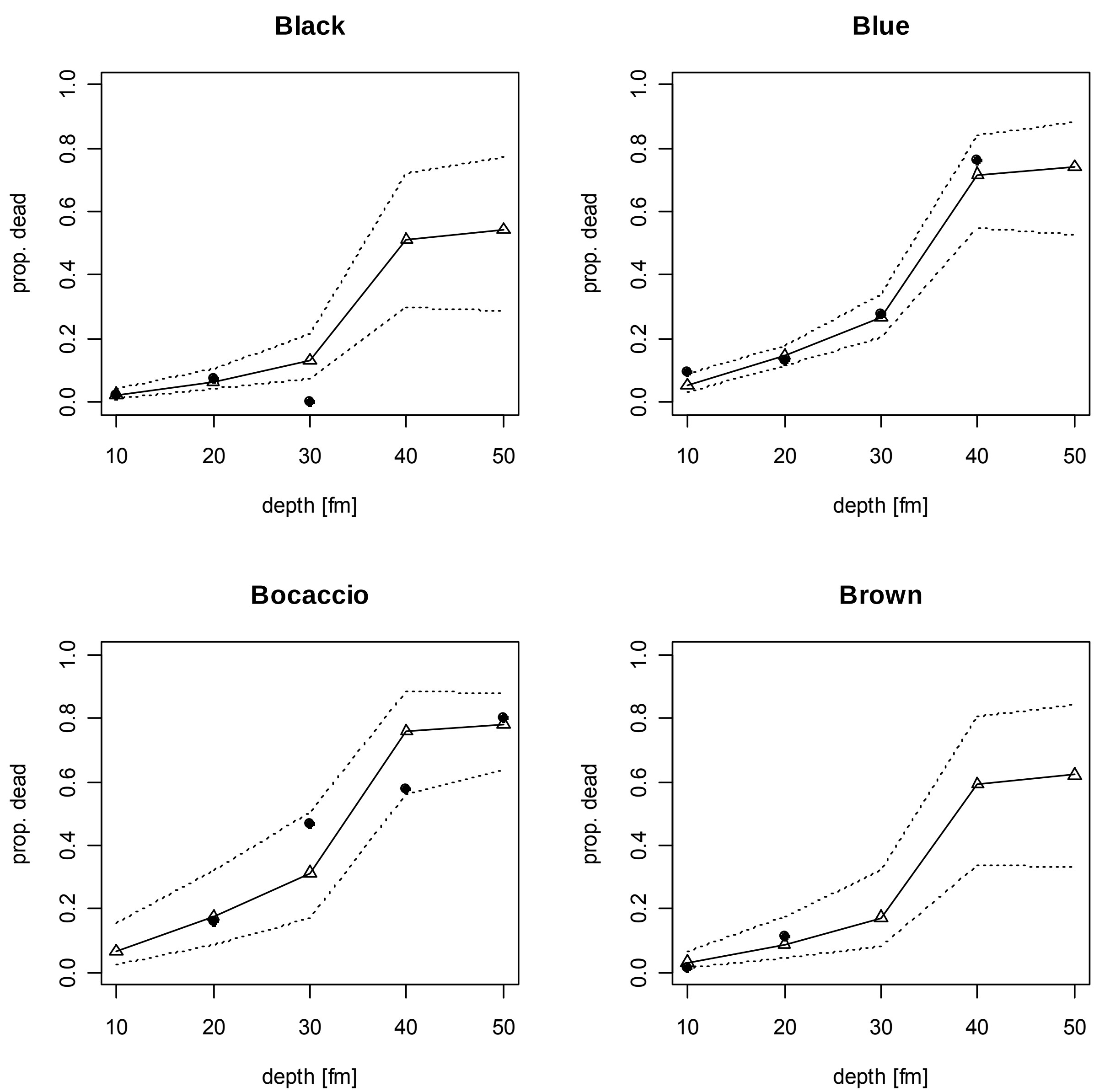


Figure 4-16. Comparison of GLM predictions of the proportion of fish released dead at the surface with observed proportions, by species and 10-fm depth bin. Observations with samples sizes less than 5 were not

plotted. Observed = solid circles, predicted = solid line with triangles, dotted lines represent 95% confidence intervals.

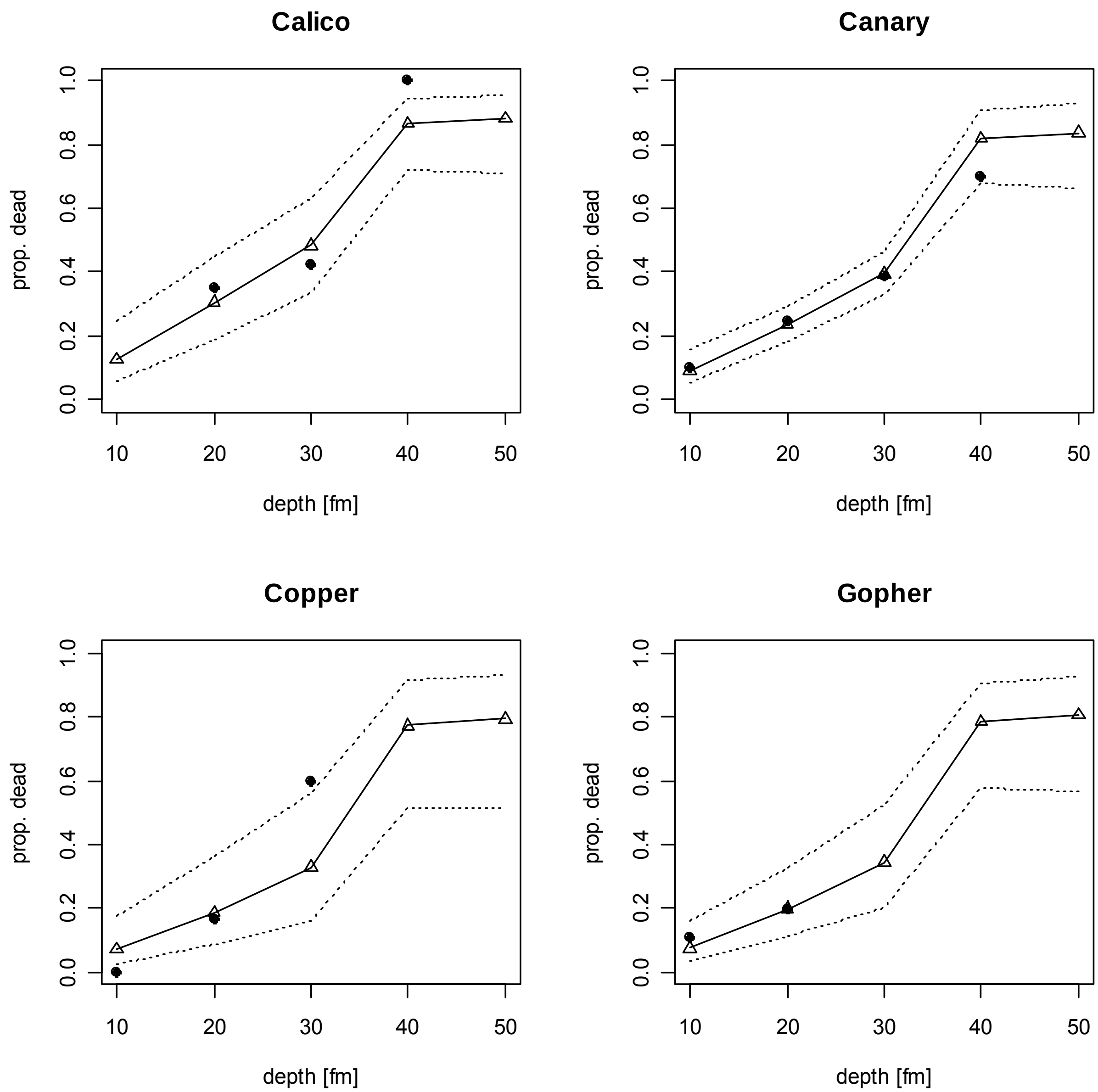


Figure 4-16. Comparison of GLM predictions of the proportion of fish released dead at the surface with observed proportions, by species and 10-fm depth bin. Observations with samples sizes less than 5 were not plotted. Observed = solid circles, predicted = solid line with triangles, dotted lines represent 95% confidence intervals (continued).

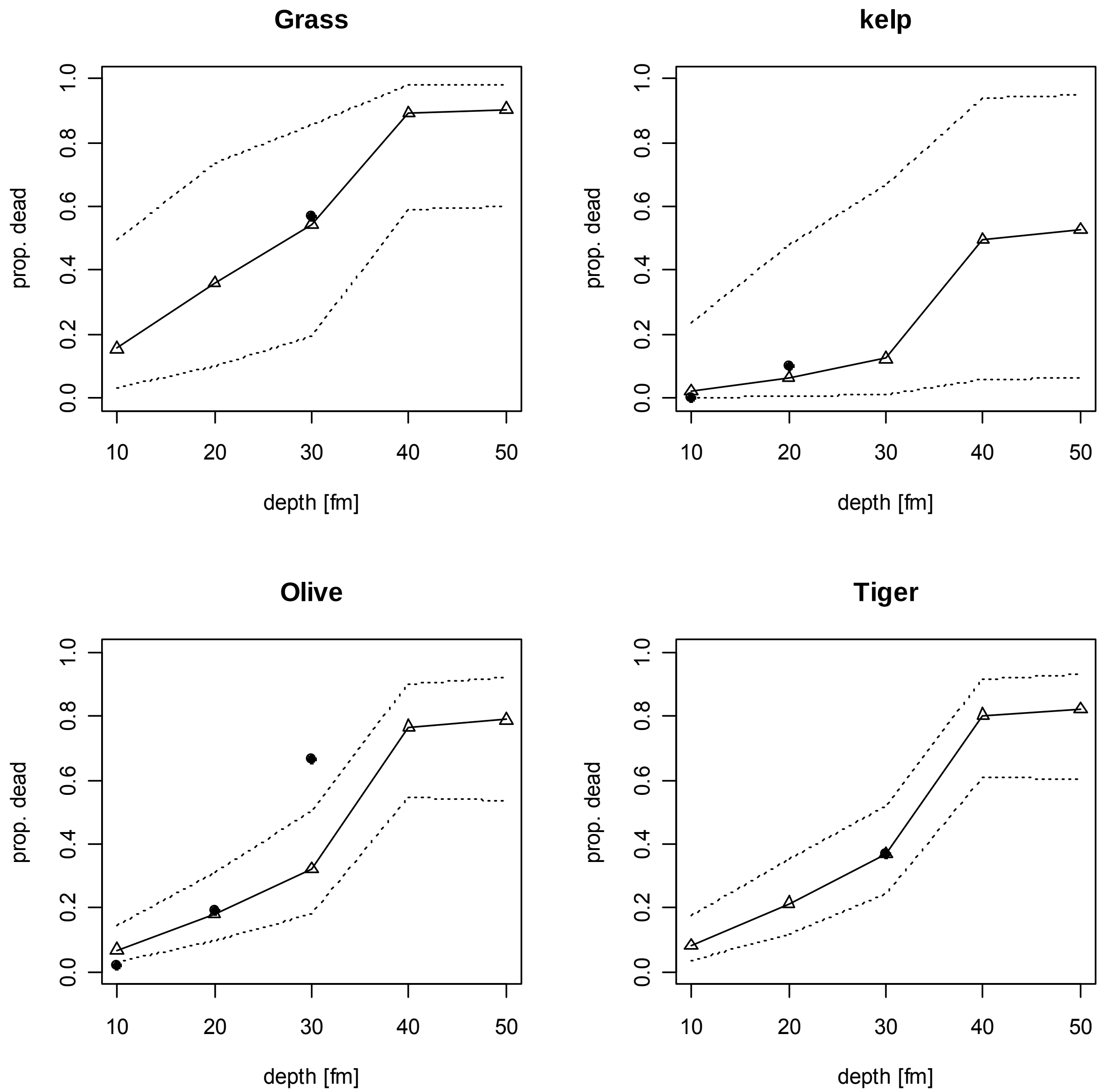


Figure 4-16. Comparison of GLM predictions of the proportion of fish released dead at the surface with observed proportions, by species and 10-fm depth bin. Observations with samples sizes less than 5 were not plotted. Observed = solid circles, predicted = solid line with triangles, dotted lines represent 95% confidence intervals (continued).

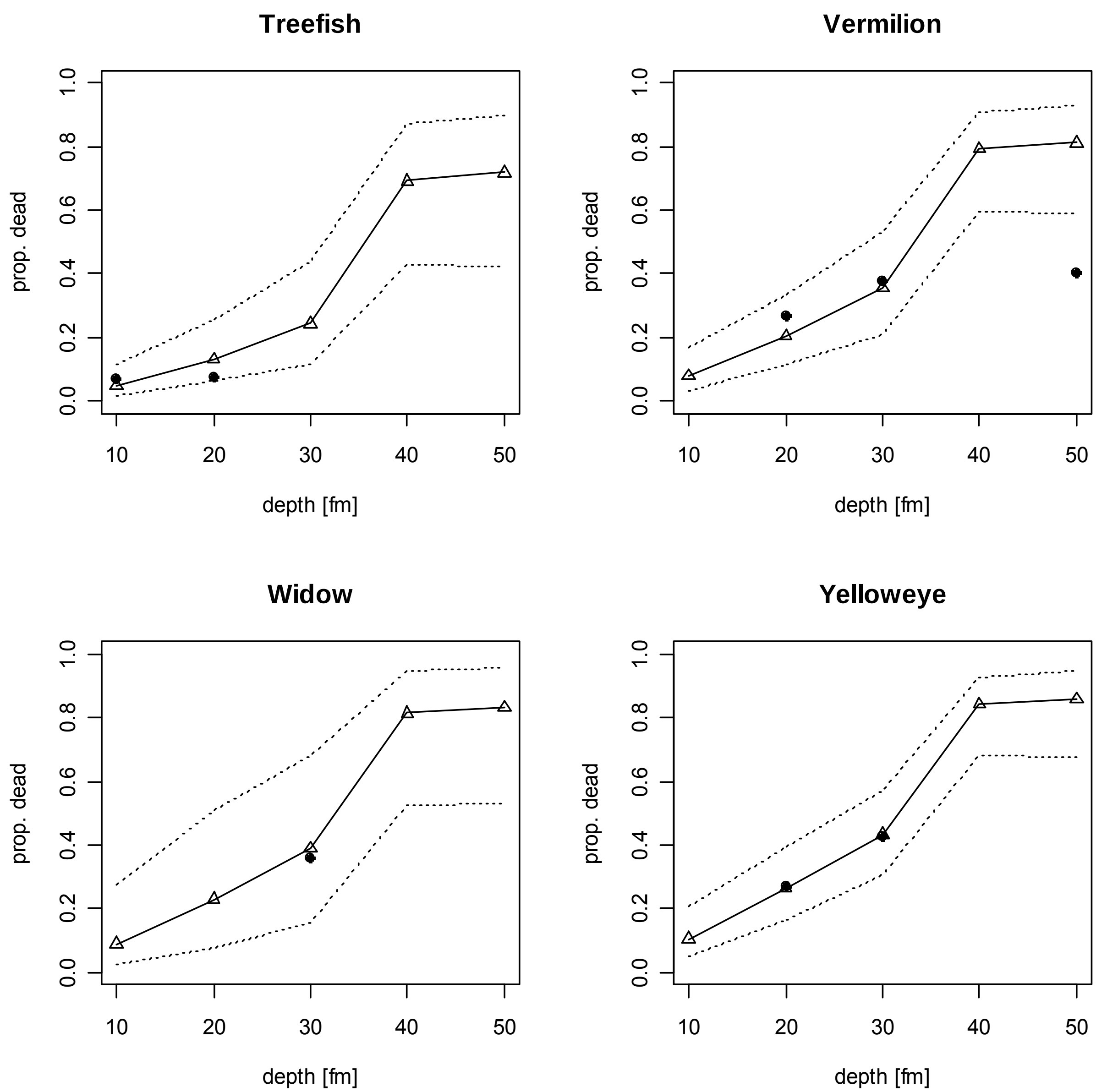


Figure 4-16. Comparison of GLM predictions of the proportion of fish released dead at the surface with observed proportions, by species and 10-fm depth bin. Observations with samples sizes less than 5 were not plotted. Observed = solid circles, predicted = solid line with triangles, dotted lines represent 95% confidence intervals (continued).

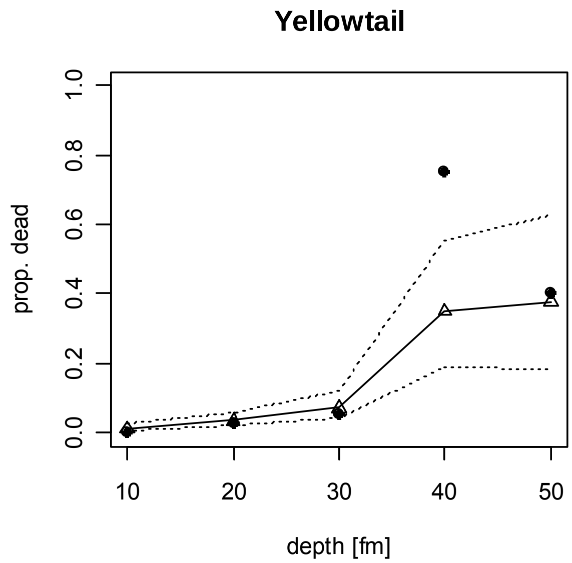


Figure 4-16. Comparison of GLM predictions of the proportion of fish released dead at the surface with observed proportions, by species and 10-fm depth bin. Observations with samples sizes less than 5 were not plotted. Observed = solid circles, predicted = solid line with triangles, dotted lines represent 95% confidence intervals (continued).

Table 4-45. Sample sizes by species and depth; data used in GLM model for surface mortality.

Species	Depth Bin (fm)				
	10	20	30	40	50
Black	254	303	11		
Blue	136	632	108	17	4
Bocaccio		19	15	19	66
Brown	141	89	1	1	
Calico	1	40	38	5	
Canary	10	249	225	10	1
Copper	5	43	5		
Gopher	19	76	3	2	
Grass	3	2	7		
kelp	18	10			
Olive	48	57	6	2	
Tiger			76		
Treefish	29	66	4		
Vermilion	3	67	8	4	5
Widow		2	14	3	2
Yelloweye	2	26	66	4	
Yellowtail	14	210	174	12	5

Although the interaction between species and depth was significant, leaving this term in the model reproduces the observed proportions exactly and provides no method for estimating missing cells. Because predictions from the model without the interaction term were quite good in most cases (Figure 4-16), the simpler model was chosen to estimate surface mortality rates (Table 4-46). Upper 95% confidence limits illustrate the degree of uncertainty associated with the GLM predictions (Figure 4-16, Table 4-47), and were consulted during precautionary adjustments to model predictions. Since upper 95% confidence limits for surface mortality approach 100% at depths greater than 30 fm, mortality beyond this depth was assumed to be 100%. The two exceptions to this approach were yellowtail and black rockfish, given their relatively low mortality rates.

The GLM predicts mortality rates from a combination of species and depth effects, so all cells in Tables 4-46 and 4-47 have predicted mortality rates. Tables 4-48 and 4-49 present GLM predictions and upper 95% confidence limits, respectively, adjusted for short- and long-term, below-surface mortality (described below).

Guild-based GLM Analysis

An analysis was conducted to estimate surface mortality for groups of species ('guilds') that have similar distribution in the water column (pelagic vs. demersal) and differences in depth distribution (deep vs. shallow) (Table 4-50). Guilds were based on published information regarding depth distribution and orientation in the water column (Love, Yoklavich, and Thorsteinson 2002) and collective experience of team members.

Data (Type 3d) for species within each guild were combined and re-analyzed using a quasi-binomial GLM as described above (Figure 4-17, Tables 4-51 to 4-55). In addition to depth of capture, this approach assumes that discard mortality depends on general patterns of depth distribution and orientation in the water column, characteristics which may not be clearly defined for all species. Therefore, precaution is advised when applying these rates since the model does not account for uncertainty associated with misclassification. Nonetheless, this method provides a means for assigning depth-specific discard mortality rates to species for which there is little or no data, based on information available from other species with similar characteristics.

Table 4-46. Predicted percentage released dead (surface mortality only) from the GLM.

Species	Depth Bin (fm)				
	10	20	30	40	50
Black	2%	7%	13%	51%	54%
Blue	5%	15%	27%	72%	74%
Bocaccio	6%	17%	31%	76%	78%
Brown	3%	9%	17%	59%	62%
Calico	12%	30%	48%	87%	88%
Canary	9%	23%	39%	82%	84%
Copper	7%	19%	33%	77%	79%
Gopher	7%	20%	34%	79%	81%
Grass	15%	36%	55%	89%	90%
kelp	2%	6%	12%	50%	53%
Olive	7%	18%	32%	77%	79%
Tiger	8%	21%	37%	80%	82%
Treefish	5%	13%	24%	69%	72%
Vermilion	8%	20%	35%	79%	81%
Widow	9%	23%	39%	82%	83%
Yelloweye	10%	26%	43%	84%	86%
Yellowtail	1%	3%	7%	35%	38%

Table 4-47. Upper 95% confidence limits of GLM predictions for surface mortality.

Species	Depth Bin (fm)				
	10	20	30	40	50
Black	4%	11%	22%	72%	77%
Blue	9%	18%	34%	84%	88%
Bocaccio	15%	32%	50%	89%	88%
Brown	7%	17%	32%	81%	85%
Calico	25%	45%	63%	94%	96%
Canary	16%	29%	47%	91%	93%
Copper	18%	36%	56%	92%	93%
Gopher	16%	33%	52%	91%	93%
Grass	49%	74%	86%	98%	98%
kelp	23%	48%	67%	94%	95%
Olive	14%	31%	51%	90%	92%
Tiger	18%	35%	52%	91%	93%
Treefish	11%	26%	44%	87%	90%
Vermilion	17%	34%	53%	91%	93%
Widow	28%	51%	68%	95%	96%
Yelloweye	21%	39%	57%	93%	95%
Yellowtail	3%	6%	12%	55%	63%

Table 4-48. Estimated percentage of fish released dead, based on GLM predictions of surface mortality adjusted by estimates of short- and long-term, below-surface mortality.

Species	Depth Bin (fm)				
	10	20	30	40	50
Black	11%	20%	29%	63%	67%
Blue	18%	30%	43%	79%	82%
Bocaccio	19%	32%	46%	82%	85%
Brown	12%	22%	33%	69%	73%
Calico	24%	43%	60%	90%	92%
Canary	21%	37%	53%	87%	89%
Copper	19%	33%	48%	83%	86%
Gopher	19%	34%	49%	84%	87%
Grass	23%	45%	63%	92%	93%
kelp	11%	19%	29%	61%	66%
Olive	34%	45%	57%	86%	88%
Tiger	20%	35%	51%	86%	88%
Treefish	14%	25%	39%	76%	80%
Vermilion	20%	34%	50%	85%	87%
Widow	21%	36%	52%	86%	89%
Yelloweye	22%	39%	56%	88%	90%
Yellowtail	10%	17%	25%	50%	55%

Table 4-49. Upper 95% confidence limits for percentage of fish released dead, based on GLM predictions of surface mortality adjusted by estimates of short- and long-term, below-surface mortality.

Species	Depth Bin (fm)				
	10	20	30	40	50
Black	13%	23%	36%	79%	84%
Blue	21%	32%	49%	88%	92%
Bocaccio	26%	44%	61%	92%	92%
Brown	15%	29%	45%	85%	89%
Calico	34%	55%	71%	96%	97%
Canary	27%	42%	59%	93%	95%
Copper	28%	48%	66%	94%	95%
Gopher	27%	44%	63%	93%	95%
Grass	54%	77%	88%	98%	99%
kelp	31%	55%	73%	95%	96%
Olive	39%	54%	69%	94%	96%
Tiger	28%	47%	62%	94%	95%
Treefish	20%	36%	54%	90%	93%
Vermilion	28%	45%	64%	93%	95%
Widow	37%	60%	75%	96%	97%
Yelloweye	31%	50%	67%	95%	96%
Yellowtail	12%	19%	29%	66%	73%

Table 4-50. Species composition of guilds based on depth distribution and orientation in the water column.

Guild	Species Included in Guild (RF=Rockfish)
Shallow Pelagic	Black RF, Olive RF, Yellowtail RF
Shallow Demersal	Brown RF, Grass RF, Kelp RF, Treefish.
Deep Pelagic	Bocaccio RF, Widow RF, Canary RF, Blue RF
Deep Demersal	Vermilion RF, Copper RF, Yelloweye RF, Gopher RF

Short-Term Below-Surface Estimates of Mortality

The GMT reviewed additional studies to identify information regarding delayed/long term mortality in addition to the baseline mortality rate provided by the GLM.

Albin and Karpov (1996) provided estimates of additional mortality accrued on recreationally caught rockfishes in 0-180 feet of water from 1-5 days after capture. In order to account for variation in mortality rate with depth, the data for 1-5 day mortality by species was grouped by shallow and deep-dwelling species to estimate delayed/long-term mortality rates based on predominant depth of occurrence. The GMT agreed to adjust the GLM results with additional mortality based on proportions from the Albin and Karpov study to provide an estimate of surface and short-term, below-surface discard mortality. For deep-water species, a short-term below-surface mortality estimate of 8.33% was incorporated into the mortality rate predicted by the GLM. For shallow-water species, a short-term below-surface mortality estimate of 4.55% was added. A separate adjustment (25.6%) was added to the GLM estimate for olive rockfish due to an unrepresentatively high estimate of long-term mortality at depth that dramatically changed the mortality estimate for shallow species.

Long-Term Delayed Estimates of Mortality

The GMT discussed the potential for long-term effects from releasing fish caught at varying depths. Fish that appear to be unharmed after catch and release may have unidentified problems, ranging from swim bladder or internal organ damage to reduced reproductive success or other factors affecting mortality rates. Very little is known about delayed mortality of discards other than there is some likely long-term effect associated with catch and release. In order to account for the uncertainty in delayed mortality, the GMT discussed further adjustment of mortality rates that were based on the GLM estimates and Albin and Karpov data. For species with swim bladders, the GMT considered rates between 2 and 5 percent for fish with swim bladders released between 0 and 10 fm. Due to the lack of available information, the GMT settled on using the higher value of 5 percent as a more conservative rate. Delayed mortality for species subject to barotrauma is expected to increase with greater changes in ambient pressure (i.e. increasing depth of capture). Based on this assumption, the GMT included an additional 5% mortality for each 10 fm of depth of capture. This component of mortality is considered independent of the GLM-estimated surface mortality and short-term below-surface mortality based on the Albin and Karpov data.

Pacific cod is another species with a swim bladder and is therefore subject to barotrauma. There is very little information on discard mortality for Pacific cod so the GMT recommends using a 5% discard rate based on hooking mortality for Pacific cod caught in the 0-10 fm range and recommends applying the combined average for all rockfish data from the GLM results for the 11-20 and the 21-30 depth bins.

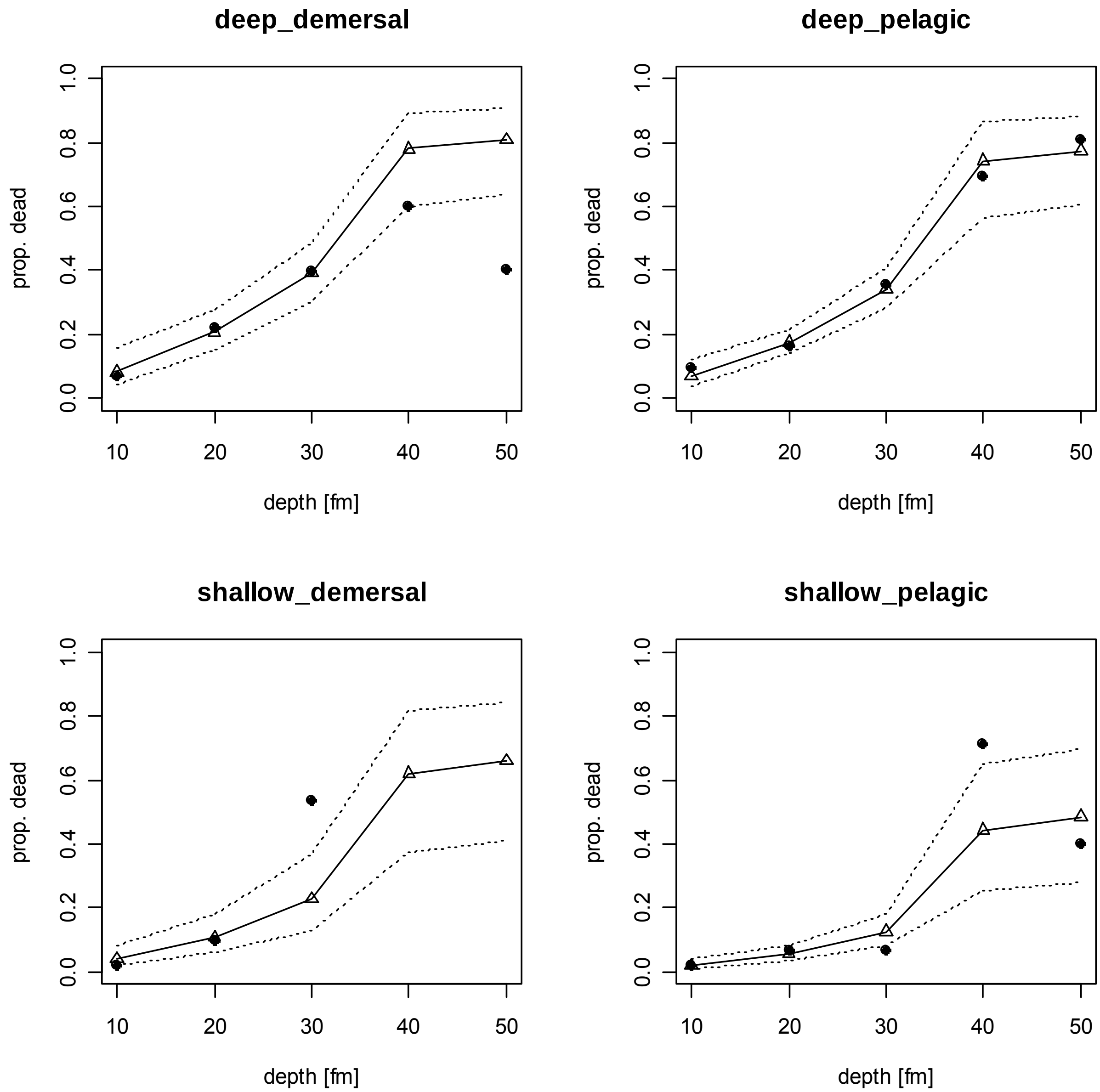


Figure 4-17. Comparison of guild-based GLM predictions of the proportion of fish released dead at the surface with observed proportions, by 10-fm depth bin. Samples sizes less than 5 were excluded. Observed = solid circles, predicted = solid line with triangles, dotted lines represent 95% confidence intervals.

Table 4-51. Sample sizes by species and depth from data used in guild-based GLM analysis.

Guild	Depth Bin (fm)				
	10	20	30	40	50
deep demersal	29	212	158	10	5
deep pelagic	146	902	362	49	73
shallow demersal	195	171	15	1	
shallow pelagic	316	570	191	14	5

Table 4-52. Predicted percentage released dead from guild-based GLM (surface mortality).

Guild	Depth Bin (fm)				
	10	20	30	40	50
deep demersal	9%	21%	38%	81%	84%
deep pelagic	6%	15%	29%	73%	77%
shallow demersal	4%	11%	23%	66%	70%
shallow pelagic	2%	5%	12%	48%	53%

Table 4-53. Upper 95% confidence limits of guild-based GLM predictions (surface mortality).

Guild	Depth Bin (fm)				
	10	20	30	40	50
deep demersal	17%	29%	49%	92%	93%
deep pelagic	11%	19%	38%	87%	88%
shallow demersal	9%	19%	38%	85%	87%
shallow pelagic	4%	8%	18%	70%	74%

Table 4-54. Predicted percentage released dead from guild-based GLM, adjusted for short- and long-term mortality (Albin and Karpov; GMT linear adjustment).

Guild	Depth Bin (fm)				
	10	20	30	40	50
deep demersal	21%	35%	52%	86%	89%
deep pelagic	18%	30%	45%	80%	84%
shallow demersal	13%	24%	37%	74%	79%
shallow pelagic	11%	19%	29%	60%	66%

Table 4-55. Upper 95% confidence limits of guild-based GLM predictions, adjusted for short- and long-term mortality (Albin and Karpov; GMT linear adjustment).

Guild	Depth Bin (fm)				
	10	20	30	40	50
deep demersal	28%	41%	60%	94%	95%
deep pelagic	23%	33%	52%	90%	92%
shallow demersal	17%	31%	50%	89%	91%
shallow pelagic	13%	21%	34%	77%	81%

Multiplicative adjustment for short- and long-term mortality

Surface mortality rates from the GLM were adjusted for below-surface, short- and long-term mortality based on the assumption that each stage of mortality was independent from the previous stages. Survival rates (fraction alive = 1 – [fraction dead]) for the three stages of mortality were multiplied together and the product was subtracted from one to produce an estimate of total mortality.

Major uncertainties and data needs

- Limited data for several species
- Very limited information about post-release mortality rates
- Insufficient data to evaluate differences in depth effects among species (interaction terms in the GLM)
- Lack of depth-specific information in delayed mortality adjustments
- No additional uncertainty associated with delayed mortality adjustment
- The data do not cover the entire coast (i.e., ends at the OR/WA border), and ignore possible regional differences (e.g. temperature effects).

The GMT and SSC recommend managing 2009-10 recreational fisheries using the discard mortality rates shown in Table 4-56 for use in estimating discard mortalities. This table should be updated each biennium and incorporate new research findings and data as appropriate.

Table 4-56. Estimated discard mortality rates for recreationally important groundfish species.

Species Group	Species	Depth Bin			
		0-10 fm	11-20 fm	21-30 fm	>30 fm
Rockfish	Black Rockfish	11%	20%	29%	63%
	Black and Yellow Rockfish	13%	24%	37%	100%
	Blue Rockfish	18%	30%	43%	100%
	Bocaccio	19%	32%	46%	100%
	Brown Rockfish	12%	22%	33%	100%
	Calico Rockfish	24%	43%	60%	100%
	Canary Rockfish	21%	37%	53%	100%
	China Rockfish	13%	24%	37%	100%
	Copper Rockfish	19%	33%	48%	100%
	Gopher Rockfish	19%	34%	49%	100%
	Grass Rockfish	23%	45%	63%	100%
	Kelp Rockfish	11%	19%	29%	100%
	Olive Rockfish	34%	45%	57%	100%
	Quillback Rockfish	21%	35%	52%	100%
	Tiger Rockfish	20%	35%	51%	100%
	Treefish	14%	25%	39%	100%
	Vermilion Rockfish	20%	34%	50%	100%
	Widow Rockfish	21%	36%	52%	100%
	Yelloweye Rockfish	22%	39%	56%	100%
	Yellowtail Rockfish	10%	17%	25%	50%
Other Fish	Cabezon	7%	7%	7%	7%
	California scorpionfish	7%	7%	7%	7%
	Kelp Greenling	7%	7%	7%	7%
	Lingcod	7%	7%	7%	7%
	Pacific Cod	5%	32%	53%	97%
General Cat.	Flatfish	7%	7%	7%	7%
	Sharks and Skates	7%	7%	7%	7%
	Dogfish	7%	7%	7%	7%

4.5.1.7 *Washington Recreational*

Washington Recreational Fishery Sampling and Catch Estimates

The Washington Ocean Sampling Program (OSP) generates catch and effort estimates for the recreational boat-based groundfish fishery, which are provided to Pacific States Marine Fisheries Commission (PSMFC) and incorporated directly into RecFIN. The OSP provides catch in total numbers of fish, and also collects biological information on average fish size, which is provided to RecFIN to enable conversion of numbers of fish to total weight of catch. Boat egress from the Washington coast is essentially limited to four major ports, which enables a sampling approach to strategically address fishing effort from these ports. Effort estimates are generated from exit-entrance counts of boats leaving coastal ports while catch per effort is generated from angler intercepts at the conclusion of their fishing trip. The goal of the program is to provide information to RecFIN on a monthly basis with a one-month delay to allow for inseason estimates. For example, estimates for the month of May would be provided at the end of June. Some specifics of the program are:

Exit/entrance count: boats are counted either leaving the port (4:30 AM - end of the day) or entering the port (approximately 8:00 AM through end of the day) to give a total count of sport boats for the day.

Interview: boats are encountered systematically as they return to port; anglers are interviewed for target species, number of anglers, area fished, released catch data and depth of fishing (non-fishing trips are recorded as such and included in the effort expansion). The OSP collects information on released catch but does not collect information on the condition of the released fish. Therefore, released catches must be post-stratified as live or dead based upon an assumed discard mortality rated. Onboard observers are deployed on charter vessels throughout the salmon season primarily to observe hatchery salmon mark rates but also to collect rockfish discard information on these trips.

Examination of catch: catch is counted and speciated by the sampler. Salmon are electronically checked for coded wire tags and biodata is collected from other species.

Sampling rates vary by port and boat type. Generally, at boat counts less than 30, the goal is 100% coverage. The sampling rate goal decreases as boat counts increase (e.g., at an exit count of 100, sample rate goal is 30%; over 300, sample rate goal is 20%). Overall sampling rates average approximately 50% coastwide through March-October season.

Sampling schedules are stratified due to differences in effort patterns on weekdays versus weekend days. Usually, both weekend days and a random 3 of 5 weekdays are sampled.

Personnel: OSP sampling staff include two permanent biologists coordinating data collection, approximately twenty-two port samplers, three on-board observers and one data keypuncher.

Volume of data: Between 20,000 and 30,000 boat interviews completed per season coastwide.

Data Expansion:
Algorithm for expanding sampled days:

$$\text{Exit Count} \,/\, \text{Total boats sampled} \;*\; P_S \text{ sampled} = P_t$$

where P_S = any parameter (anglers, fish retained, fish released) within a stratum,
and P_t = total of any parameter with stratum for the sample day.

Algorithm for expanding for non-sampled days:

Total Weekday Catch = = $\Sigma(P_t)$ on sampled weekdays / number weekdays sampled * no. of weekdays in stratum;

Total Weekend Catch =$\Sigma(P_t)$ on sampled weekend days / number weekend days sampled * no. weekend days in stratum number;

Total weekend catch + total weekday catch = total catch in stratum.

Notes on Data Expansion:
Salmon and halibut catches are stratified by week; all other species are stratified by month. All expansions are stratified by boat type (charter or private), port, area and target species trip type (e.g., salmon, halibut, groundfish, or albacore).

Washington Recreational Fishery Impact Modeling

Pre-Season Catch Projections

Projected impacts for Washington's recreational fishery are essentially based upon the previous season's harvest estimated by the Ocean Sampling Program (OSP) and incorporated in . This is especially true if recreational regulations remain consistent.

In 2005 the Washington Department of Fish and Wildlife implemented a depth restriction of 30 fm for a portion of the Washington coast. Since 2002, the OSP program began collecting fishing depths as well as discard information. This information is keypunched and analyzed on an annual basis with respect to depth of catch for species of concern. Beginning in 2006, and carrying through 2007 and 2008, we have modified our pre-season catch projections, based on the use of depth restrictions, by subarea and fishery. The Washington recreational management measures for 2009-10 will continue to include prohibiting fishing deeper than 20 or 30 fm (depending upon time and management subarea); therefore, the depth analysis was again used to determine the catch and mortality of discarded fish for 2009-10 pre-season catch projections relative to these depths as follows:

Canary Rockfish

- Apply 100% mortality rate to canary rockfish caught on all recreational fishing trips targeting Pacific halibut, when there is no depth restriction in place
- Apply 66% mortality rate to canary rockfish on recreational fishing trips targeting species other than Pacific halibut, when there is no depth restriction in place (based upon average depth distribution of catch from intercept surveys).
- When a 20-fm depth restriction is in place, apply a 50% mortality rate to canary rockfish caught on all recreational fishing trips (based on research by Albin and Karpov, 1995).

Yelloweye Rockfish

- Apply 100% mortality rate to yelloweye rockfish caught on all recreational fishing trips, when there is no depth restriction in place
- When a 20-fm depth restriction is in place, apply a 50% mortality rate to yelloweye rockfish caught on all recreational fishing trips (based on research by Albin and Karpov, 1995).
- When a 20-fm depth restriction is in place, apply an encounter rate reduction of 25% (based on 2005 OSP catch-by-depth data) as yelloweye tend to inhabit deeper depths.

Inseason Catch Projections for 2009-2010

Inseason catch projections are based upon the most recent OSP estimates (with a one-month time lag) with subsequent months extrapolated from the pre-season catch projections. In 2009-10, depth dependant mortalities will be applied uniformly to all discarded fish coast wide through . This will replace the mortality estimates for canary and yelloweye used in 2007-2008. Projected impacts for 2009-10 were based on 2007-2008 impact estimates and the depth analysis described above. The 2007-2008 impact model was used because post season catch estimates could not be recalculated using the new mortality estimates and at the time, the coastwide depth dependant mortality matrix was still preliminary. It should be noted that the precision of recreational groundfish catch estimates based upon previous seasons will continue to be influenced by factors such as the length and success of salmon and halibut seasons, weather and unforeseen factors.

4.5.1.8 *Oregon Recreational*

Modeling the Effects of Oregon 2009-10 Recreational Groundfish Management Measures

Data Source for Base Model

Modeling of expected 2009-10 Oregon recreational fishery impacts of selected groundfish species was based on recent year estimates of landings and discards. For the ocean boat fishery, the data source was the Oregon Department of Fish and Wildlife Ocean Recreational Boat Survey (ORBS). For the shore and estuary fishery, the data source was the Marine Recreational Fisheries Statistics Survey (MRFSS). Analyzed species included black, blue, brown, canary, china, copper, grass, quillback, and yelloweye rockfishes; as well as kelp and rock greenling, cabezon and lingcod. Base level landings and discards for the ocean boat fishery (in numbers of fish) were based on normalized 2005, 2006 and 2007 landings and discards because these data reflect fishery years with regulations most similar to those expected in 2009-10 (i.e., bag limits, offshore closures, behavioral activities to avoid depleted species, etc.). Base level landings and discards for the shore and estuary fishery (in weight), largely not affected by management of depleted species, reflect the most recent 5-year average, 1998-2002. Annual weights of greenling and cabezon were adjusted to reflect changes in minimum length.

Normalizing 2005, 2006, and 2007 Ocean Boat Catch and Angler Trip Data

A base year period of 2005-07 was chosen for modeling catch and angler effort. Equal weighting was given to each year as it is not possible to forecast the opportunity for other targeted fisheries (i.e., salmon, halibut, tuna, etc.) in 2009-10. The fisheries in 2005-07 vary in both angler opportunity and success for other target species such as salmon, tuna and halibut. All three base years include groundfish fishery restrictions (e.g., offshore closures and restrictions on groundfish retention in the directed Pacific halibut fishery).

To facilitate providing maximum flexibility in modeling 2009-10 fishery options, landings in 2005, 2006 and 2007 were normalized to a 10-fish marine bag limit and a year round season with no offshore closures (essentially the basic regulations from 2000 through 2003). Starting in 2004 the sport fishery was managed with offshore closures to reduce impacts on depleted species (i.e., lingcod, canary rockfish, and yelloweye rockfish); the marine fish bag limit of 10 was carried over from 2003. In response to an early closure in 2004 due to attainment of the black rockfish harvest guideline, the marine bag limit in 2005 started at 8 fish on January 1 and was reduced to 5 fish on July 16. During 2006-08 the marine fish bag limit imposed under state regulations was 6 fish to provide for a year round nearshore fishery and not exceed the black rockfish harvest guideline. The marine fish bag limit includes rockfish, greenling, cabezon and other species excluding lingcod, flat fish, Pacific halibut, salmon, trout, steelhead, perch, sturgeon, striped bass, offshore pelagic species, and bait fish (herring, smelt anchovies and sardines).

Normalizing to a 10-fish marine bag limit was accomplished through comparing the average catch per angler trip (CPUE) under 8, 6 and 5 fish regulations in 2005-07 with comparable periods in 2003-04 under a 10 fish marine bag limit. The average CPUE change from 10 to 8 fish was a 13.5 percent reduction, which compared to a 34.3 and 37.8 percent reduction when reducing the bag limit from 10 to 6 and 5 fish, respectfully. The same exercise was also applied to discards per angler as the number discarded for many species for which retention was allowed generally increased as the retention bag limit was reduced. The average duration of groundfish trips did not change, but anglers sorted through more fish. The number of yelloweye rockfish and canary rockfish encountered, both species for which all retention was prohibited in the model base years, was not adjusted due to the reduced marine bag limit as the average duration of groundfish angler trips were nearly the same regardless of the marine bag limit. These adjustments were not made for lingcod, which has a separate bag limit.

Landings and discards were normalized to an all-depth season. In 2004-06, from June through September the groundfish fishery was closed seaward of the 40-fm line; for 2007 the offshore closure seaward of 40-fm occurred from April through September. The expected increase in encounter rates for offshore residing species (i.e., yelloweye rockfish and canary rockfish) in normalizing to an all-depth scenario was based on data from 2001 and 2003-07 at-sea observations on Oregon charter vessels (over 500 trips were observed). The observer study was not conducted in 2002. The following increased encounter rate (numbers of fish) were applied to appropriate months (those that were closed seaward of 40-fm) when normalizing to an all-depth fishery: canary rockfish = 1.20 and yelloweye rockfish = 1.47.

Landings and discards in 2005 were normalized to a year round season as the fishery was closed earlier than scheduled. In both 2004 and 2005 regulations were changed inseason (starting in early September in 2004 and mid-October in 2005). Because of the inseason closures in 2004-05, the 2003 fishery was used as a template for seasonal catch and effort pattern in the groundfish fishery as it was open January through December. Estimating potential catch for October through December in 2005 was based on normalized January through September 2005 estimates and applying the monthly temporal pattern observed in 2003.

The expected weight of landed fish was based on the 2005-07 average by species and month for the ocean boat fishery. The expected average weight of discarded fish in the ocean boat fishery was based on combined at-sea observations in 2003-2007 with attention paid to matching samples with depth closure regulations (releases were not measured on 2001 at-sea trips). Observations indicate that yelloweye rockfish and canary rockfish caught inside of the 40-fm line were considerably smaller compared to the average size of those caught offshore as it appears more juveniles of these species reside nearshore. An exception in the method to estimate the size of discards was made for nearshore rockfish species, other than black rockfish and blue rockfish, due to small sample sizes (most are retained), where a 50 percent reduction in average landed weight was assumed for discards. The fifty percent reduction in average weight was based on the observed average size of discarded black rockfish and blue rockfish which were on the order of a 50 percent reduction from average landed weight. A 50 percent reduction was also used for greenling species since they are also rarely released.

Ocean boat angler trip data from 2005 was also normalized using the 2003 temporal pattern to estimate groundfish effort during October through December when the nearshore fishery was closed.

Angler effort in shore and estuary areas was assumed to be similar to the base period of 1998-2002. Groundfish angler trips in the shore and estuary fishery are not available, only total angler trips of all trips types combined, thus all projections of angler trips by trip type exclude shore and estuary.

Model Inputs

Bag limits, offshore closures, season structure and halibut quotas were the basic input factors applied to the standardized model.

Bag limits were modeled to range from 6 to 10 marine fish and from 2 to 3 lingcod. Fish species included in the marine bag limit were defined earlier in this report. The expected reduction in CPUE from reducing the marine bag limit from 10 fish was based on the same comparison between a 10 and 8, 6 or 5 bag limit discussed earlier in this report. In estimating expected reductions in CPUE for marine bag limits a linear relationship was developed using the observations between 10, 8, 6 and 5 fish bag limits (Figure 4-18). The number of released fish of species for which retention is not prohibited was estimated to increase as the bag limit was reduced (Figure 4-19). As assumed in normalizing the model no effect on CPUE was expected for the non-retention species yelloweye rockfish and canary rockfish for changes in the marine fish bag limit (refer to earlier discussion in this report).

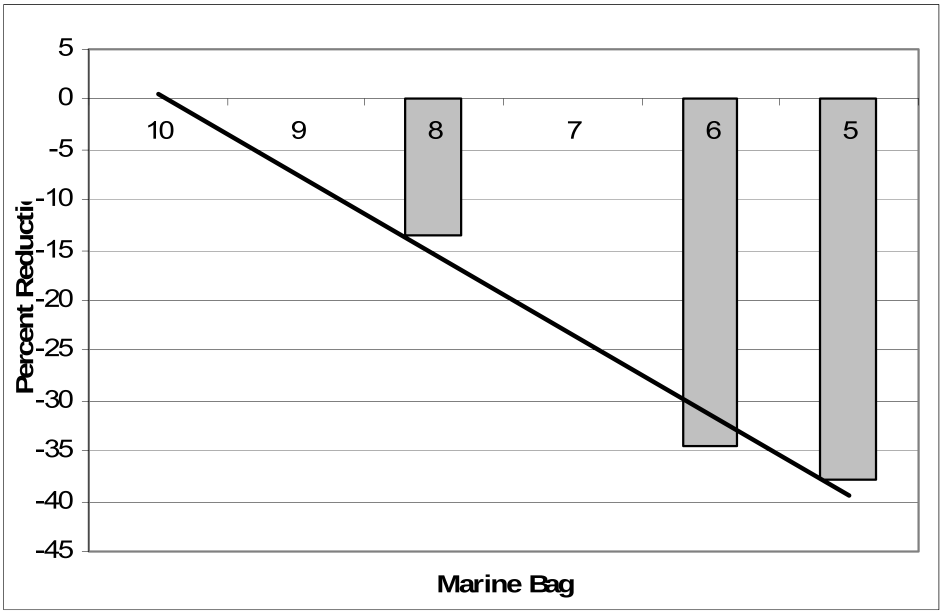


Figure 4-18. Percent reduction of catch per angler under decreasing marine bag limits for nearshore groundfish.

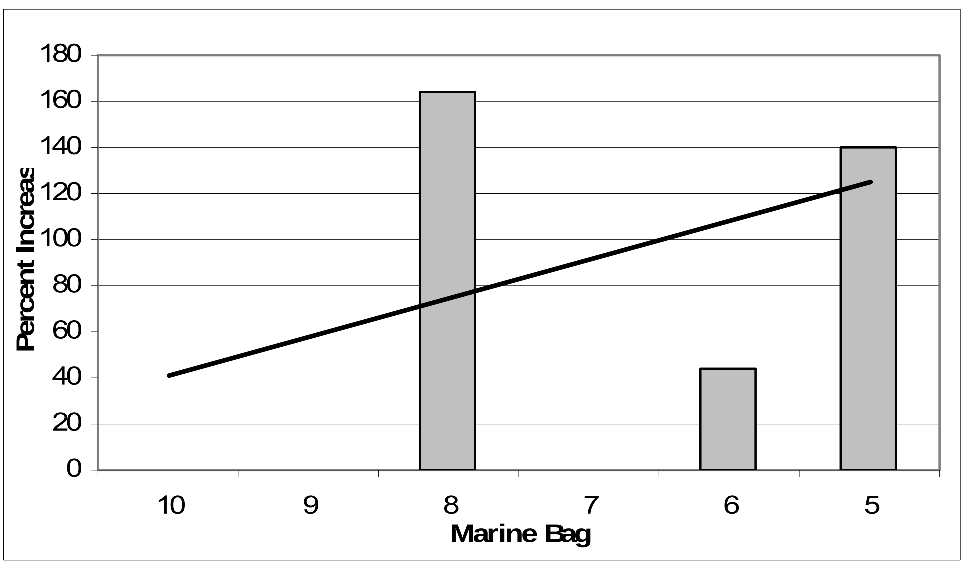


Figure 4-19. Percent increase of release per angler with decreasing marine bag limits for nearshore groundfish.

Estimates were also made for the effect of increasing the lingcod bag limit from 2 to 3 fish on landed fish and were made external to the impact model. In the ocean boat fishery the analysis from the 2007-08 EIS was carried forward; sample data from 2005 was used to determine the percent of anglers that had achieved their 2 fish bag limit in 2005 (6.3%). Assuming each of these anglers would have retained a third fish under a 3 fish bag resulted in a 10 percent increase of total fish landed (applied to the 2005-07 average landings). No adjustments were made for increased targeting due to the increased bag limit.

Discussions with anglers and charter operators indicate any likely increase in targeting lingcod would occur in offshore areas, for which opportunity is drastically reduced due to offshore closures during the peak summer fishing periods (if not all year under some options).

Expected encounter rate reductions for yelloweye rockfish and canary rockfish normally encountered in offshore waters were developed for offshore closures outside of 40, 30, 25, and 20 fm (Table 4-57). They were based on the at-sea observations mentioned earlier in the report. Modeling assumptions included a shift in offshore effort (7 percent of total groundfish directed effort) to open areas nearshore during offshore closure periods affecting the catch rates of fish encountered.

Table 4-57. Percent total encounter reductions in yelloweye rockfish and canary rockfish due to depth closures.

2001, 2003-2007 Distribution of encounters by depth bin (fm) from at-sea observations (fishery open all depths)						
Species	<20 fm	21-25 fm	26-30 fm	31-40 fm	>40 fm	(n)
Canary rockfish	59%	15%	5%	7%	16%	518
Yelloweye rockfish	32%	24%	7%	5%	31%	74
Percent reduction in total encounters from open all depths to the following depth closures						
Species	Closed >20 fm	Closed >25 fm	Closed >30 fm	Closed >40 fm		
Canary rockfish	43%	28%	23%	16%		
Yelloweye rockfish	67%	43%	36%	31%		

Monthly groundfish directed angler effort was assumed to remain equal to the 2005-07 normalized average unless the fishery season was reduced to less than a May through September season (the five core months). If the season duration was less than May 1 through September 30 the assumption would be that a third of the normal effort during the closed season would be shifted into the open period (the same assumption used in the 2007-08 EIS). Thus, for the May 1 through September 30 option (option 6) it was assumed that the angler effort from the closed period (January 1 through April 30 and October 1 through December 31) would not transfer to the open period as the five core months would be open.

Angler effort in the directed Pacific halibut fishery was assumed to decrease slightly in 2009-10 due to the slight reduction in halibut allocation. The halibut allocation in 2009-10 was assumed to be equal to the 2008 allocation, which is six percent lower than the allocation in 2007. Because the International Pacific Halibut Commission is considering a substantial reduction in the allocation to Area 2A (Washington, Oregon and California) in 2009, an option (option 2) was modeled. The halibut effort and catch in this option was assumed to be reduced by 50 percent and the groundfish fishery was expanded based on the reduced yelloweye rockfish impacts in the halibut directed fishery (total for all Oregon sport fisheries not to exceed 2.5 mt). The decision on the 2009 halibut catch allocation will occur after the 2009-10 groundfish regulations will be set. One potential inseason regulatory change that could result under a reduced halibut allocation is illustrated by option 2.

<u>Model Description</u>

The model design was similar to that used in setting the 2007-08 regulations. The model is housed as an Excel spreadsheet. The model has both landed and discarded fish sections. Each section has similar components although the discarded section also has components to apply both differential mortality rates and average size changes due to various potential offshore closures (i.e., seaward of 20, 25, 30 or 40 fm). Groundfish impacts on yelloweye rockfish and canary rockfish in the Pacific halibut fishery were modeled as a separate fishery. Lingcod landings under the two bag limit options were addressed external to the model.

The model normalized to a 12 month all-depth fishery was used to address impacts from all ocean boat fishery sources, excluding the targeted Pacific halibut fishery. It includes the following components for each species by month: (1) catch; (2) bag limit affects; (3) offshore fishery effects on encounter rates and average size; (4) a 7 percent effort shift to the nearshore fishery due to offshore closures; (5) average size and (6) mortality rates for discarded fish. For landed and discarded fish the methodology to address the affects of various marine bag limits, and offshore closure effects on (a) encounter rates and (b) effort shifts nearshore, were discussed earlier in the report under the Normalization section. Average weight was based on the 2005-07 average landed weight and at-sea observations since 2001 for discarded fish as discussed earlier in this report also under the Normalization section. Discarded fish mortality rates by rockfish species and depth were developed from at-sea observer data for catch distribution using mortality rates by species and depth adopted by the PFMC (Table 4-58). Discard mortality rates of 5 percent were applied to lingcod, cabezon and greenling as they do no suffer from barotrauma.

Expected impacts on yelloweye rockfish and canary rockfish in the Pacific halibut fishery were addressed separately. The encounter rate per halibut pound landed in 2005, 2006 and 2007, using the 2002-2003 average weight of fish caught outside of 30-fm, was applied to the 2008 Oregon central coast all-depth halibut sport allocation. The estimated impacts were averaged between the three years to address expected impacts on both species. This assumes similar Pacific halibut allocations in 2009-10 for all but option 2 (see the discussion above under Model Inputs).

Landings and discard impacts for shore and estuary caught species were modeled on a season total basis using the 1998-2002 average metric tons. This fishery will be managed for a year round season as it does not impact yelloweye rockfish and canary rockfish. The metric tons were adjusted for length limits applied to cabezon and greenling since that period (refer to the 2004-05 EIS). Sub-legal cabezon and greenling that were landed in the 1998-2002 period were now considered discards. A mortality rate of 5 percent was applied to all species discarded in the shore and estuary fishery to represent hooking mortality as the waters are not deep enough to cause mortality from barotrauma.

Table 4-58. Discard mortality rate calculations for select rockfish species based on sport observer data from 2001 and 2003-07. Mortality rates are predicted for all-depth fisheries and various depth closure scenarios.

2001, 2003-2007 count of released fish by depth bin (fm)							
Species	≤10 fm	11-20 fm	21-25 fm	26-30 fm	31-40 fm	>40 fm	Total
Black rockfish	506	522	29	2	0	0	1,059
Blue rockfish	308	846	87	7	0	0	1,248
Brown rockfish	0	1	0	0	0	0	1
China rockfish	1	7	3	0	0	0	11
Copper rockfish	0	12	1	1	0	0	14
Quillback rockfish	0	3	1	0	0	0	4
Canary rockfish a/	15	295	78	26	21	83	518
Yelloweye rockfish a/	1	24	18	5	4	23	74
Distribution of released fish by depth bin (fm) when open all depths.							
Species	≤10 fm	11-20 fm	21-25 fm	26-30 fm	31-40 fm	>40 fm	Total
Black rockfish	48%	49%	3%	0%	0%	0%	1,059
Blue rockfish	25%	68%	7%	1%	0%	0%	1,248
Brown rockfish	0%	100%	0%	0%	0%	0%	1
China rockfish	9%	64%	27%	0%	0%	0%	11
Copper rockfish	0%	86%	7%	7%	0%	0%	14
Quillback rockfish	0%	75%	25%	0%	0%	0%	4
Canary rockfish a/	3%	57%	15%	5%	4%	16%	518
Yelloweye rockfish a/	1%	32%	24%	7%	5%	31%	74
Predicted distribution of released fish when closed outside 40 fm							
Species	≤10 fm	11-20 fm	21-25 fm	26-30 fm	31-40 fm	Total	
Black rockfish	48%	49%	3%	0%	0%	1,059	
Blue rockfish	25%	68%	7%	1%	0%	1,248	
Brown rockfish	0%	100%	0%	0%	0%	1	
China rockfish	9%	64%	27%	0%	0%	11	
Copper rockfish	0%	86%	7%	7%	0%	14	
Quillback rockfish	0%	75%	25%	0%	0%	4	
Canary rockfish	3%	68%	18%	6%	5%	435	
Yelloweye rockfish	1%	46%	35%	10%	7%	51	
Predicted distribution of released fish when closed outside 30 fm							
Species	≤10 fm	11-20 fm	21-25 fm	26-30 fm	Total		
Black rockfish	48%	49%	3%	0%	1,059		
Blue rockfish	25%	68%	7%	1%	1,248		
Brown rockfish	0%	100%	0%	0%	1		
China rockfish	9%	64%	27%	0%	11		
Copper rockfish	0%	86%	7%	7%	14		
Quillback rockfish	0%	75%	25%	0%	4		
Canary rockfish	4%	71%	19%	6%	414		
Yelloweye rockfish	2%	50%	37%	11%	47		

Table 4-58. Discard mortality rate calculations for select rockfish species based on sport observer data from 2001 and 2003-07. Mortality rates are predicted for all-depth fisheries and various depth closure scenarios (continued).

Predicted distribution of released fish when closed outside 25 fm

Species	≤10 fm	11-20 fm	21-25 fm	Total
Black rockfish	48%	49%	3%	1,057
Blue rockfish	25%	68%	7%	1,241
Brown rockfish	0%	100%	0%	1
China rockfish	9%	64%	27%	11
Copper rockfish	0%	92%	8%	13
Quillback rockfish	0%	75%	25%	4
Canary rockfish	4%	76%	20%	388
Yelloweye rockfish	2%	56%	42%	42

Predicted distribution of released fish when closed outside 20 fm

Species	≤10 fm	11-20 fm	Total
Black rockfish	49%	51%	1,028
Blue rockfish	27%	73%	1,154
Brown rockfish	0%	100%	1
China rockfish	13%	88%	8
Copper rockfish	0%	100%	12
Quillback rockfish	0%	100%	3
Canary rockfish	5%	95%	310
Yelloweye rockfish	3%	97%	24

Mortality rate

Species	≤10 fm	11-20 fm	21-25 fm	26-30 fm	31-40 fm	> 40 fm
Black RF	11%	20%	29%	29%	63%	63%
Blue RF	18%	30%	43%	43%	100%	100%
Brown rockfish	12%	22%	33%	33%	100%	100%
China rockfish	13%	24%	37%	37%	100%	100%
Copper rockfish	19%	33%	48%	48%	100%	100%
Quillback rockfish	21%	35%	52%	52%	100%	100%
Canary RF	21%	37%	53%	53%	100%	100%
Yelloweye RF	22%	39%	56%	56%	100%	100%

Total mortality rate for discarded fish by proposed depth closure

Species	≤10 fm	≤ 20 fm	≤25 fm	≤30 fm	≤40 fm	All depth
Black rockfish	11%	16%	16%	16%	16%	16%
Blue rockfish	18%	27%	28%	28%	28%	28%
Brown rockfish	12%	22%	22%	22%	22%	22%
China rockfish	13%	23%	27%	27%	27%	27%
Copper rockfish	19%	33%	34%	35%	35%	35%
Quillback rockfish	21%	35%	39%	39%	39%	39%
Canary rockfish	21%	36%	40%	40%	43%	52%
Yelloweye rockfish	22%	38%	46%	47%	51%	66%

a/ Observed retained fish in 2001 and 2003 were included in the analysis.

4.5.1.9 *California Recreational*

The CDFG revised their impact projection model ("RecFish") that was reviewed by the GMT at their January 2008 meeting and at the April 2008 PFMC meeting. The GMT recommends this updated model for use in projecting impacts of groundfish species in 2009–10 California recreational fisheries. This model is described below and is used in impact analyses in this EIS.

Recreational fisheries management for multispecies assemblages in California presents many challenges. In recent years, declining stocks of several rockfish species have dictated recreational groundfish management seasons and depths in California. Increasingly complex restrictions have been necessary to keep total catch of depleted species within the reduced limits that are necessary to rebuild the stocks while providing fishing opportunity.

Prior to 2000, the recreational daily bag limit for rockfish was 15 fish per angler with no closed months or depths. Beginning in 2000, the daily bag limit was reduced to 10 fish. Regulations have changed each year since 2000, making analyses of the effects of particular regulations difficult. In addition, regulations have become more region-specific, adding to the difficulty of modeling projected catches.

Methodology Used to Project Recreational Catches for 2009–10

The recreational catch model incorporates a number of parameters and assumptions, all of which are either risk-neutral or risk-adverse. The basic analytical approach is the same as that used for 2007–08, with revision to the proportion of catch by depth for yelloweye rockfish, percent of catch by month for yelloweye and canary rockfish, division of the North-Central management area into two areas, and use of depth-dependent mortality rates for rockfish of the genus *Sebastes*. The 2005-2007 data from the California Recreational Fishery Survey (CRFS) program serves as a baseline. The model output predicts expected catch under any combination of season and depth fishing restrictions for each of the regions described below:

- Northern Groundfish Management Area: North of 40°10' N latitude to CA/OR border
- North-Central North of Pt. Arena Groundfish Management Area: South of 40°10' N latitude to 38°57' N. latitude (Pt. Arena)
- North-Central South of Pt. Arena Groundfish Management Area: South of Pt. Arena to 37°11' N latitude (Pigeon Pt.)
- South-Central Monterey Groundfish Management Area: South of Pigeon Pt. to 36° N latitude (Lopez Pt.)
- South-Central Morro Bay Groundfish Management Area: South of Lopez Pt. to 34°27' N latitude (Pt. Conception)
- South Groundfish Management Area: South of Pt. Conception to CA/Mexico Border

CDFG/California Recreational Groundfish (RecFish) Model Assumptions

Effort Shift Inshore: The model includes a 27.6 percent increase in expected landings when fishing is restricted to less than 30 fm and a 39.3 percent increase in expected landings when fishing is restricted to less than 20 fm. The increase, or effort shift, is to account for increased effort in a smaller fishing area.

Discard Mortality: The GMT developed depth-dependent mortality rates for discarded rockfish of the genus *Sebastes* in 10-fm increments, the derivation of which is described in section 4.1.5.6. The species-specific depth-dependent mortality rates agreed upon by the GMT and approved by the PFMC in 2008 are applied to the discarded fish in the CRFS base data from 2005-07 used in the RecFish model. When projecting the 2009-10 season catch, discard catch estimates are multiplied by the proportion of catch in a given 10-fm depth increment times the depth-dependent mortality rate for the corresponding depth for each species.

Inputs and Key Parameters for the Model

Weighting of Base Years: Base year data 2005-2007 were given nearly equal weighting by applying a 0.99 decay function. The previous biennial cycle made use of a 0.67 decay function to weight 2005 more heavily than 2004. With the exclusion of the 2004 data in the current model due to issues with the comparability of trip types between years, there are three years of data available for the model and these are weighted nearly equally (2007 = 33.7%, 2006 = 33.3%, 2005 = 33.0%) to represent the base catch in the model.

Base Year Catch: Initially, CRFS catch estimates in weight of fish were summed for caught and retained (CRFS "A" catch), filleted/caught otherwise unavailable ("B1" catch), and for species of concern, a proportion of CRFS reported discarded fish derived using depth-based mortality estimates. Base year catch estimates are assumed to be for an unrestricted fishing year with no months closed and no depths closed. Therefore, for each year, a back calculation method was used to obtain an estimate for what the catch would have been if all months and all depths had been open. This back calculation uses month and depth catch proportions derived from historical catch estimates from seasons unregulated by month and depth.

Historical Catch By Month: Estimates of historical percent catch by two-month period were calculated for each region based on Marine Recreational Fisheries Statistics Survey (MRFSS) data (weight of A+B1) from 1993-99, which was a time period when seasons and depths were unconstrained. Proxies were considered on a species by species basis for regions where there was a lack of catch data for that area. Monthly estimates of percent catch then were divided equally (50:50) for each pair of months. This percentage was adjusted for yelloweye and canary rockfish in order to reflect the apparent opener effect in recent years, which resulted in increased catch in the months following the season opening and reduced effort later in the year as compared to the historical data. For these two species, the average proportion of catch by month for 2005 and 2006 were used to perform a post-model adjustment to apportion the projected catch for the year to the given months of the season.

Historical Catch by Depth: Estimates of percent catch by depth were calculated for each region based on MRFSS depth sample data (numbers caught A+B1 for CPFV and A+B1+B2 for PR) from 1999-2000, which was a time period when depths were unconstrained. Proxies were considered on a species by species basis for regions where there was a lack of catch data for that area.

To improve the accuracy of catch estimates for yelloweye rockfish, two methods were employed when modeling the effect of depth restrictions on the catch of this species:

1) For expanding baseline input catch data from regulated seasons to all depths, unregulated depth distribution of catch data from other areas can be used to supplement the existing historical data; these data must be from unregulated years to be able to expand to all depths. In the North, data from 1999-2003 were used (years unregulated by depth in the North), recent unregulated Oregon catch by depth (1999-2003), and 1999-2000 data from the North-Central area that is north of Point Arena (for bathymetric and fishing effort similarities to the North). For the North-Central area, additional data from dockside party charter catch by depth data from 1999-2000 were used.

2) More recent catch data from CRFS were used to produce region–specific proportions of catch by depth with a higher sample size than historical data to provide improved projections that represent the current depth distribution of catch. Although this data is from regulated years, recent years have seen a consistent regulatory scheme by depth that would allow for use in apportioning catch by depth within the open depth strata. For example, for the North, the years 2004-2007 saw a consistent 0-30 fm depth

restriction in place. The catch by depth for those years was used to project the depth distribution within the upper 30 fm for upcoming years (assuming catch will be restricted to within this zone), providing a more current framework than using the historical 1999-2000 data. Similarly, this applies to 2006-2007 catch by depth data for the North-Central Regions (same 0-30 fm depth restrictions). These depth distributions are applied as a post-model run adjustment, reapportioning the projections with the new depth distributions.

Determining the Proportion of Angler Reported Unavailable Dead Catch for Yelloweye and Canary Rockfish that was Composed of Discarded Dead Fish:

The California Recreational Fisheries Survey program (CRFS) uses several different catch types in generating catch estimates: sampler examined catch (“A”), angler reported unavailable catch including discarded dead (“B1”), and angler reported discarded live catch (“B2”). The B1 category includes disposition such as retained (filleted fish, fish given away, used for bait or otherwise unavailable) and fish discarded dead. Unfortunately, since CRFS began in 2004, no disposition of the B1 catch has been recorded for the majority of private and rental trips which are sampled in the PR1 mode. Therefore, it is not possible to separate the discarded dead fish from the retained unavailable fish in the B1 catch type without use of a proxy for the proportion of fish discarded dead. Attempts have been made to use sparse available data and apply these to the B1 catch data, but little data exists for depleted non-retention species, such as yelloweye and canary rockfish.

To estimate the proportion of B1 catch of yelloweye and canary rockfish that is discarded dead, a “compliance factor” (CF) was determined from recent (2005-2007) CRFS data. The CF is calculated by dividing the B2 catch by the total catch (A+B1+B2); this represents the proportion of fish reported discarded live by anglers (reported live only) while complying with regulations. It is conservative, as a portion of the B1 catch (the discarded dead) in the denominator should be in the numerator. The CF is used as a proxy for the proportion of B1 that is discarded dead, and so it is multiplied by the B1 catch to estimate the total fish discarded dead. This amount is added to the known B2 catch to arrive at total discards. This value is then multiplied by discard mortality factors by depth to obtain the discard mortality. Total mortality is then the retained catch (A+B1, less the proportion of B1 designated discarded dead) + discard mortality. Because the CFs are conservative, the proportions of B1 that are considered otherwise unavailable dead (filleted, used for bait, given away) will be biased high, thereby leading to an estimate of total mortality that is biased high. CFs were determined for each management area for both yelloweye and canary rockfish and applied to the B1 (aggregate unavailable dead catch) catch for these species to provide a conservative proxy estimate of fish discarded dead to which depth dependent mortality rates would be applied in estimating total mortality.

Methodology Used to Calculate Annual Unrestricted Catch

1. Pull (A+B1+B2+B3) Catch for each year from the RecFIN CRFS data web site:
http://www.psmfc.org/recfin/forms/est2004.html.
Specify species, and select the parameters: month and district under Define Table Layout.

2. Pull historical catch by depth (1999-2000, most recent years unregulated by depth) from the RecFIN boatdepth2 site:
http://www.psmfc.org/recfin/forms/boatdepth2.html
Add PC and PR fish caught together for each separate region and species, maintaining
combined depth totals for each depth strata. Calculate average percentage of total fish caught within each 10 fm depth stratum (= “Depth Profile”) by dividing 10 fm depth strata totals by combined total sum of all strata for the region. Assign proxies as needed for data-poor areas, using adjacent regions, similar species, etc.

3. Pull historical catch through time (1993-1999, the most recent years unregulated by monthly closure) from RecFIN web site:
http://www.psmfc.org/recfin/forms/est.html
Calculate average wave percents over combined years 1993-1999 by dividing individual wave totals by sum of all waves for each region. Assign proxies as needed for data-poor areas using the other region (North or South) as the proxy.

4. For each management region and species, calculate total regulated catch based on months each set of regulations was in effect. For example, if fishing was only open from 0-60 fm for March-December, sum total catch for those months only. Each management region should now have catch data for all species grouped by the different sets of management regulations (MR sets) in effect for the year so that the identical calculations can easily be performed on identically restricted species.

5. Expanding to All Depths. For each MR set: If there was no depth restriction, use the unmodified total regulated catch as the expected catch for all depths for that period of the year. If a depth restriction was in place, use total regulated catch to expand out each species in each MR set to all depths: from the Depth Profile, divide total regulated catch by sum of proportion of catch represented by the depths where fishing was open. This is the total expected catch for all depths. For example, if fishing for a MR set was open < 20 fm, divide the total catch by the percentage of the catch < 20 fm using the appropriate Depth Profile (historical unregulated catch data) for each species and region.

6. Effort Shift. If the depth restriction is confined to a 20 or 30 fm band, we assume increased effort occurred for these months. To remove this effect, apply an Effort Shift factor to remove the increased fishing (and increased catch) for the constrained depth zone. For example, if a 0-20 fm restriction was in effect, divide the total expected catch for all depths by 1.393 to get final total expected catch for those months. Similarly, use a factor of 1.276 if fishing was restricted within a 30 fm range. No Effort Shift is applied for depth restrictions > 30 fm.

7. Accounting for Closed Months. After expanding to all depths and removing Effort Shift (if needed), sum all the final expected catch values across all the MR sets for the year for each management region and species. Divide this sum by the percent catch for the year that these regulated months represent (from the wave percents for the year). In other words, divide the calculated catch for all open months by the percentage of the catch for the year these months historically represent. This results in the expected annual unregulated catch, expanded out from the regulated catch, for each region and species.

8. Input expected annual unregulated catch for each region-species into the Catch by Year Table in the RecFish Model database. The weighting of the different years' data to be used by the model in projecting catch can be selected at the model-user interface.

Projecting Catch from Model Runs

The RecFish model output consists of a matrix for each species or species group and management area. Within each matrix, catch tonnages are generated for each month and 10-fm depth stratum. Following a model run for all months and depths open (with a 0.99 decay value selected), the resulting catch projection values matrix is adjusted by separating out the retained (A+B1) and discarded (B2+B3) catch. The discard tonnages are obtained using 05-07 average discard proportions for each species and multiplying these by the total tonnages obtained from the model. These discard tonnages are multiplied by mortality factors condensed from: 1) GMT-determined mortality rates by depth, and 2) CRFS depth distributions from seasons with identical depth restrictions to expected future seasons. The resulting discard mortality is then recombined with retained catch to obtain total projected mortality. This final matrix is used as a base to project catch by summing catch from selected months and depths open, while also factoring any effort shift effects. In addition, for yelloweye and canary rockfish there are other post-model adjustments for catch by time and depth (see "Inputs and Key Parameters for Model" above).

Subdivision of the North-Central Management Area

Ports south of Point Arena contributed only 2% of the statewide catch of yelloweye rockfish in 2007. In order to prevent the area south of Point Arena from being unnecessarily closed inseason, the North-Central Management Area will be divided into two management areas, the North-Central North of Point Arena Management Area and North-Central South of Point Arena Management Area. Adoption of this line will divide the current North-Central Management Area into two smaller areas.

Depth Restriction Changes

The 20-fm depth restriction will continue in the Northern and North-Central North of Point Arena Management Areas to reduce impacts on yelloweye rockfish. The shallower depth restriction is projected to result in a 33.8% reduction in yelloweye rockfish catch in the North-Central North of Point Arena and a 26.8% reduction in the North Central South of Point Arena. To reduce impacts on Minor Nearshore Rockfish in the North-Central South of Point Arena Management Area, the depth restriction may be increased to 30 fm.

California Recreational Yelloweye Rockfish Conservation Area Analysis

CDFG used 1999-2007 MRFSS/CRFS effort data and CRFS 2006 and 2007 yelloweye catch data (both sampler examined and reported) with latitude and longitude of catch data to identify one square nautical mile blocks with high yelloweye rockfish catch per unit effort from northern California (Pt. Conception to the OR/CA border) using Arc View 9.1. We ascribed the sampled catch of yelloweye rockfish and effort of anglers with rockfish in their catch to the centroid of a given block to determine the catch per unit effort in each 1nm square block. The 2006 CPUE and a conglomerate data set of 1999-2007 CPUE were plotted to identify other potential yelloweye rockfish hotspots that we may have missed using only 2007 data.

We identified many areas in the North and North-Central Management Area North of Point Arena that have high yelloweye catch. Three criteria were used in identifying areas for further analysis of potential catch savings from YRCAs:

- High yelloweye catch per unit effort within a given 1 nm square block.
- Clustering of high catch per unit effort blocks in the same area.
- Repeated presence of high catch per unit effort among years.

The following sections discuss the catch savings estimation methods and areas identified as prospective YRCAs for in-state waters alone and for areas in both state and federal waters.

Yelloweye Rockfish Conservation Areas Previously Proposed in State Waters for 2008

The YRCAs developed for use during the 2008 season could only be implemented in state waters since analysis of these areas was not included in the 2007-08 EIS. This precluded the inclusion of high yelloweye catch per unit effort areas in federal waters. To compensate for the inability to close areas where high numbers of yelloweye rockfish are known to occur, larger areas within state waters were identified (see the California Recreational portion of section 2.2.4.2). These areas included large enough portions of the fishable grounds in the vicinity of a given port that the assumption could be made that the effort inside the YRCA would not be redistributed, but instead would be lost from a given port. Thus the catch savings from these areas were calculated as:

Catch Savings = yelloweye catch for the port * (proportion of the catch occurring within the YRCA).

Yelloweye Rockfish Conservation Areas Proposed for 2009-2010

CDFG used 1999-2007 MRFSS/CRFS effort data and CRFS 2006 and 2007 yelloweye catch data (both sampler examined and reported) with latitude and longitude of catch data to identify one square nautical mile blocks in state and federal waters off northern California with high yelloweye rockfish catch per unit effort using Arc View 9.1.

Many areas in the North and North-Central Management Area North of Point Arena that have high yelloweye catch were identified. Three criteria were used in identifying areas for further analysis of potential catch savings from YRCAs:

- High yelloweye catch per unit effort within the block.
- Clustering of high catch per unit effort blocks in the same area.
- Repeated presence of high catch per unit effort among years.

The following sections discuss the catch savings estimation methods and areas identified as prospective YRCAs for select areas that include both state and Federal waters.

The 2009-10 EIS development provided the opportunity to identify areas since the analysis could be included in the FEIS and be available for use in the 2009-10 seasons. The catch savings which potentially could result from the YRCAs were calculated as:

> Percent Catch Reduction from YRCA Implementation = ((sampled yelloweye catch for the remaining ports in the management area + ((sampled yelloweye catch for the port * (1-the proportion of sampled yelloweye catch within the YRCA) * (1 + the proportion of effort with rockfish in the catch within the YRCA))) / sampled yelloweye catch for the management area.)*100.

Table 4-59 provides the results of this analysis.

Table 4-59. Estimated percent yelloweye catch reduction from the implementation of YRCAs and combinations of YRCAs.

Yelloweye Rockfish Conservation Area	Management Area	Port of Origin	Percent Reduction in Management Area Yelloweye Catch
Point Saint George	Northern	Crescent City	8%
South Reef	Northern	Crescent City	6%
Redding Rock	Northern	Trinidad	30%
Point Delgada North	North-Central North of Pt. Arena	Shelter Cove	6%
Point Delgada South	North-Central North of Pt. Arena	Shelter Cove	32%
Point Saint George and South Reef	North-Central North of Pt. Arena	Crescent City	17%
Point Delgada North and South	North-Central North of Pt. Arena	Shelter Cove	49%
All Northern Management Area YRCAs	Northern	Crescent City / Trinidad	47%
All North-Central North of Pt. Arena Management Area YRCAs	North-Central North of Pt. Arena	Shelter Cove	49%

Should any of the YRCAs be implanted to reduce impacts to yelloweye, the percentages of anticipated catch savings above may be used to provide additional fishing time (i.e. longer seasons) in the two northernmost management areas.

It is important to note that the statistical calculations above rely on the premise that recreational anglers will not mitigate for the new closure areas; i.e. that effort shift will not occur into the remaining open areas, or alternatively, the additional angling pressure in the remaining open areas will not result in any yelloweye catch.

While the proposed YRCAs show promise in terms of protecting hotspot areas where significant yelloweye impacts have been demonstrated in the past, because of the uncertainty involved in catch savings, the numbers above should be used conservatively when evaluating potential fishing season durations. The amount of additional fishing time that YRCAs might allow for would require consideration of other factors, such as the months selected as the open season and the number selected as the CA recreational yelloweye harvest guideline. Also, recreational groundfish fishing seasons have traditionally been defined in terms of months or half-months. Therefore, when converting yelloweye savings from YRCAs into additional time on the water, the selection of specific season dates becomes more important and could add administrative complexity if the time periods considered involve numbers of days or weeks rather than months.

The latitudes and longitudes that delineate the proposed YRCAs for possible use in the 2009-10 seasons are provided in the California Recreational portion of section 2.2.4.2.

Analyzing the Effectiveness of the Sanddabs and Other Flatfish Gear Restriction Regulation

Sanddabs and Other Flatfish are allowed to be taken in the California recreational fishery when fishing for rockfish, lingcod and associated species (referred to as the RCG complex below for simplicity) are closed, and also may be taken in depths which comprise the recreational RCA. Starting in 2004 the following regulations were placed on sanddabs and other flatfish to reduce bycatch of overfished species:

> *The use of weight no more than 2 pounds and no more than 12 hooks size 2 or less while fishing for sanddabs and Other Flatfish during the months in which the RCG complex is closed.*

CDFG proposes to eliminate this requirement as it has shown it does not offer additional protection to overfished rockfish. Additionally, both CRFS samplers and party boat operators indicate that bycatch of rockfish while fishing for sanddabs and other flatfish is minimal.

Comparing the bycatch of rockfish in years when there were no gear restrictions to years when the restrictions were put in place shows that the regulations have not served to reduce the take or interaction with overfished species. Four rockfish species of concern were analyzed: bocaccio, canary rockfish, cowcod, and yelloweye rockfish. As bycatch levels are unchanged from years when there were no restrictions, the gear restrictions may be unnecessary and could potentially be eliminated, simplifying the ocean sport fish regulations.

Using the CRFS database for 2004-07 and the MRFSS database for 2001-03, relevant data were extracted pertaining to all catch events in which sanddab species group was targeted. All species that were caught in association with sanddab as a targeted species group during the months in which rockfish were closed were queried for 2004 through 2007. Data were stratified into the northern California (Oregon/California border to Point Conception) and southern California (Point Conception to the U.S.-Mexico border) areas. Data were further stratified by party/charter boats (PC) and private/rental boats (PR). The same data extraction and query was made using the MRFSS data base for 2001 through 2003. A comparison of the bycatch was made between the seasons with no gear restrictions (2001-03) and the seasons when the restrictions were in place (2004-07). It was assumed that anglers were using the required gear when fishing for sanddabs.

Table 4-60 shows that before the sanddab gear restrictions were in place, there was little to no catch association of species of concern when sanddabs were the targeted species. The results for the bycatch of species of concern during the time when the gear restrictions were in place also showed little to no catch of those species. The results suggest that sanddabs and Other Flatfish fishery gear restrictions have not been effective in restricting the bycatch of the rockfish species of concern, and thus could be eliminated.

Table 4-60. Numbers of fish and ratios of rockfish species of concern to sanddabs before and after gear restriction regulations.

Year	Numbers of Fish Sampled					Bycatch Ratio to Sampled Sanddabs			
	Sanddabs	Bocaccio	Canary	Cowcod	Yelloweye	Bocaccio	Canary	Cowcod	Yelloweye
Prior to Gear Restrictions									
Northern California PC Boats									
2001	No data	NA	NA	NA	NA	NA	NA	NA	NA
2002	1,657	0	0	0	0	0.0000	0.0000	0.0000	0.0000
2003	2,984	0	0	0	0	0.0000	0.0000	0.0000	0.0000
Northern California PR Boats									
2001	210	0	0	0	0	0.0000	0.0000	0.0000	0.0000
2002	324	0	0	0	0	0.0000	0.0000	0.0000	0.0000
2003	220	0	0	0	0	0.0000	0.0000	0.0000	0.0000
Southern California PC Boats									
2001	309	0	0	0	0	0.0000	0.0000	0.0000	0.0000
2002	2,528	0	0	0	0	0.0000	0.0000	0.0000	0.0000
2003	1,743	0	0	0	0	0.0000	0.0000	0.0000	0.0000
Southern California PR Boats									
2001	42	1	0	0	0	0.0238	0.0000	0.0000	0.0000
2002	494	0	0	0	0	0.0000	0.0000	0.0000	0.0000
2003	740	0	0	0	0	0.0000	0.0000	0.0000	0.0000
After Gear Restriction Regulations									
Year	Numbers of Fish Sampled					Bycatch Ratio to Sampled Sanddabs			
	Sanddabs	Bocaccio	Canary	Cowcod	Yelloweye	Bocaccio	Canary	Cowcod	Yelloweye
Northern California PC Boats									
2004	4,183	0	0	0	0	0.0000	0.0000	0.0000	0.0000
2005	967	0	0	0	0	0.0000	0.0000	0.0000	0.0000
2006	1,383	0	0	0	0	0.0000	0.0000	0.0000	0.0000
2007	575	0	1	0	0	0.0000	0.0017	0.0000	0.0000
Northern California PR Boats									
2004	2,837	0	0	0	2	0.0000	0.0000	0.0000	0.0007
2005	952	0	0	0	0	0.0000	0.0000	0.0000	0.0000
2006	963	0	0	0	0	0.0000	0.0000	0.0000	0.0000
2007	1,037	0	3	0	0	0.0000	0.0029	0.0000	0.0000
Southern California PC Boats									
2004	2,522	5	0	0	0	0.0020	0.0000	0.0000	0.0000
2005	3,175	1	0	0	0	0.0003	0.0000	0.0000	0.0000
2006	900	0	0	0	0	0.0000	0.0000	0.0000	0.0000
2007	3,439	2	0	0	0	0.0006	0.0000	0.0000	0.0000
Southern California PR Boats									
2004	598	1	0	0	0	0.0017	0.0000	0.0000	0.0000
2005	676	2	0	0	0	0.0030	0.0000	0.0000	0.0000
2006	1,351	1	0	0	0	0.0007	0.0000	0.0000	0.0000
2007	1,158	2	0	0	0	0.0017	0.0000	0.0000	0.0000

Bag Limit Analyses

Rockfish Cabezon and Greenling (RCG) Bag Limit

A six fish bag limit is being considered for Northern and North-Central North of Point Arena Management Area to reduce impacts on yelloweye rockfish. The RCG Bag Limit Reduction analysis was done using the Bag Frequency Analysis tool available on the RecFIN web site available at http://www.psmfc.org/recfin/forms/bfreq.html. The parameters selected in the analysis were based on past analysis of bag limit reduction by species. The species chosen were all rockfish, kelp greenling, cabezon with a 10 fish bag limit. The marine area selected was all areas shoreward of 3 nm. Three modes were analyzed separately: Party and Charter mode, Private and Rental mode, and Shore mode. In the Data type parameters, “split shared angler bags” was selected and the catch type was A+B1+B2: total catch. Counties selected were based on the counties within their respective Management Areas. The analysis looked at two areas, the Northern and North-Central Management Area North of Pt. Arena. The range of Hypothetical Bag Limits analyzed was 10 to 3 fish for RCG. The years used in the analysis were 2005-07.

Once the parameters were set, the analysis was conducted and the results were used to calculate total % catch reduction for a reduced bag limit. The total catch for each bag limit from 10 fish down to 3 fish were subtracted by the total catch of the current 10 fish bag limit regulation. The result was divided by the current 10 fish bag limit total catch number and multiplied by 100 to provide a percent reduction in catch resulting from a given bag limit. The resulting catch reductions for the private rental and party charter modes can be seen in Table 4-61.

A six fish bag limit is estimated to result in a 20% reduction in the RCG catch for the private rental mode and a 26% catch reduction in the party charter mode in the Northern Management Area. The majority of the rockfish catch in California originates from the PR and the 20% catch reduction is used as the proxy for catch reduction for all modes in calculating the catch resulting from a 6 fish bag limit in the Northern Management Area and the North-Central Management Area North of Pt. Arena. This analysis accounts for only the catch reduction due to the reduction in retained fish by a given angler, it does not account for reductions in effort due to the reduced opportunity represented by the lower bag limit which could further reduce catch. This analysis does not account for the possibility of increased discarding with lowered bag limits as anglers become more selective with regard to the fish they retain.

Table 4-61. Percent reductions in the RCG catch resulting from reductions in the bag limit from the current 10 fish bag limit for the Private Rental and Party Charter Modes in the Northern and North-Central Management Areas.

Bag Limit	Private and Rental Percent RCG Catch Reduction	Party Charter Percent RCG Catch Reduction
9	3%	5%
8	8%	11%
7	14%	18%
6	20%	26%
5	28%	35%
4	38%	45%
3	48%	56%

Bocaccio, Greenling, and Cabezon Bag Limit Analyses

Alternative 2009-10 bag limits include an increase in the greenling and cabezon bag limits from one to two fish. CDFG used the RecFIN methodology for Hypothetical Bag Limit Analyses to determine increased impacts on greenlings and cabezon resulting from this change. We used the A+B1+B2 fish from 2004 for estimating the increased impact based on all fish encountered. The A fish are sampled dead fish. CDFG assumes for greenlings and cabezon that B1 includes filets and there were no fish thrown back dead as kelp greenlings and cabezon usually survive release. B2 includes live fish over the bag limit or under the size limit of 12". Since there is no way to estimate the proportion of fish that were undersized, this analysis also assumes there were no fish thrown back as sublegal and assumes that all B2 fish would be available if the bag limit were increased as the most conservative estimate. All bags over the hypothetical limit are then set to the hypothetical limit to calculate increased take. Results show a consistent increase in expected catch for the private/rental mode for both species, as well as increases in catch for cabezon shore modes (Table 4-62).

An alternative 2009-10 bocaccio bag limit includes a reduction in the bocaccio bag limit from Cape Mendocino to the Oregon border from 2 to 1 fish to protect bocaccio under the lower OY. The estimated saving in bocaccio as a result of this change is not possible to determine because the data cannot be summarized for only this region. Bocaccio is at the northern end of its distribution in this part of the state and the fishing effort is low relative to other regions. The estimated take of bocaccio in 2005 was minimal in this region; therefore, some small but undetermined amount of savings would be expected.

Conversely, an alternative bocaccio bag limit includes an increase in the bocaccio bag limit from one to two fish for the area south of Cape Mendocino so that the statewide bag limit would be two fish. CDFG used the RecFIN methodology for Hypothetical Bag Limit Analyses to determine increased impacts on bocaccio resulting from this change. The program uses the A+B1+B2 fish from 2005-07 for estimating the increased impact. The A fish are sampled dead fish. CDFG assumes for bocaccio that B1 includes filets and fish thrown back dead (over the bag limit) as bocaccio do not usually survive release. B2 fish were included as CDFG assumed most of the B2 fish were regulatory discards after the angler had already caught one bocaccio. All bags over the hypothetical limit are then set to the hypothetical limit to calculate increased take. The increased estimated impacts on bocaccio are strongly pronounced in the private/rental mode south of Pigeon Pt., especially in the Southern Management Area, and in the party/charter mode in the Southern Management Area (Table 4-62)

There have been anecdotal suggestions that there has been good bocaccio recruitment in southern California during 2003 and/or 2004. Those fish would be expected to recruit first to the recreational fishery in 2006 or 2007, so that additional unknown and unquantified impacts from new recruits could also occur, however, CDFG reviewed the 2005 and 2006 CRFS sample data to look for a spike in small fish with no success.

Table 4-62. Results of analyses of bag limit changes for bocaccio, greenlings, and cabezon.

Management Area	Bocaccio		Greenlings		Cabezon			
	Fishing Mode a/							
	PC	PR	PC	PR	PC	PR	MM	BB
North	"-	"-	33	34	0	44	5	75
North-Central N of Pt. Arena	0	0	0	47	0	20	14	0
North-Central S of Pt. Arena	8	0	0	21	8	24	23	17
South-Central - Monterey	3	33	0	38	0	21	13	0
South-Central - Morro Bay	7	25	0	40	8	37	0	0
South	29	63	0	0	3	24	20	20

a/ PC = party/charter; PR = private/rental; MM = man-made structures; BB = beach/bank.

Proposed Reduction of the Lingcod Size Limit in Northern California

One measure under consideration for the 2009-10 groundfish management cycle involves a decrease in the lingcod recreational and commercial minimum size limit from 24 inches to 22 inches, consistent with the limit in Oregon and Washington. This measure is being considered to potentially help alleviate fishing pressure on yelloweye rockfish.

Analysis of yelloweye rockfish interactions show that, at least in the northern portion of the state, lingcod catch (harvested and released) is highly associated with yelloweye rockfish encounters. This has been especially true for the past two groundfish seasons. Lowering the recreational lingcod minimum size limit to 22 inches could get recreational anglers off the water sooner (by meeting their bag limit in less time), thus decreasing the amount of yelloweye rockfish encounters. For commercial fishermen, lower size limits may mean filling the trip limit more quickly. However, any anticipated savings are speculative and cannot be quantified.

Moreover, it is likely that drawbacks of the proposed change would outweigh any potential savings to yelloweye rockfish. Specifically, the lower size limit would add administrative complexity and potential enforcement difficulties within California, as the measure is not under consideration for southern California. It is also speculative to presume that a regulation change to lower the size limit would prompt a change in fishing behavior as it relates to yelloweye interactions. The size limit reduction would not require sport or commercial fishermen to stop fishing once a lingcod limit is reached. Fishermen may continue to fish for other groundfish species in the same areas, and would be allowed to do so by law.

4.5.2 Impacts of Management Measure Alternatives by Sector

4.5.2.1 *Limited Entry Non-Whiting Trawl*

The alternative trip limits and RCA configurations for the non-whiting trawl sector designed to stay within the constraints imposed by the rebuilding alternatives are described in section 4.3.1.2.

<u>One Bottom Trawl Gear on Board North of 40°10' N Latitude</u>

The intention of the one bottom trawl gear on board is to increase the certainty that large footrope gear is not being used shoreward of the Rockfish Conservation Area (RCA). Large footrope is better able to fish in rocky habitats and using this gear in shoreward areas tends to increase bycatch of depleted species found on the shelf. Additionally, allowing a vessel to fish only one bottom trawl net type has been viewed as a potential way to more accurately predict target fishery participation. The bycatch model estimates depleted species' impacts, shoreward and seaward of the RCA. Allowing only one bottom trawl net type to be used, or aboard the vessel, during an entire cumulative fishing period is one way of achieving a more accurate prediction.

If a vessel chooses to use multiple bottom trawl gears during one trip, there could be trip limit enforcement concerns. Cumulative limits are applied to the most restrictive gear used during the period. Common practice is to record the gear which caught the most fish (i.e., dominant gear) on the landing receipt, when multiple gear types are used. If most of the trip employs a less restrictive gear and the fish ticket only reflects the dominant gear, then enforcing the proper cumulative limit could become problematic.

Additionally, sampling concerns are associated with the use of multiple trawl gears during one trip and implementation of a one trawl gear onboard regulation would resolve these concerns. Fish are not kept in separate holds by gear type and therefore samples taken at the dock cannot be associated to a specific gear or area fished (shoreward or seaward of the RCA). Gear and area codes cannot be recorded on fish tickets and logbooks when more than one gear is used. When samples cannot be linked to the gear and area fished, they are unable to be used, which results in a loss of important information used in stock assessments.

No data are available to inform the number of vessels or trips where multiple trawl gears are on board a vessel. However, landing summaries indicate the number of trips where multiple gears have been used. In Washington and California, samplers rarely see multiple trawl gears used during one trip (even though vessels may have two gears on board). From 2005-07, approximately 2.7% of Oregon landings were composed of trips where multiple gears were used (Table 4-63). The number of trips where multiple gears were used has declined in recent years. Using multiple gears on one trip primarily occurs in Astoria (Table 4-64).

Table 4-63. Number of non-whiting trawl trips using multiple gear landed into Oregon.

Year	Number of Multiple Gear Trips	Total Number of Bottom Trawl Trips	% Multiple Gear Trips
2005	28	1,040	2.69%
2006	32	1,119	2.86%
2007	18	689	2.61%

Table 4-64. Number of non-whiting trawl trips using multiple gear landed into Astoria, Oregon.

Year	Number of Multiple Gear Trips	Total Number of Bottom Trawl Trips	% Multiple Gear Trips
2005	27	466	5.79%
2006	30	550	5.45%
2007	18	300	6.00%

Several issues were identified with a one trawl gear provision. If trawlers are held to a single trawl gear during a period, this may inadvertently result in increased trawl effort on the shelf for those vessels that currently fish both seaward and shoreward but are restricted to the smaller limits. Based on historical practices, if a one gear on board provision was adopted, it would primarily constrain Oregon vessels, and particularly those vessels in Astoria. In addition, switching between one trawl gear and another may force vessels to incur a cost that they currently do not incur, thus having an adverse economic impact to trawl vessels. Anecdotal evidence indicates that the cost to switch nets ranges from approximately $100 to $300.

4.5.2.2 *Limited Entry Whiting Trawl*

The implications to 2009-10 whiting fisheries posed by alternative widow rockfish OYs are described in section 4.3.1.2.

Bycatch limits have been used to constrain the incidental catch of depleted rockfish species in the non-tribal Pacific whiting fishery (i.e., all sectors) since 2004 (Table 4-65). If a bycatch limit is reached, all commercial Pacific whiting fisheries are closed for the remainder of the year, regardless of whether or not the Pacific whiting allocations have been reached[11]. This catch management tool has been used to prevent exceedance of ABCs and OYs and also to prevent harm to other fishery sectors that may be impacted by higher than expected catch amounts of bycatch species.

Table 4-65. Range of Depleted Species Bycatch Limits (mt) set by the Pacific Fishery Management Council for the non-tribal Pacific whiting fishery.

Species	**2004**	**2005**	**2006**	**2007**	**2008** a/
Canary	6.2 – 7.3	4.7	4.0 – 4.7	4.7	4.7
Darkblotched	9.5	n/a	25	25	40
Widow	n/a	200 – 212	200 – 220	220 – 275	275
a/ Year 2008 values represent the numbers currently outlined in the Federal Regulations, which can be modified by the Council during inseason action.					

Historically, the Council has adopted the ABC/OY of Pacific whiting while taking into account bycatch projections, in order to promote harvesting of the whiting OY relative to depleted species constraints. This performance standard approach has worked well. However, in 2007, the non-tribal Pacific whiting fishery was closed when the widow bycatch limit was exceeded. This was the first time the non-tribal whiting fishery had been closed upon attainment of a bycatch limit prior to achieving the whiting OY. The fishery reopened on October 7, 2007 after the Council increased the widow cap from 220 to 275 mt (72 FR 56664, October 4, 2007).

In response to the early season closure, the Council requested the analysis of several bycatch limit management measures for the non-tribal Pacific whiting fishery including 1) sector-specific bycatch

[11] However, the fishery can be reopened if there is available yield under the specified OY and the Council elects to increase the affected bycatch limit through inseason action.

limits, 2) seasonal releases of bycatch limits, 3) closing the fishery upon projected attainment of a bycatch limit, and 4) depth-based restrictions as an inseason measure upon the projected attainment of one or more bycatch caps for canary rockfish, widow rockfish, and darkblotched rockfish or the Chinook incidental take allowance. The goal of these management measures is to reduce cross-sector competition and reduce the race-for-bycatch and to reduce bycatch.

2009-10 Area Restriction Alternatives

In order to assess the effects of RCAs in the whiting fishery, bycatch rates were calculated by sector and by depth. This data was taken from at-sea observers in the at-sea fishery, and from logbook data in the shoreside fishery. Bycatch rates are defined as the poundage of depleted species taken per pound of whiting. These bycatch rates were applied to each sector’s allocation of a hypothetical 250,000 metric ton whiting OY to simulate the possible effects of implementing RCAs on the whiting fishery. Depth contours of 100, 125, and 150 fm were analyzed.

This bycatch rate analysis suggests that it is not unequivocally the case that deeper depths result in less bycatch. In fact, for widow and darkblotched deeper depths may actually result in a higher rate, while canary and yelloweye rates and associated catch may decrease at depths greater than 150 fm. These rates and their implications appear to vary by sector as well. Table 4-66 illustrates the effect of this approach on bycatch of depleted groundfish.

Since the whiting fishery is managed with a performance standard management tool (bycatch limits), the actual performance of the whiting fishery with respect to bycatch could differ quite substantially from the table above. Indeed, depending on fleet behavior, bycatch could be substantially greater or substantially lower than the numbers indicated above. One reasonable approach at assessing bycatch of depleted species in a performance standard-based fishery is to assess the risk of encountering relatively large amounts of depleted species on a depth basis. The concept behind this approach is that industry is attempting to avoid depleted stocks in order to access whiting. Successful avoidance will mean the fishery can continue operating. However, there is some uncertainty associated with fishing and relatively large and unexpected depleted species catch events can occur. The risk of encountering a relatively large and unexpected catch event can be assessed in a simple fashion by examining the variability of depleted species catch and the size of certain catch events by depth.

A simple, somewhat qualitative, assessment of risk was done to inform the risks associated with various depth contours and the associated implementation of a whiting fishery RCA. This simple assessment was done by plotting the catch of depleted groundfish by whiting sector by depth (Figures 4-20 to 4-25). These figures indicate that substantially more risk of widow rockfish and canary rockfish encounters may exist when participants are operating at depths less than 150 fm than when they are operating at depths greater than 150 fm. The greatest amount of risk may exist when operating between 50 and 125 fm. This information suggests that the implementation of a 150 fm RCA in the whiting fishery may minimize the risk that relatively large encounters of canary and widow rockfish will occur. The minimization of this risk may mean the fishery is better able to prosecute whiting while avoiding depleted stocks.

Table 4-66. Predicted bycatch by non-tribal sectors of the whiting trawl fishery under alternative depth-based RCA restrictions.

Fm Restriction	Sector	Allocation	Canary	Darkblotched	POP	Widow	Yelloweye
No Fm Restriction	Tribal	32,500	0.98	0.00	0.51	2.50	0.00
	Mothership	51,720	1.98	5.83	1.05	113.78	0.01
	CP	73,270	0.24	5.73	1.08	139.21	0.01
	Shoreside	90,510	1.51	2.72	0.32	144.82	0.02
	Total	248,000	4.71	14.28	2.96	400.31	0.04
100 Fm Restriction	Tribal	32,500	0.98	0.00	0.51	2.50	0.00
	Mothership	51,720	2.06	6.24	1.10	117.18	0.00
	CP	73,270	0.24	5.44	1.08	136.48	0.01
	Shoreside	90,510	2.64	8.30	0.67	121.43	0.01
	Total	248,000	5.91	19.98	3.36	377.59	0.02
125 Fm Restriction	Tribal	32,500	0.98	0.00	0.51	2.50	0.00
	Mothership	51,720	2.66	5.12	1.28	104.07	0.00
	CP	73,270	0.18	4.90	0.66	139.64	0.01
	Shoreside	90,510	3.08	11.36	0.41	120.59	0.01
	Total	248,000	6.90	21.38	2.86	366.80	0.02
150 Fm Restriction	Tribal	32,500	0.98	0.00	0.51	2.50	0.00
	Mothership	51,720	0.27	5.27	1.60	93.94	0.00
	CP	73,270	0.13	3.98	0.48	196.90	0.01
	Shoreside	90,510	0.56	12.44	0.48	118.65	0.01
	Total	248,000	1.94	21.69	3.06	411.99	0.02

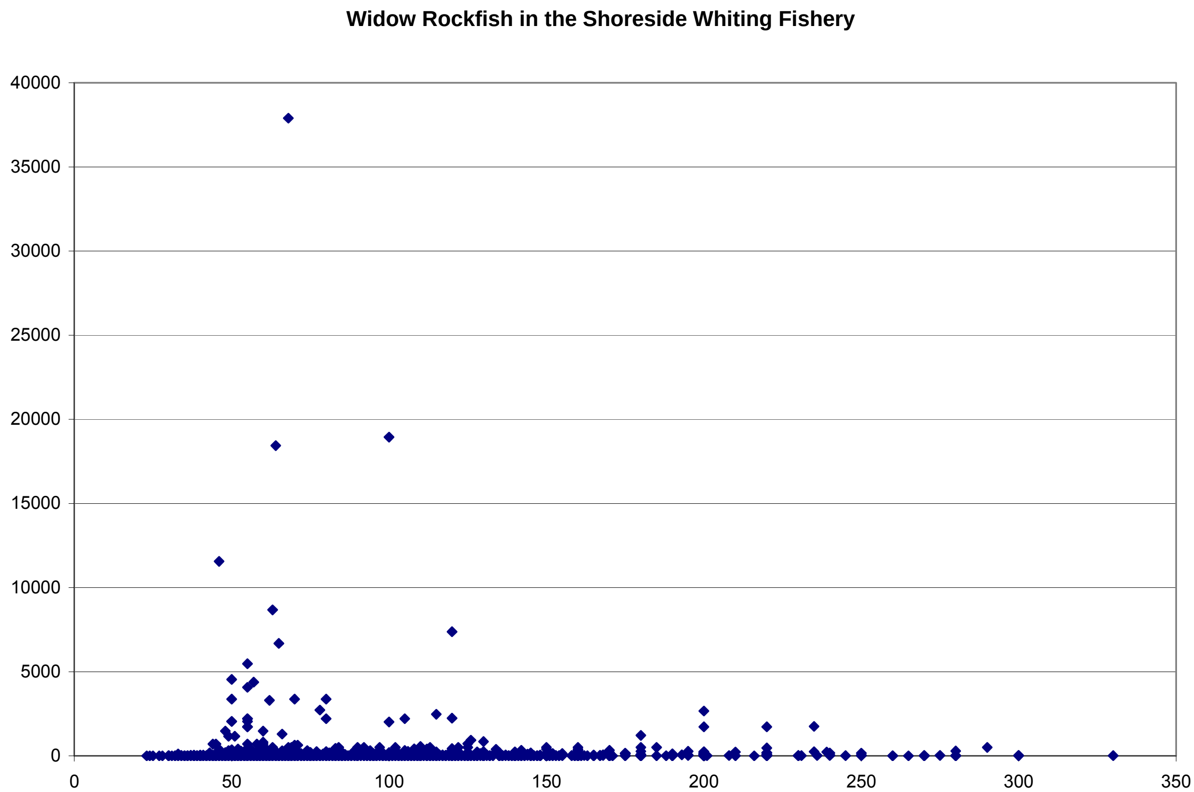


Figure 4-20. Plot of widow rockfish caught in the shoreside whiting fishery by depth (fm).

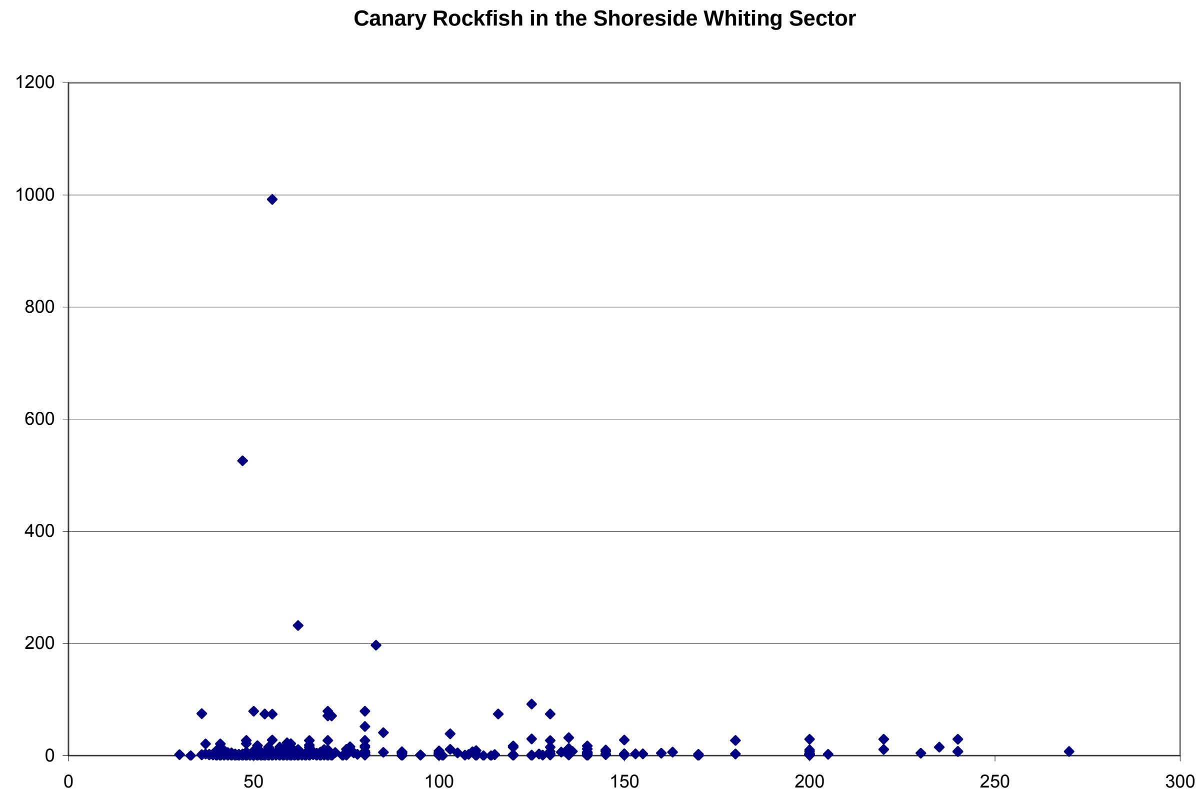


Figure 4-21. Plot of canary rockfish caught in the shoreside whiting fishery by depth (fm).

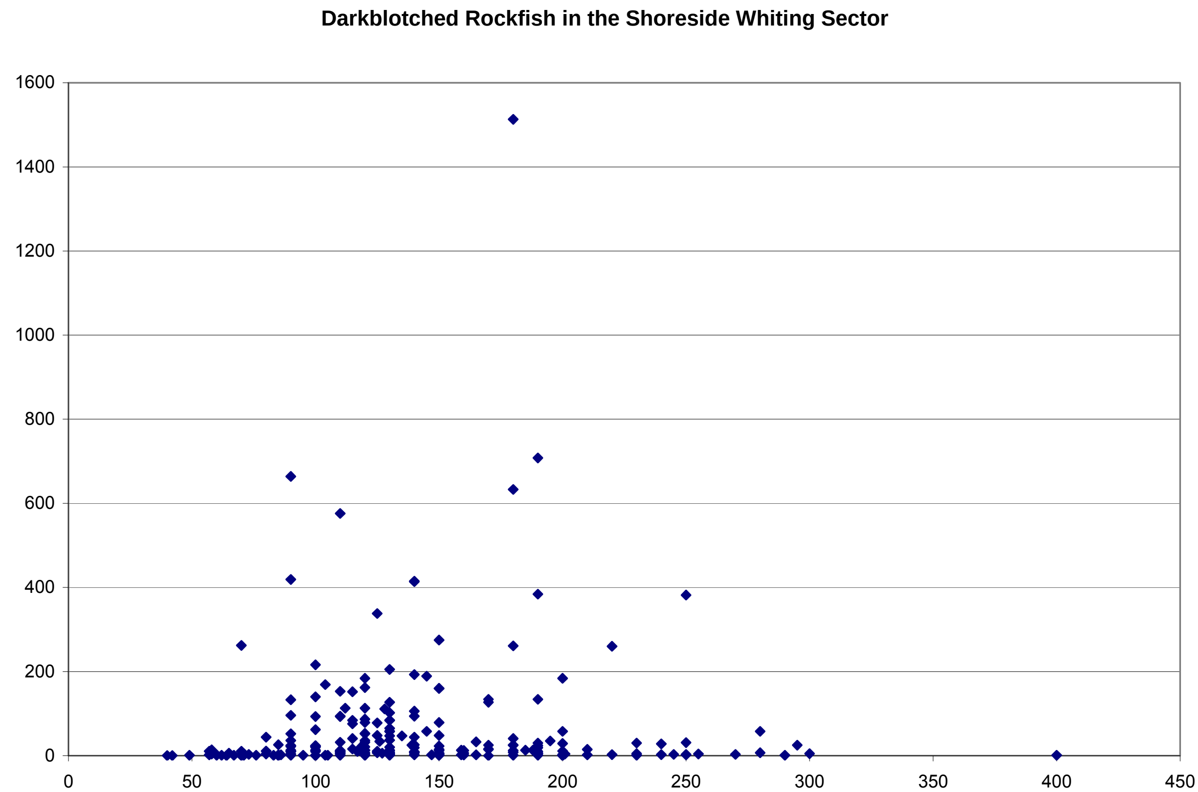


Figure 4-22. Plot of darkblotched rockfish caught in the shoreside whiting fishery by depth (fm).

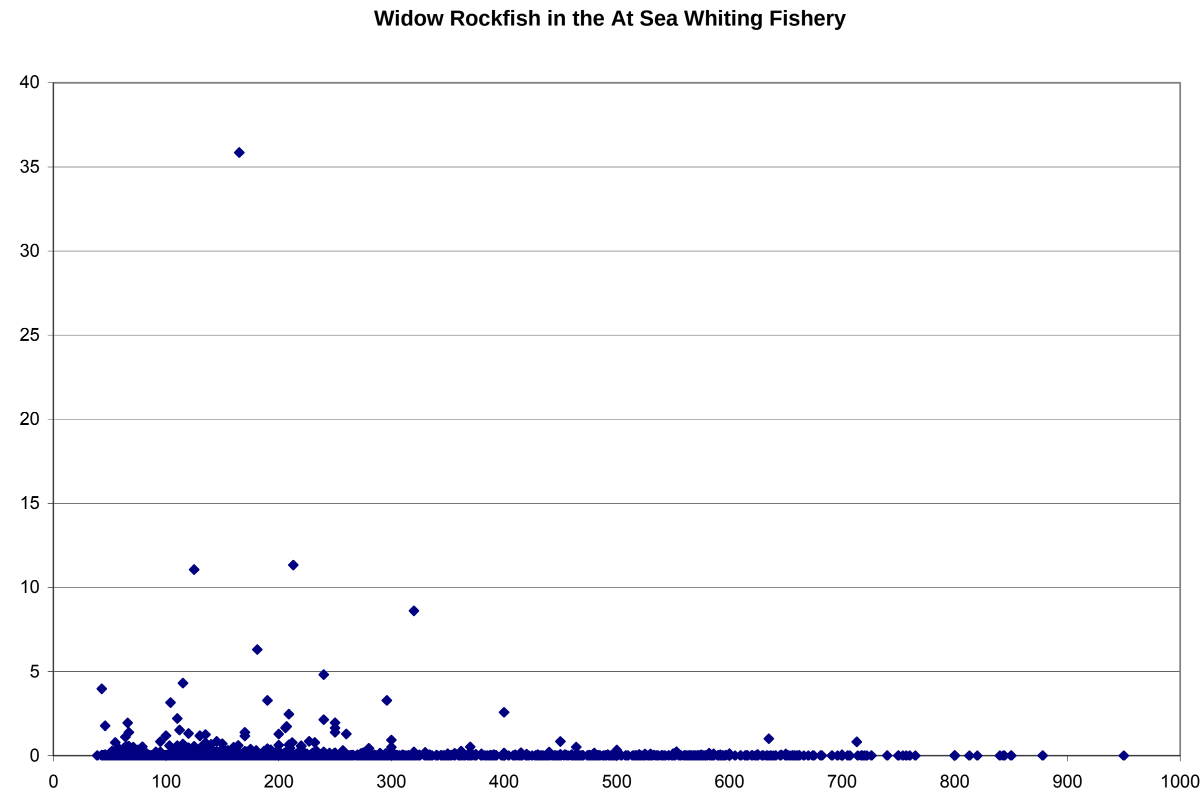


Figure 4-23. Plot of widow rockfish caught in the at-sea whiting fishery by depth (fm).

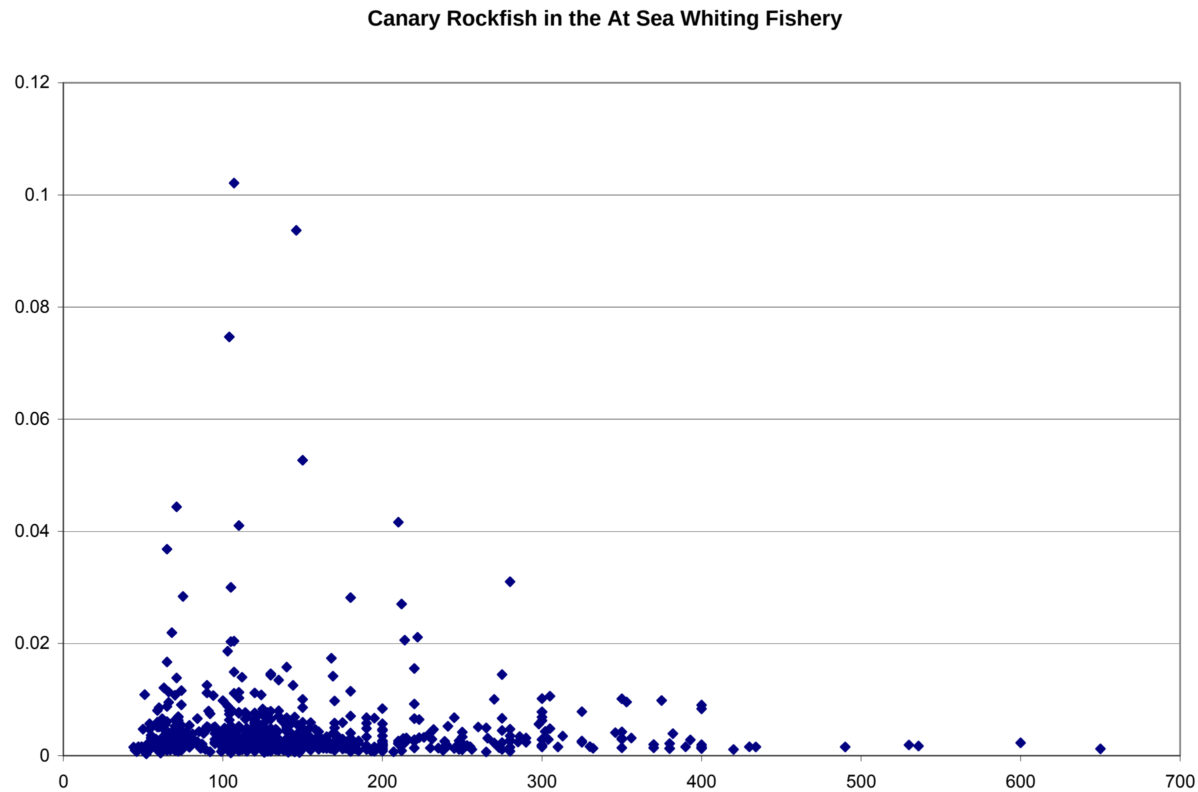


Figure 4-24. Plot of canary rockfish caught in the at-sea whiting fishery by depth (fm).

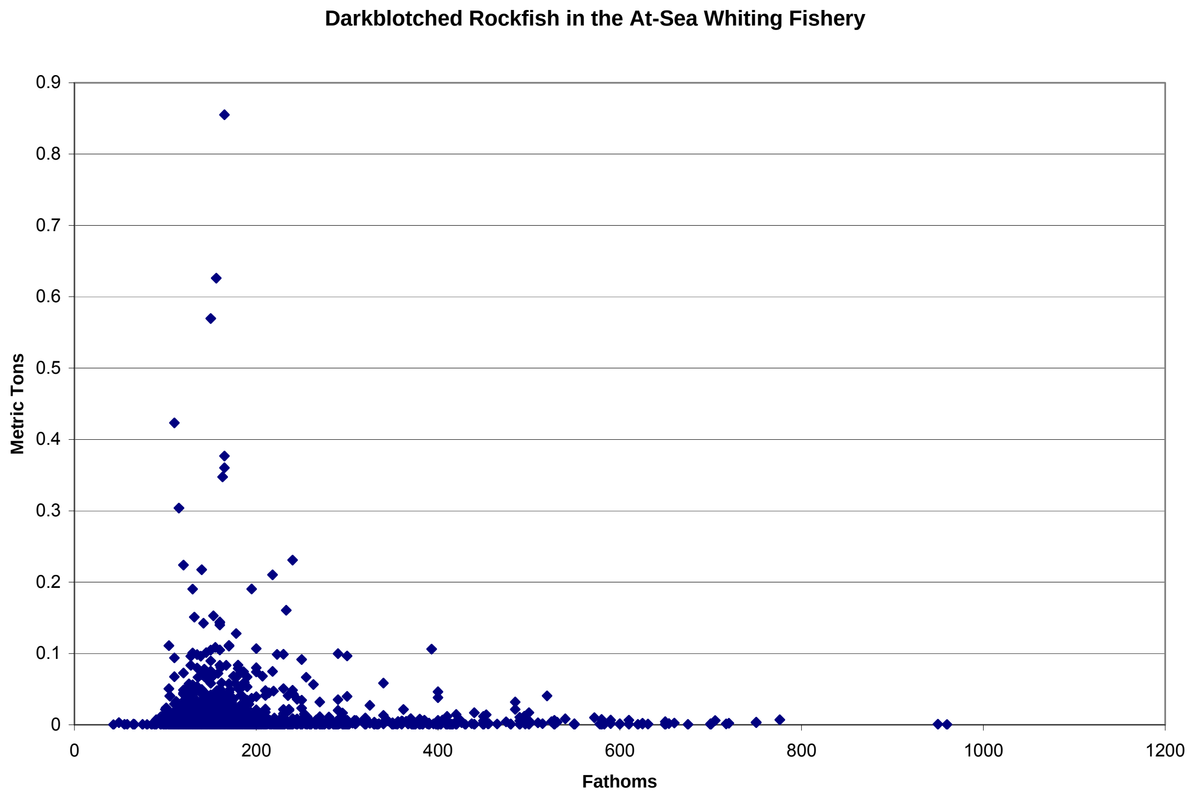


Figure 4-25. Plot of darkblotched rockfish caught in the at-sea whiting fishery by depth (fm).

Sector-specific Bycatch Caps

The Council recommended two options for analysis to determine sector-specific bycatch caps for the shore-based, mothership, and catcher-processor sectors: 1) pro-rata distribution based on whiting allocations and 2) distributions based on whiting bycatch model rates. Additionally, the Council specified two provisions that provide for an unused bycatch limit to either be rolled over to other non-tribal whiting sectors on a pro-rata basis (based on initial whiting allocations), or for use as residual yields by any other sector as needed.

Pro-Rata Distribution Results

Pro-rata distributions of depleted species currently managed with bycatch limits in the Pacific whiting fishery are found in Tables 4-67 to 4-70. The distributions are based on the 2008 status quo bycatch limits as well as bycatch projections from the whiting bycatch model for the highest and lowest whiting OYs specified by the Council for analysis (Tables 2-1a and 2-1b).

Some caution should be exercised when interpreting the bycatch projections from the model as it is based on an extension of the linear trend analysis for predicting widow bycatch that the GMT has been using since the start of 2007. Data used to inform the model is through 2007, and therefore, the trend is predicting bycatch rates two years into the future. This creates some substantial uncertainty, so the estimates are best treated as order of magnitude estimates. The whiting bycatch model uses both weighted averages (canary and darkblotched) and a linear interpolation (widow) from 2004-07 fishery data. This approach assumes that fleet depth distributions are similar to 2004-07. However, in 2008 the Council adopted a new bycatch limit strategy which is intended to result in more catcher-processor and mothership effort occurring in deeper depths, potentially reducing canary and widow rockfish bycatch rates relative to previous years. The expected reduction in widow rockfish impacts as a result of the potential effort shift, are provided in Table 4-70.

Table 4-67. Predicted sector distributions of canary rockfish under status quo bycatch limits, a high whiting OY scenario, and a low whiting OY scenario.

Non-tribal Whiting Sector	Status Quo Distribution (mt)	High Whiting OY Bycatch Projection (mt)	Low Whiting OY Bycatch Projection (mt)
Catcher-Processor	1.6	2.2	0.6
Mothership	1.1	1.5	0.5
Shoreside	2.0	2. 7	0.8
Total	4.7	6.4	1.9

Table 4-68. Predicted sector distributions of darkblotched rockfish under status quo bycatch limits, a high whiting OY scenario, and a low whiting OY scenario.

Non-tribal Whiting Sector	Status Quo Distribution (mt)	High Whiting OY Bycatch Projection (mt)	Low Whiting OY Bycatch Projection (mt)
Catcher-Processor	13.6	8.3	2.5
Mothership	9.6	5.8	1.7
Shoreside	16.8	10.2	3.0
Total	40	24.3	7.2

Table 4-69. Predicted sector distributions of widow rockfish under status quo bycatch limits, a high whiting OY scenario, and a low whiting OY scenario.

Non-tribal Whiting Sector	Status Quo Distribution (mt)	High Whiting OY Bycatch Projection (mt)	Low Whiting OY Bycatch Projection (mt)
Catcher-Processor	93.5	230.5	68.5
Mothership	66.0	162.7	48.4
Shoreside	115.5	284.9	84.7
Total	275	678.1	201.6

Table 4-70. Predicted sector distributions of widow rockfish under status quo bycatch limits, a high whiting OY scenario, and a low whiting OY scenario. the bycatch projections for the high and low whiting OY scenarios are adjusted for the new darkblotched rockfish strategy.

Non-tribal Whiting Sector	Status Quo Distribution (mt)	High Whiting OY Bycatch Projection (mt)	Low Whiting OY Bycatch Projection (mt)
Catcher-Processor	13.6	192.1	57.1
Mothership	9.6	135.6	40.3
Shoreside	16.8	237.3	70.6
Total	40.0	565.1	168.0

Sector-Specific Bycatch Limits

Sector-specific bycatch limits were also calculated based on the whiting bycatch model projections (Tables 4-71 to 4-73). Distributions are based on the 2008 whiting OY as well as the highest and lowest whiting OYs specified by the Council for analysis (Tables 2-1a and 2-1b). As mentioned previously, some caution should be exercised when interpreting the bycatch projections from the model as it is based on an extension of the linear trend analysis for predicting widow bycatch two years into the future. This creates some substantial uncertainty, so the estimates are best treated as order of magnitude estimates. Also, this approach assumes that fleet depth distributions are similar to 2004-07 and does not account for the potentially deeper depth distributions of the at-sea fleet which may occur in 2008. The expected reduction in widow rockfish impacts, as a result of the potential effort shift, are estimated in the final column of each table.

Table 4-71. Bycatch model predictions of canary, darkblotched, and widow rockfish by sector under a high whiting OY scenario.

Non-tribal Whiting Sector	Canary (mt)	Darkblotched (mt)	Widow (mt)	Widow - New Strategy (mt)
Catcher-Processor	0.4	9.8	237.3	
Mothership	3.4	9.9	193.9	
Shoreside	2.6	4.6	246.8	
Total	6.4	24.3	678.1	565.1

Table 4-72. Bycatch model predictions of canary, darkblotched, and widow rockfish by sector under the status quo whiting OY.

Non-tribal Whiting Sector	Canary (mt)	Darkblotched (mt)	Widow (mt)	Widow - New Strategy (mt)
Catcher-Processor	0.3	6.2	150.2	
Mothership	2.1	6.3	122. 8	
Shoreside	1.6	2.9	156.3	
Total	4.0	15.4	429.3	357.7

Table 4-73. Bycatch model predictions of canary, darkblotched, and widow rockfish by sector under a low whiting OY scenario.

Non-tribal Whiting Sector	Canary (mt)	Darkblotched (mt)	Widow (mt)	Widow - New Strategy (mt)
Catcher-Processor	0.1	2.9	70.5	
Mothership	1.0	3.0	57.7	
Shoreside	0.8	1.4	73.4	
Total	1. 9	7.2	201.6	168.0

The sector allocation of whiting differs significantly from historical utilization of bycatch by sector (Table 4-74). For example, historically the catcher-processor sector utilized 7.8 percent of the total canary rockfish take while successfully achieving the sector's whiting allocation. Under a pro-rata distribution, the catcher-processor fleet would receive 34 percent, an allocation that may be unnecessarily high. Additionally, data indicates that the darkblotched rockfish limit has been restricting fishing flexibility for both the catcher-processor and mothership fleets. Historically, the catcher-processor and mothership fleets utilized 44.9 percent and 38.4 percent, respectively, of the total darkblotched rockfish take (Table 4-74). Shoreside, however, only used 17.1 percent. The pro-rata distribution based on the whiting allocation would result in 42 percent of the darkblotched rockfish limit being distributed to the shoreside fleet, which may be unnecessarily high and may further constrain the at-sea sectors. Therefore, adjustments to the pro-rata distributions, taking into consideration historical utilization, may be necessary to prevent setting an overly constraining or unreasonably high limit.

Table 4-74. Historical utilization (2004-07) of depleted species impacts, compared to the whiting sector allocation.

Sector	Canary	Darkblotched	Widow	Whiting Allocation
Catcher-Processor	7.8%	44.9%	27.9%	34%
Mothership	41.6%	38.4%	28.9%	24%
Shoreside	50.6%	17.1%	43.1%	42%

The disparity between historical utilization of bycatch limit species and the pro-rata allocations are likely a result of fleet depth and latitude distributions. Generally, shoreside vessel activities are restricted by the distance from shore, and thus the fleet's depth distribution is also limited. This restriction occurs because shoreside vessels must remain in close proximity to the shoreside processing plants in order to maintain product quality. Also, some smaller shoreside vessels do not have the equipment necessary to fish at deeper depths (e.g., horsepower). Catcher vessels participating in the mothership fishery and catcher-processors have greater flexibility in terms of fishing location and depth since they are not tied to a port area. Since the three bycatch limit species have different depth distributions, it is anticipated that each sector will have different bycatch needs based on the sector's depth distribution. Generally, canary and widow rockfish are found along the continental shelf while darkblotched rockfish are found along the slope. As such, an upward adjustment in the canary and widow rockfish limit may be appropriate for the shoreside sectors while an upward adjustment in the darkblotched rockfish limit may be appropriate for the at-sea sectors.

Sector-specific bycatch limits generated from the whiting bycatch model reflect historical the depth distributions of the fleet. Therefore, the allocations more closely aligned with historical utilization may result in less disruption to status quo operations.

Implementing sector-specific bycatch limits, either through pro-rata distributions or by using the bycatch model, may be appropriate for species with relatively larger limits or may be overly constraining for species with relatively lower limits. For example, the status quo canary rockfish bycatch limit is 4.7 mt. Under a pro-rata distribution, the catcher-processor sector would receive 1.6 mt, mothership sector would receive 1.1 mt, and shoreside would receive 2.0 mt (Table 4-67). Dividing this relatively small limit by three sectors may limit fleet flexibility in some cases, but may reduce the probability that one sector may affect another in other cases. For a species like widow rockfish where the total limit is greater, division among sectors may not reduce flexibility to the same degree as a divided canary rockfish limit.

Tables 4-75a, 4-75b, and 4-75c compare the different methods discussed for apportioning sector-specific bycatch limits for canary, darkblotched, and widow rockfish, respectively.

Table 4-75a. A comparison of different methods (i.e., pro-rata distribution, bycatch model projection, historical utilization) used to apportion bycatch limits of canary rockfish to the non-tribal sectors of the west coast whiting trawl fishery.

Sector	Year	Catch (mt)	Annual %	Pro-rata %	Bycatch Model	98-07 Ave.	04-07 Ave.
Catcher-processor	1998	0.25	8.1%	**34%**	**6.5%**	27.5%	7.8%
	1999	1.03	56.3%				
	2000	0.86	44.3%				
	2001	0.65	31.7%				
	2002	1.590	56.2%				
	2003	0.170	47.2%				
	2004	0.480	8.3%				
	2005	0.340	10.4%				
	2006	0.100	3.9%				
	2007	0.350	8.8%				
Mothership	1998	2.460	79.6%	**24%**	**53.1%**	38.2%	41.6%
	1999	0.190	10.4%				
	2000	0.560	28.9%				
	2001	0.950	46.3%				
	2002	0.810	28.6%				
	2003	0.080	22.2%				
	2004	4.110	71.5%				
	2005	0.700	21.3%				
	2006	0.850	32.8%				
	2007	1.620	40.7%				
Shoreside	1998	0.380	12.3%	42%	40.5%	34.2%	50.6%
	1999	0.610	33.3%				
	2000	0.520	26.8%				
	2001	0.450	22.0%				
	2002	0.430	15.2%				
	2003	0.110	30.6%				
	2004	1.160	20.2%				
	2005	2.240	68.3%				
	2006	1.640	63.3%				
	2007	2.010	50.5%				

Table 4-75b. A comparison of different methods (i.e., pro-rata distribution, bycatch model projection, historical utilization) used to apportion bycatch limits of darkblotched rockfish to the non-tribal sectors of the west coast whiting trawl fishery.

Sector	Year	Catch (mt)	Annual %	Pro-rata %	Bycatch Model	98-07 Ave.	04-07 Ave.
Catcher-processor	1998	6.94	31.3%	34%	40.1%	55.8%	45.1%
	1999	6.94	56.9%				
	2000	3.81	37.5%				
	2001	11.50	89.3%				
	2002	2.19	70.0%				
	2003	4.21	92.1%				
	2004	4.36	53.0%				
	2005	5.95	36.0%				
	2006	6.73	50.8%				
	2007	5.28	40.7%				
Mothership	1998	11.28	50.8%	**24%**	**40.9%**	32.9%	37.9%
	1999	4.84	39.7%				
	2000	5.15	50.6%				
	2001	0.57	4.4%				
	2002	0.93	29.7%				
	2003	0.10	2.2%				
	2004	3.02	36.7%				
	2005	5.08	30.7%				
	2006	4.24	32.0%				
	2007	6.73	51.9%				
Shoreside	1998	3.97	17.9%	**42%**	**19.0%**	11.4%	17.0%
	1999	0.42	3.4%				
	2000	1.21	11.9%				
	2001	0.81	6.3%				
	2002	0.01	0.3%				
	2003	0.26	5.7%				
	2004	0.84	10.2%				
	2005	5.51	33.3%				
	2006	2.27	17.1%				
	2007	0.95	7.3%				

Table 4-75c. A comparison of different methods (i.e., pro-rata distribution, bycatch model projection, historical utilization) used to apportion bycatch limits of widow rockfish to the non-tribal sectors of the west coast whiting trawl fishery.

Sector	Year	Catch (mt)	Annual %	Pro-rata %	Bycatch Model	98-07 Ave.	04-07 Ave.
Catcher-processor	1998	120.92	18.4%	34%	35.0%	37.8%	27.9%
	1999	101.25	29.7%				
	2000	69.97	23.6%				
	2001	139.71	66.2%				
	2002	115.10	81.7%				
	2003	11.56	46.6%				
	2004	8.37	17.4%				
	2005	43.14	27.7%				
	2006	66.99	35.6%				
	2007	72.77	31.0%				
Mothership	1998	171.84	26.1%	24%	28.6%	23.8%	28.9%
	1999	47.70	14.0%				
	2000	150.65	50.8%				
	2001	29.19	13.8%				
	2002	20.50	14.5%				
	2003	0.69	2.8%				
	2004	11.43	23.8%				
	2005	35.50	22.8%				
	2006	71.80	38.1%				
	2007	72.99	31.1%				
Shoreside	1998	366.00	55.6%	42%	36.4%	38.4%	43.1%
	1999	192.00	56.3%				
	2000	76.00	25.6%				
	2001	42.00	19.9%				
	2002	5.32	3.8%				
	2003	12.54	50.6%				
	2004	28.26	58.8%				
	2005	77.24	49.6%				
	2006	49.51	26.3%				
	2007	88.97	37.9%				

Sector-specific bycatch limits provide the surety that some amount of bycatch will be available regardless of the season or other sectors' operations. This could reduce cross-sector competition and the race for bycatch that currently exists in the whiting fishery. Specifically, sector-specific limits could provide the opportunity for a sector to change the primary season in which they operate, which could provide the opportunity to enhance their participation in other fisheries, maximize profit, and potentially reduce bycatch. For example, the catcher-processor sector has stated a preference for a fall fishery given a sector-specific bycatch limit. Data indicate that there is less bycatch and improved whiting product recovery in the fall (Larkin and Sylvia 1999). Thus a fall fishery might be preferable for this sector. However, a fall fishery may not be desirable for the mothership or shoreside sectors. Under sector-specific bycatch limits, these sectors would still have the opportunity to choose the season which provides them the greatest operational flexibility.

The Council specified two provisions that provide for unused bycatch limits to be either rolled over to other non-tribal whiting sectors on a pro-rata basis (based on initial whiting allocations) or placed back into the scorecard for use by all sectors. If rollovers are done on a pro-rata basis, the distributions may not match up with the sector's historical depth distribution. Therefore, it may be more appropriate to re-distribute the rollover based on projected needs from the bycatch model. For efficiency, these rollovers could be done automatically outside of a Council meeting to prevent a stop and start fishery. Further, once the whiting allocation for all sectors has been reached, it would be logical to roll any excess back into the scorecard for use by the non-whiting sectors.

The second option for unused bycatch limits is to rollover the excess into the scorecard for use by non-whiting sectors, prior to the whiting allocation for all sectors being reached. If this option is selected, there is a possibility that the excess could be used by a non-whiting sector and none would be remaining if a whiting sector required more. This could result in a situation where the whiting allocation for that sector remains unharvested.

Rollovers that are scheduled only when a sector achieves its whiting allocation may restrict fleet flexibility. For example, consider a scenario where two sectors are fishing concurrently and sector A runs out of bycatch prior to achieving its whiting allocation. Sector B may be willing to release some bycatch to sector A, depending on the amount needed, prior to attaining its sector allocation. However, if the rollover provisions state that a sector's whiting allocation must be harvested prior to the rollover, this option would not be available. In order to provide for greater flexibility, an option similar to the current whiting reapportionment rule could be considered. Under the whiting reapportionment rule, NMFS consults with industry on a certain date (September 15) to determine whether the sector intends to harvest their remaining whiting allocation. If the Regional Administrator determines that the whiting allocation will not be used by the end of the fishing year, it may be made available for harvest by all sectors. Depending on the amount of bycatch needed, it may be feasible to consider a rollover prior to the sector achieving its allocation. An examination of the current season bycatch rates would provide an indication of how much bycatch a sector could rollover without jeopardizing the opportunity to harvest their remaining whiting allocation. A rollover could be considered on a certain date or at a Council meeting, instead of restricting the rollover period to the time after a sector harvests its whiting allocation.

Seasonal Releases of Bycatch Limits

At its April 2008 meeting, the Council recommended an analysis of seasonal releases of bycatch limits in the non-tribal Pacific whiting fishery (Table 4-76). Seasonal releases are one means of protecting individual sectors from one another. In particular, a seasonal release can protect the shoreside sector (which starts June 15) from the at-sea sectors (which start on May 15). Since the three fisheries share a common bycatch limit, the activities of one sector can affect others making it possible that the at-sea sectors can preempt the shoreside sector, which is similar to status quo conditions.

Table 4-76. Council-recommended seasonal releases of bycatch limit species.

	April 15	June 15	Fall a/
Option 1	45%	40%	15%
Option 2	50%	40%	10%
Option 3	50%	45%	5%
a/ September 1, September 15, or October 1.			

The whiting bycatch model was used to estimate bycatch needs based on the status quo whiting OY as well as the highest and lowest whiting OYs adopted by the Council for analysis. Then, the Council recommended proportions were applied to the bycatch projections in order to reflect the amounts available under each of the seasonal distributions (Tables 4-77 to 4-79).

Table 4-77. Predicted scheduled release of widow rockfish assuming a status quo bycatch limit and high/low whiting OYs.

Status Quo Widow Bycatch Limit (mt)			
	15-Apr	15-Jun	Fall a/
Option 1	123.75	110.00	41.25
Option 2	137.50	110.00	27.50
Option 3	137.50	123.75	13.75
Widow Bycatch Limit 275 mt			
Projection Under the High Whiting OY (mt)			
	15-Apr	15-Jun	Fall a/
Option 1	305.13	271.23	101.71
Option 2	339.04	271.23	67.81
Option 3	339.04	305.13	33.90
Widow Bycatch Limit 678.08 mt			
Projection Under the Low Whiting OY (mt)			
	15-Apr	15-Jun	Fall a/
Option 1	90.70	80.62	30.23
Option 2	100.78	80.62	20.16
Option 3	100.78	90.70	10.08
Widow Bycatch Limit 201.56 mt			
Projection Under the High Whiting OY, Incorporates New Darkblotched Strategy (mt)			
	15-Apr	15-Jun	Fall a/
Option 1	254.28	226.02	84.76
Option 2	282.53	226.02	56.51
Option 3	282.53	254.28	28.25
Widow Bycatch Limit 565.06 mt			
Projection Under the Low Whiting OY, Incorporates New Darkblotched Strategy (mt)			
	15-Apr	15-Jun	Fall a/
Option 1	75.59	67.19	25.20
Option 2	83.99	67.19	16.80
Option 3	83.99	75.59	8.40
Widow Bycatch Limit 167.97 mt			
a/ September 1, September 15, or October 1.			

Table 4-78. Predicted scheduled release of canary rockfish assuming a status quo bycatch limit and high/low whiting OYs.

Status Quo Canary Bycatch Limit (mt)			
	15-Apr	15-Jun	Fall a/
Option 1	2.12	1.88	0.71
Option 2	2.35	1.88	0.47
Option 3	2.35	2.12	0.24
Canary Bycatch Limit 4.7 mt			
Projection Under the High Whiting OY (mt)			
	15-Apr	15-Jun	Fall a/
Option 1	2.86	2.54	0.95
Option 2	3.18	2.54	0.64
Option 3	3.18	2.86	0.32
Canary Bycatch Limit 6.35 mt			
Projection Under the Low Whiting OY (mt)			
	15-Apr	15-Jun	Fall a/
Option 1	0.85	0.76	0.28
Option 2	0.95	0.76	0.19
Option 3	0.95	0.85	0.09
Canary Bycatch Limit 1.89 mt			
a/ September 1, September 15, or October 1.			

Table 4-79. Predicted scheduled release of darkblotched rockfish assuming a status quo bycatch limit and high/low whiting OYs.

Status Quo Limit (mt)			
	15-Apr	15-Jun	Fall a/
Option 1	18.00	16.00	6.00
Option 2	20.00	16.00	4.00
Option 3	20.00	18.00	2.00
Darkblotched Bycatch Limit 40 mt			
Projection Under the High Whiting OY (mt)			
	15-Apr	15-Jun	Fall a/
Option 1	10.95	9.73	3.65
Option 2	12.17	9.73	2.43
Option 3	12.17	10.95	1.22
Darkblotched Bycatch Limit 24.33 mt			
Projection Under the Low Whiting OY (mt)			
	15-Apr	15-Jun	Fall a/
Option 1	3.25	2.89	1.08
Option 2	3.62	2.89	0.72
Option 3	3.62	3.25	0.36
Darkblotched Bycatch Limit 7.23 mt			
a/ September 1, September 15, or October 1.			

Additionally, whiting bycatch data was initially analyzed with Generalized Additive Models, where the independent variables included sector, year, month, week into season, and the interactions of these main effects. Smoothing of these variables was used, where possible. Most of the interactions were significant; however, trends were difficult to interpret with this small, unbalanced dataset. Therefore, separate sector models with only month as a categorical variable was used to look at the monthly trend, over all years, and by sector (Figures 4-26 to 4-29). The plots reveal that bycatch of darkblotched, POP, and widow in the catcher-processor sector decreases as the season progresses. The trend for canary is less certain but there is a slight decline. Mothership participation in the whiting fishery is greatest in May and June, but less in summer and fall. As a result, confidence intervals are wide and trends are less certain. However, for darkblotched, widow, and canary rockfish some decrease in bycatch is evident. For the shoreside fishery, seasonal bycatch trends are less evident, though an increase in POP bycatch is seen later in the year. Specifically, the lack of data later than August precludes meaningful insight for seasonal trends in this sector.

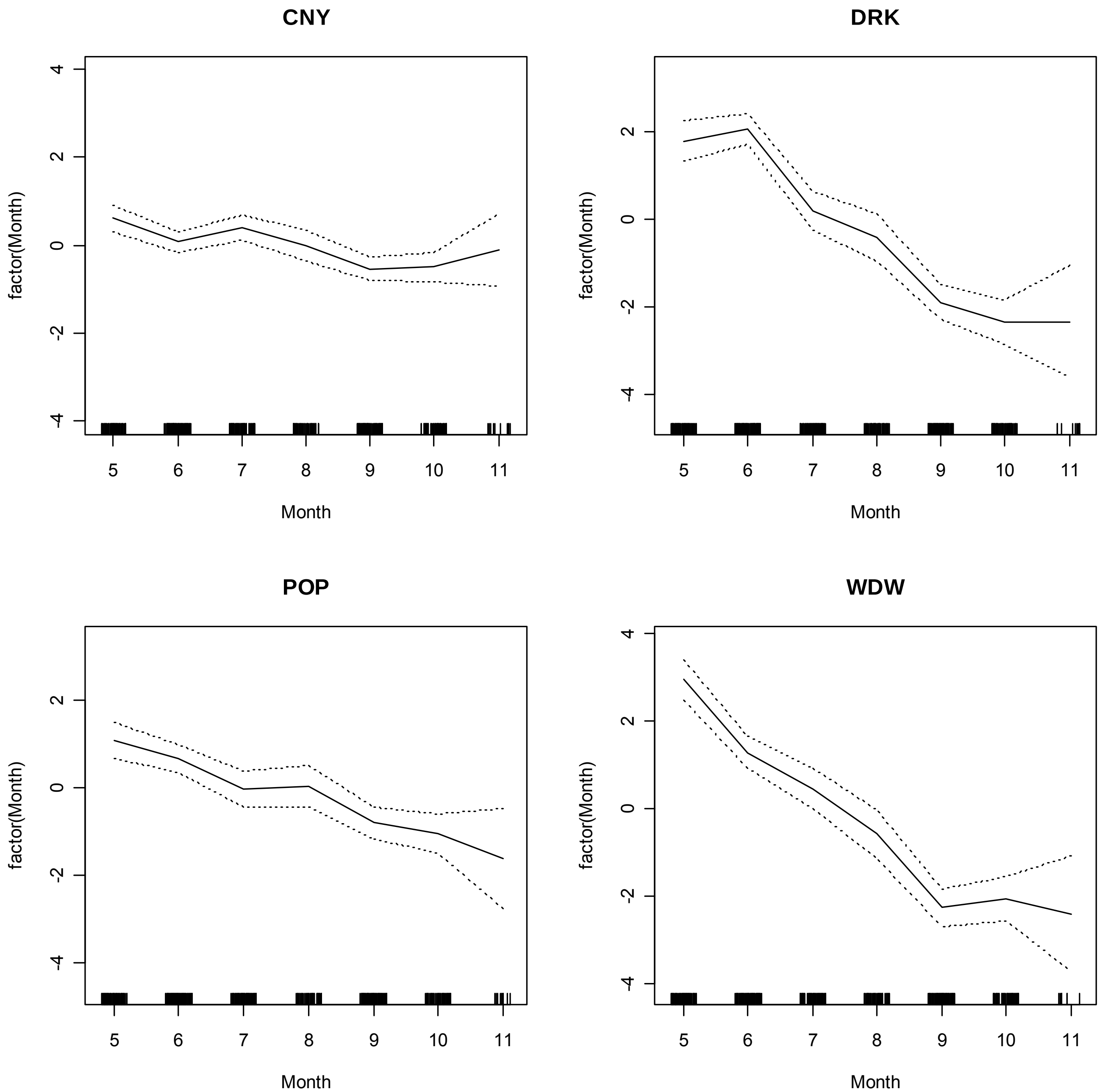


Figure 4-26. 2004-2007 catcher-processor data bycatch data (does not include data from the 2007 re-opening). Dependent variable is log of daily aggregated bycatch weight divided by daily aggregated Pacific whiting catch. The independent variable is month as a category. Y-axes contain relative coefficients. Note that the ranges on the y-axes are equal.

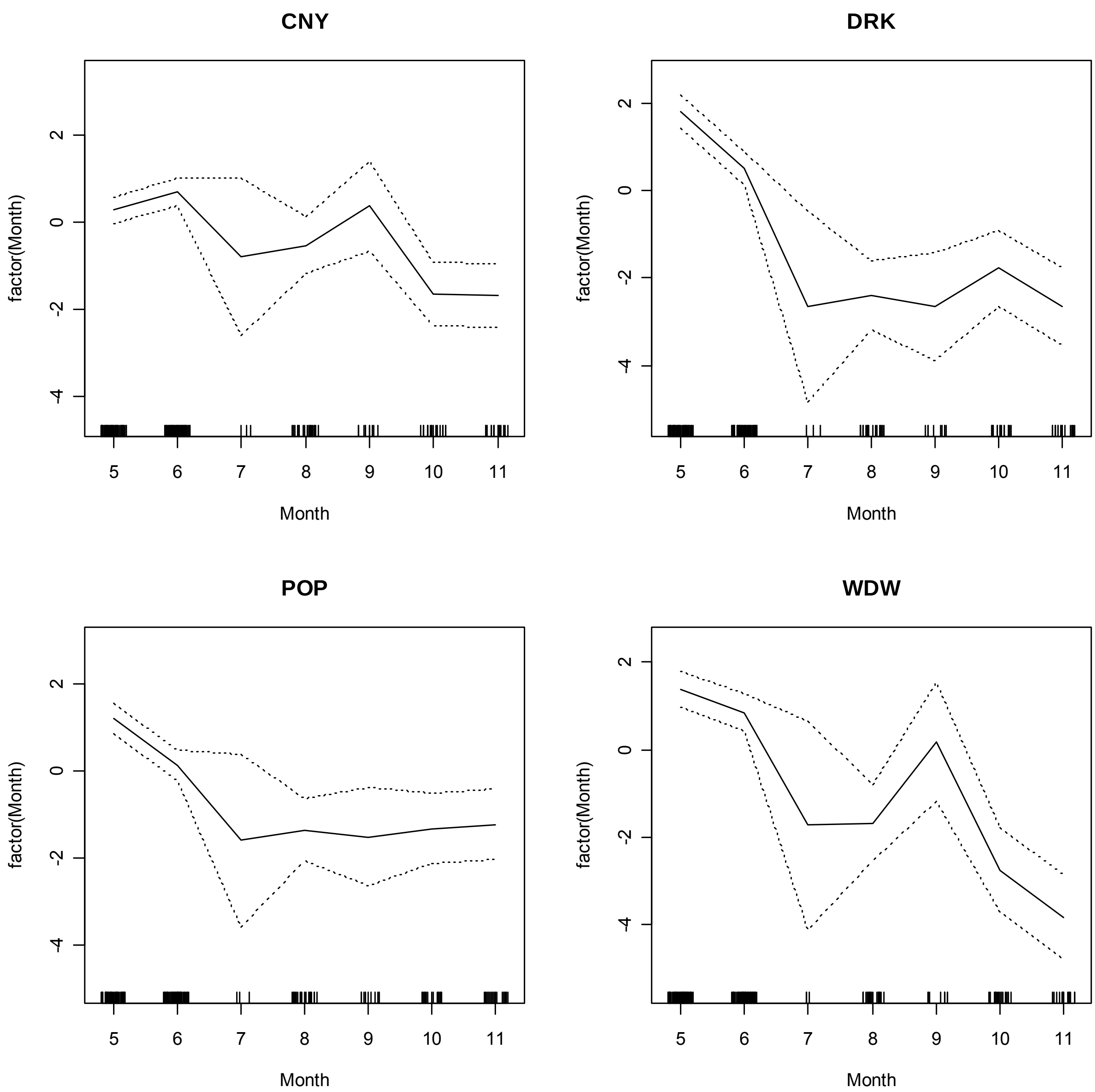


Figure 4-27. Mothership bycatch data modeled (does not include data from the 2007 re-opening). Dependent variable is log of daily aggregated bycatch weight divided by daily aggregated Pacific whiting catch. The independent variable is month as a category. Y-axes contain relative coefficients. Note that the ranges on the y-axes are equal.

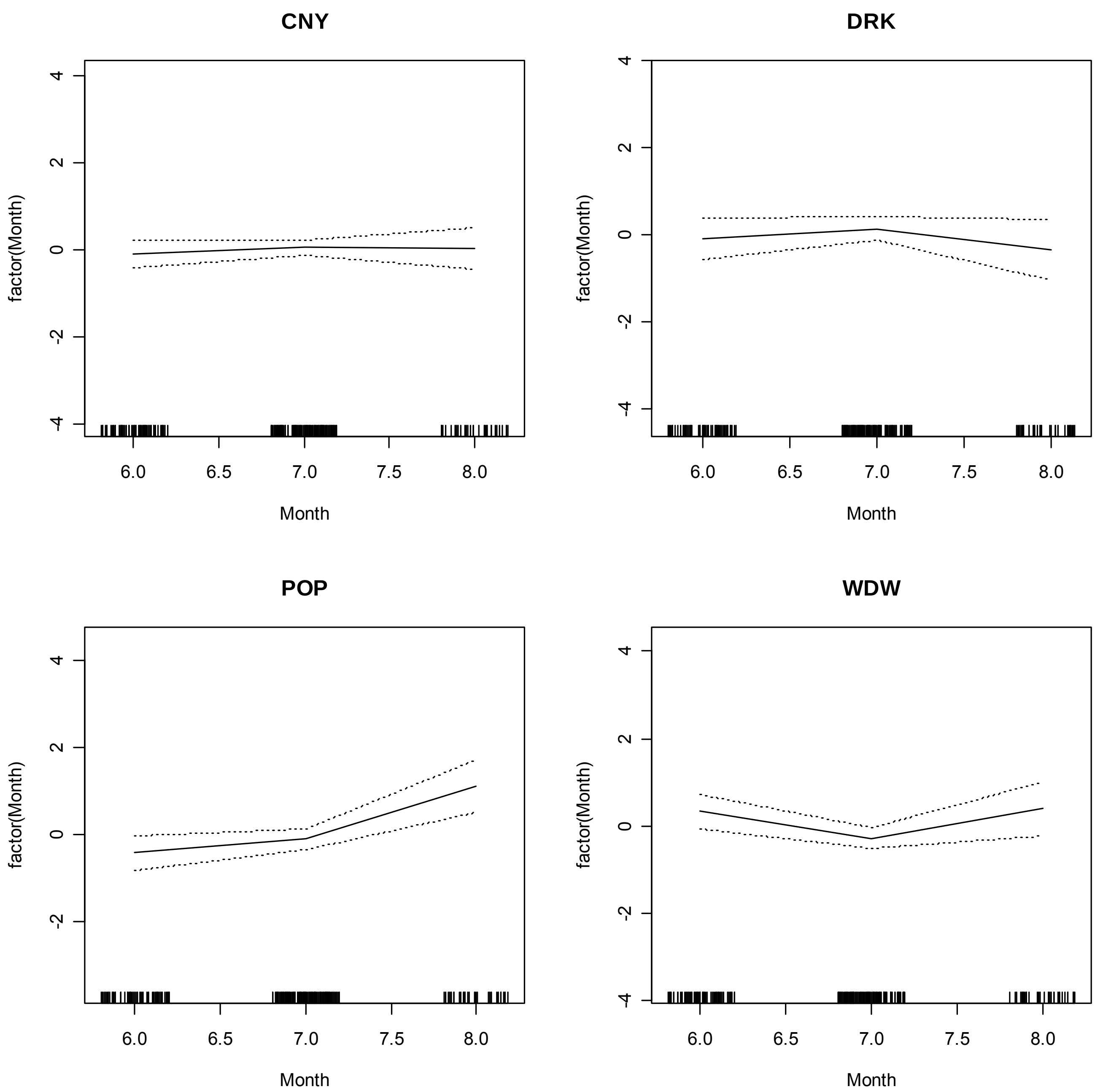


Figure 4-28. Shoreside data bycatch data modeled (does not include data from the 2007 re-opening). Dependent variable is log of daily aggregated bycatch weight divided by daily aggregated Pacific whiting catch. The independent variable is month as a category. Y-axes contain relative coefficients. Note that the ranges on the y-axes are equal.

Seasonal releases of bycatch can be viewed as a bycatch management tool used in lieu of sector-specific allocations of bycatch. Seasonal releases are one method of protecting one sector from another (since the sectors traditionally operate at different times) and minimizing the risk of bycatch occurring in one sector affecting the opportunities in another sector. If the amount of bycatch allocated to each season is structured in an appropriate fashion, such seasonal releases may allow successful prosecution of whiting activity while insuring that the sector that starts later in the year is not pre-empted by the attainment of a bycatch limit from sectors operating earlier in the year.

Figure 4-26 reveals that bycatch of darkblotched, POP, and widow in the catcher-processor sector decreases as the season progresses. Therefore, bycatch in this sector may be reduced if seasonal releases are structured to leave sufficient amounts available for a fall fishery. Although no bycatch limits are currently specified for the whiting fishery, the seasonality of POP interactions in the catcher-processor sector should also be taken into consideration.

Historical participation in the mothership sector is greatest in May and June with less fall fishing. As a result, confidence intervals are wide and seasonal bycatch trends are less certain. However, for darkblotched, widow, and canary rockfish, some decrease in bycatch is evident. The timing of mothership participation in the whiting fishery is coordinated with both the mothership and catcher vessel participation in the Alaska pollock fishery. If seasonal releases of bycatch are used to alter the seasonal structure of the mothership whiting fishery, complicated logistics could arise. For example, some whiting catcher vessels participate in the shorebased pollock sector and some in the at-sea pollock sector. Catcher vessels are then restricted to periods where the shoreside plants or motherships are accepting pollock deliveries. Further, approximately half of the whiting mothership catcher vessels also fish in the shoreside whiting fishery. Therefore, it is uncertain how much whiting fall fishing would occur in the mothership sector if seasonal distributions provided for a larger fall fishery.

For the shoreside fishery, seasonal bycatch trends are less evident due to a lack of a historical fall fishery. Thus, it is uncertain how much fall fishing would occur and what the associated bycatch interactions would be if seasonal distributions provided for a larger fall fishery. Approximately half of the shoreside vessels also participate as catcher vessels in the whiting mothership fishery. Therefore, the timing of the shoreside fishery is somewhat related to the timing of the mothership fishery. Additionally, some shoreside catcher vessels also participate in the Alaska pollock fishery, so their participation in the whiting fishery is also coordinated with the pollock seasons. Finally, processing companies may be affected by changing the seasonal distribution of the shoreside fishery. For example, processing facilities need to coordinate the volume of whiting deliveries relative to other processing activities (e.g., sardines, groundfish, etc).

One restriction created by a seasonal release of bycatch is that it may make it difficult for harvesters in a sector to change the timing of their fishing opportunity. If, for example, 50 percent of the widow is allocated to the time period between April and June, that 50 percent allocation of widow may work effectively at preserving fishing opportunity based on past practice. If one sector desires to spend more time fishing in the fall months however, that amount of widow allocated to the April through June time period may be inappropriate and may make it difficult for harvesters to fish later in the year (because there would presumably be less widow later in the year than would otherwise be the case). Compare this situation to a case where each sector has their own bycatch limit and harvesters can choose the harvest timing they find most appropriate and use the allocated bycatch during that time. Under this latter situation, changing harvest timing may be relatively simpler compared to a case where seasonal releases of bycatch are made.

Changing the At-Sea Processing Restrictions in the Shoreside Whiting Fishery

In 2006 and 2007, a 68 foot shore-based vessel headed and gutted Pacific whiting at sea (NOAA, April 2008). The vessel used a smaller net and shorter tows to maintain product quality. Head and gut machines were used at sea and the product was immediately placed in thick slurry of ice. As a result, the vessel was able to significantly increase its at-sea production and ex-vessel price of Pacific whiting. The ex-vessel price of the headed and gutted catch was approximately four times greater than the price for whiting landed whole in unsorted EFP landings, and approximately double the price when taking the weight conversion from dressed head off form to round weight into account (i.e., when comparing prices on the basis of a common weight measure). Because fish that are headed and gutted (i.e., leaving the tail on) with no further processing (such as freezing) are not considered to be a final product, under current regulations, the vessel's activities do not qualify as a catcher-processor. The operation, which occurred during the primary season for the shore-based sector, was allowed to operate within the Rockfish Conservation Areas without an EFP and an electronic monitoring system (EMS).

At its April 2008 meeting, the Council requested an analysis of an at-sea processing exemption for Pacific whiting vessels 75 feet and less for 2009-10. The intent of the proposal is to explore the expansion of this value-added operation and to allow for further processing (i.e., tailing and freezing) by small vessels. The Council stipulated that vessels qualifying for the small vessel processing exemption would fish under the shoreside whiting allocation and be exempt from current catcher-processor monitoring requirements.

The proposed rule for Amendment 10 contains provisions for a maximized retention and monitoring program for the shoreside Pacific whiting fishery (NOAA, May 2007). Maximized retention encourages full retention while recognizing that minor discard events that include large animals (> 6 ft) and minor levels of operational discard may occur. The Amendment 10 proposed rule also allows qualifying vessels to obtain a waiver which would allow for sorting at-sea, an activity necessary to conduct the proposed small vessel processing activities. Under the Amendment 10 waiver, vessels are required to carry and pay for an observer so discards can be monitored. Preliminary analyses indicate that, based on the qualifying criteria, only one vessel qualifies for the sorting waiver. If a small vessel processing exemption is desired, then a modification of the Amendment 10 sorting waiver may be necessary in order to allow additional vessels to sort at sea. Furthermore, modifications to shoreside monitoring or reporting requirements may be necessary in order to track Pacific whiting landings relative to the shoreside allocation.

The proposed rule for Amendment 15 would create a limited entry program for the non-tribal sectors of the Pacific whiting fishery. Amendment 15 is intended to be an interim measure until the implementation of a trawl individual quota or cooperative management program under Amendment 20; however, no sunset provision has been established. The total number of eligible vessels that qualify in each Pacific whiting sector (i.e., shoreside, catcher-processor, and mothership) will be limited under Amendment 15 and thus the total number of vessels eligible for the small vessel processing exemption would also be limited. However, limitations on entry could expire upon Amendment 20 implementation, as early as 2011, and the total number of vessels eligible for the small vessel processing exemption would be unlimited.

Of the vessels that qualify under the Amendment 15 criteria with a current limited entry permit, 12 vessels are 75 feet and less and thus would be eligible for the proposed small vessel processing exemption. Thirty seven vessels would be excluded. Seventeen additional vessels qualify under Amendment 15, but do not currently hold a limited entry permit. The lengths of these vessels are unknown. The number of vessels that would be eligible if/when Amendment 15 sunsets would be unlimited. Additionally, depending on the management measures adopted for the catcher-processor sector (IFQ or co-ops) under Amendment 20, participation in the catcher-processor sector could also be unlimited if/when Amendment 15 sunsets. Under the current regulatory structure, there are no limitations on length for the catcher-processor sector.

Thus far, one vessel has expressed interest in the small vessel processing exemption. Preliminary discussions with the Groundfish Advisory Subpanel did not indicate concern if the Pacific whiting removals under the small vessel processing exemption were deducted from the shoreside sector whiting allocation. However, if small boat processing became significantly more efficient than traditional shoreside catcher vessel operations and greatly expanded, inequity concerns could arise. As previously mentioned, 12 vessels are eligible vessels under the proposed processing exemption under Amendment 15. Information on the capacity and potential processing capabilities of the 12 vessels is unavailable, thus potential Pacific whiting removals are unknown. If Amendment 20 is adopted and Amendment 15 sunsets, participation could be unlimited and removals could greatly increase. The Council may wish to consider a limit to the amount of Pacific whiting that can be processed under the small vessel processing exemption.

In April 2008, the Council specified that small vessels under the proposed exemption would not be subject to the same catch monitoring requirements as catcher-processors. It may be impractical and overly burdensome, given space constraints and the type of operations, to require the catcher-processor monitoring requirements on vessels 75 feet or less. However, some at-sea monitoring specific to the proposed operations is appropriate given the need to adequately track the incidental take of Chinook salmon, as required in the Endangered Species Act (ESA) Section 7 Biological Opinion for Chinook salmon catch in the Pacific Whiting Fishery, to meet the standardized reporting methodology defined by the Magnuson-Stevens Act and to track the catch of target and depleted groundfish species such that the fishing industry is not unnecessarily constrained and that OYs, harvest guidelines, sector allocations and bycatch limits are not exceeded (NOAA, May 2007). The following considerations were identified with regard to catch monitoring requirements for small vessels processing at-sea: 1) sample design, 2) levels of observer coverage, 3) logistics and cost structure of observer coverage, and 4) inseason monitoring and data storage.

A sampling program for vessels sorting at sea would likely focus on discards, especially Chinook salmon and bycatch limit species, since the Pacific whiting would be landed and tracked shoreside. Prior to 1994, at-sea observers were used in the shoreside whiting fishery and information from those operations may be useful in developing a new program. Sample design for these vessels may also be similar to the discard sampling that occurs in the non-whiting groundfish fisheries. Additionally, at-sea sampling occurs in the catcher-processor and mothership sectors of the whiting fishery. Factory sampling on these large vessels will likely be very different from small vessel operations, however some similarities may exist.

Currently, the WCGOP observes approximately 25 percent of the non-whiting trawl fleet. Less than 100 percent catch monitoring on small vessels processing whiting may not be sufficient to meet the objectives outlined above (monitoring of Chinook salmon, bycatch limits, etc.). Therefore, consideration should be given to developing a program with independent funding in order to adequately sample the operations.

If a monitoring program for small processing vessels is desired, the cost structure and training model from the catcher-processor sector could be adopted. Currently, catcher-processors and motherships hire and pay for groundfish observers through a NMFS approved contractor. Training for these observers is coordinated with NMFS personnel and also paid for by industry.

At-sea data on discards collected from these small processing vessels would need to be incorporated into a database and monitored inseason. Currently, at-sea data are stored at the Alaska Fisheries Science Center in the NORPAC database and shoreside data are stored at the Northwest Region. Sample data collected from small vessels processing at sea would be similar in nature to data collected in the catcher-processor sector (i.e., discard data); however, tracking of whiting and bycatch would be specific to the shoreside sector. Therefore, some forethought and data coordination would be necessary to accommodate these new data.

4.5.2.3 *Limited Entry Fixed Gear*

Yelloweye impacts in offshore fixed gear fisheries occur seaward of the non-trawl RCA 100 fm line north of 40°10' N latitude. Yelloweye discard rates, based on the aggregate 2002-06 observed discards of yelloweye relative to retained sablefish in limited entry and open access line gear fisheries, were applied to sector sablefish allocations of the 2009-10 sablefish OYs north of 36° N latitude to predict yelloweye impacts for each sector assuming the full allocation of sablefish would be taken. Yelloweye impacts are predicted to be 1.5 mt and 0.4 mt for offshore limited entry and open access fixed gear fisheries, respectively under a status quo 100 fm seaward RCA boundary (see LEFG Alt. 7 in Table 2-34 and OA DTL Alt. 7 in Table 2-35).

The 2009-10 limited entry fixed gear management measure alternatives are designed to progressively avoid yelloweye rockfish impacts by moving all or a portion of the seaward boundary of the non-trawl RCA north of 40°10' N latitude from 100 fm to 125 fm or 150 fm (Table 2-34). Analyses informing the effect of alternative non-trawl RCA configurations varied seaward extensions of the non-trawl RCA north of 40°10' N latitude to 125 fm and 150 fm for the entire northern boundary and in four subareas bounded by 40°10' N lat.; the Columbia-Eureka line at 43° N lat. near Cape Blanco, Oregon; Cascade Head, Oregon at 45.064° N lat., Pt. Chehalis, Washington at 46.888° N lat.; and the U.S.-Canada border. The yelloweye rockfish impacts predicted under each alternative are compared against the yield amounts available under alternative catch sharing scenarios using the 2005 or 2007 scorecard amounts (Table 2-9) and alternative yelloweye rockfish OYs in Table 4-80. This comparison reveals that the status quo RCA configuration cannot be sustained under yelloweye OYs less than 15 mt unless more yelloweye impacts are allocated to the limited entry fixed gear sector than provided under the 2005 or 2007 scorecard catch sharing scenarios. However, predicted impacts under all the other management measure scenarios under those two catch sharing scenarios can be accommodated under lower yelloweye OYs. A minimal change to the northern non-trawl RCA configuration under OYs less than 15 mt are provided under LEFG Alternatives 5 and 6, both of which are predicted to result in a 1.2 mt yelloweye impact. These two alternatives move the seaward RCA boundary to 125 fm in the area north of Pt. Chehalis under LEFG Alternative 5 or between 43° N latitude (the Columbia-Eureka line near Cape Blanco, Oregon) and Cascade Head, Oregon under LEFG Alternative 6. These two subareas exhibited the two highest bycatch rates of yelloweye by the observed fixed gear fleets of the four northern subareas analyzed (Tables 4-35 to 4-37).

The amounts of retained sablefish associated with aggregated observed trips in these two subareas at depths deeper than 125 fm (Table 4-24) are approximately 79% and 76% of retained sablefish associated with aggregated observed trips in these two subareas at depths deeper than 100 fm (Table 4-23) for the subarea north of Pt. Chehalis and the subarea between 43° N latitude and Cascade Head, respectively. It is likely that fixed gear fishermen targeting sablefish in these two subareas would still be able to attain their sablefish allocations by moving to depths greater than 125 fm in either area, although overhead costs associated with longer runs to open fishing grounds may increase. There may also be a disproportionate cost to some areas of the coast under these alternatives. For instance, fixed gear vessels home porting in Puget Sound may have longer transits to open fishing grounds if the RCA is extended to 125 fm since much of the Juan de Fuca canyon would be closed (Figure 4-29).

Extending the northern non-trawl RCA further seaward would also affect fixed gear fishermen targeting Pacific halibut either in a directed fishery or incidental to sablefish targeting north of Pt. Chehalis. However, as summary data from the IPHC provided in Table 4-81 indicates, subarea extensions to deeper depths may not prohibit full attainment of commercial Area 2A halibut quotas given the significant proportion of halibut catch in depths greater than 125 fm. For instance, Table 4-81 indicates approximately 70% of the commercial halibut catch north of Pt. Chehalis occurred in depths greater than 125 fm. This compares to about 41% of the commercial halibut catch in depths greater than 125 fm in the area between 43° N latitude and Cascade Head. The same increased cost of fishing halibut can be posited if the RCA is extended seaward as was done above for sablefish targeting due to longer transits to open fishing grounds.

One difference between the halibut fisheries seaward of the RCA in these two areas is that all halibut caught north of Pt. Chehalis are incidental to the directed sablefish fishery, which may influence the depths of target fishing. Halibut are directly targeted in fisheries south of Pt. Chehalis and the depth of fishing is more likely influenced by the depth distribution of halibut when the fishery is open than the depth of sablefish. The apparent clustering of halibut targeting closer to the 100 fm line in the area between Cape Blanco and Cascade Head from the IPHC data is validated by comments from commercial fishermen solicited in public scoping meetings sponsored by ODFW in preparation for the Council's final June 2008 decision on 2009-10 management measures. This tradeoff may indicate less of a fishery impact with the same amount of yelloweye savings if the RCA is extended to 125 fm north of Pt. Chehalis rather than in the area between Cape Blanco and Cascade Head. However, further fishery impacts are associated with extending the RCA to 125 fm north of Pt. Chehalis.

While it may be concluded that sablefish and halibut target opportunities may not be significantly affected by extending the non-trawl RCA seaward to reduce yelloweye impacts, it is likely that the small fixed gear fishery targeting spiny dogfish north of Pt. Chehalis would be significantly impacted. Those vessels targeting spiny dogfish seaward of the existing 100 fm RCA line in waters off northern Washington fish very close to the 100 fm line since that is where dogfish apparently congregate at certain times of the year. Past testimony of fishermen that participate in the target dogfish fishery off northern Washington was that extending the RCA to depths of 125 fm or deeper would terminate the fishery since they would be pushed seaward of those areas where dogfish aggregate.

The GMT therefore proposed to extend the RCA to 125 fm in the area between Cape Blanco and Cascade Head except on days when the directed halibut fishery is open, when the line would remain at 100 fm, if such a change is needed to reduce yelloweye impacts. The GMT believes there would be very minimal additional yelloweye impacts under this scenario, since the directed halibut fishery in this area typically lasts for 3-6 days. The GMT estimates that 0.4 mt of yelloweye impacts would be saved by this proposal with 0.3 mt of savings in the limited entry fishery and 0.1 mt in open access fisheries.

The GMT also recommended that Council consider adding an exemption for the dogfish fishery to the suite of 2009-10 management measures to accommodate that fishery under a 125 or 150 fm line north of Pt. Chehalis. The exemption would require participants to make a VMS declaration and fish outside the 100 fm line. Sablefish could not be retained and vessels would need to return to port before re-declaring and setting out on a sablefish trip.

Table 4-80. The 2009-10 limited entry fixed gear management alternatives predicted to meet yelloweye impacts (denoted "*") under alternative catch sharing scenarios and OYs.

Management Measure Alternative	Catch Sharing Scenario	Predicted Total Catch (mt)	Yelloweye OY Alternatives							
			OY Alt. 2		OY Alt. 3		OY Alt. 4		OY Alt. 5	
			2009 13 mt	2010 14 mt	2009 17 mt	2010 14 mt	2009 15 mt	2010 15 mt	2009 17 mt	2010 17 mt
No Action	2005%	1.5	Fails	*	*	*	*	*	*	*
	2007%		Fails	Fails	*	Fails	*	*	*	*
LEFG Alt. 1	2005%	0.6	*	*	*	*	*	*	*	*
	2007%		*	*	*	*	*	*	*	*
LEFG Alt. 2	2005%	0.7	*	*	*	*	*	*	*	*
	2007%		*	*	*	*	*	*	*	*
LEFG Alt. 3	2005%	1.0	*	*	*	*	*	*	*	*
	2007%		*	*	*	*	*	*	*	*
LEFG Alt. 4	2005%	1.0	*	*	*	*	*	*	*	*
	2007%		*	*	*	*	*	*	*	*
LEFG Alt. 5	2005%	1.2	*	*	*	*	*	*	*	*
	2007%		*	*	*	*	*	*	*	*
LEFG Alt. 6	2005%	1.2	*	*	*	*	*	*	*	*
	2007%		*	*	*	*	*	*	*	*

Table 4-81. Commercial halibut catch from directed commercial and incidental to sablefish longline fisheries associated with logbook data, 2003-2007 (weight: net weight pounds, excludes treaty tribes).

Region	Depth Category	Longline/Target Halibut	Longline/All Targets	All Gear/All Targets	All/All Distinct Vessels
North of Pt. Chehalis	100-124 fm	a/	55,065	55,065	25
	125-149 fm	a/	40,839	40,839	26
	≥150 fm	-	85,297	85,297	27
Cascade Head to Pt. Chehalis	100-124 fm	58,548	59,408	59,408	33
	125-149 fm	36,247	36,328	36,328	22
	≥150 fm	4,809	5,221	5,221	6
Cape Blanco to Cascade Head	100-124 fm	183,092	183,092	184,542	67
	125-149 fm	245,905	245,905	245,905	55
	≥150 fm	53,619	53,619	53,619	21
OR/CA to Col/Eur	100-124 fm	b/	b/	b/	< 3

a/ < 3 vessels in the incidental to sablefish fishery set skates targeting halibut.
b/ < 3 vessels, poundage was added to the Col/Eur to Cascade Head category, Magnitude: less than 2% of the All/All log poundage total.

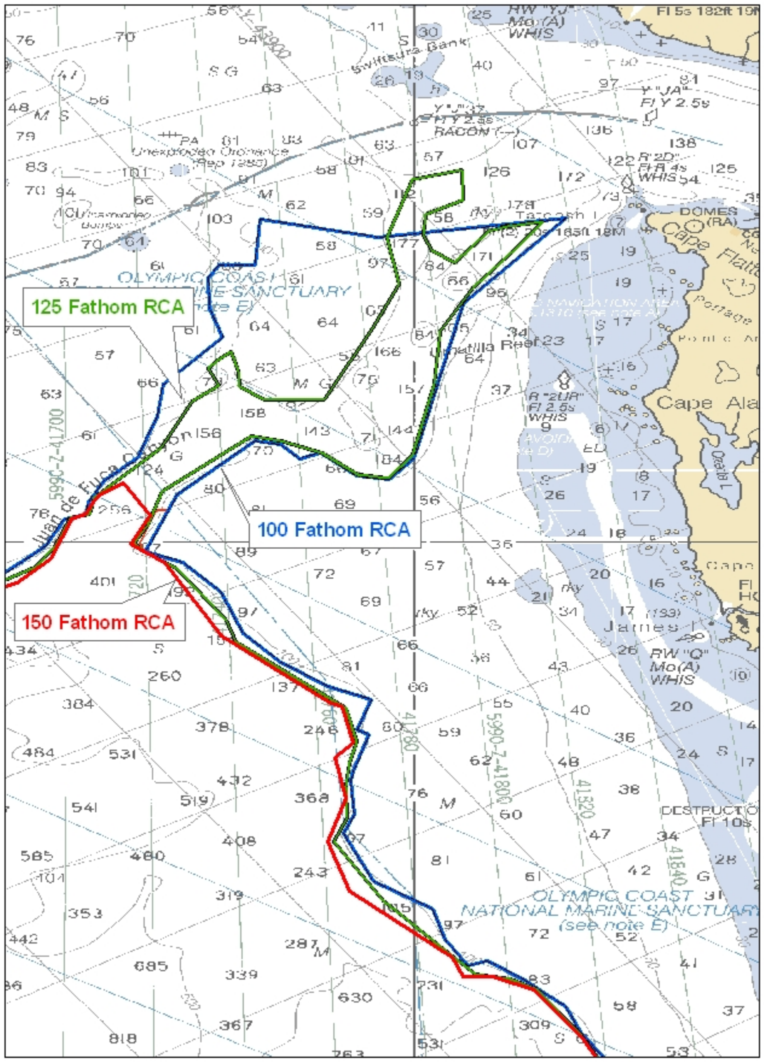


Figure 4-29. Rockfish Conservation Area boundaries off northern Washington approximating the 100, 125 and 150 fm contours.

Gear Switching

The GMT considered the possibility of differential management measures in the limited entry fixed gear fishery by vessels using pots or traps versus longline gears. The basis for this consideration was the significantly lower bycatch rates of demersal rockfish such as canary and yelloweye rockfish using pot gear. Observations of fixed gears north of 40°10’ N latitude in depths greater than 100 fm during 2002-06 showed that longline gears had a 0.066% discard ratio of yelloweye to retained sablefish, while pot gears had a 0.000% discard ratio (Table 4-26).[12] Other species, such as Pacific halibut and lingcod, had higher bycatch rates, but in all cases these rates were much lower than those observed using longline gear.

The GMT originally proposed the concept of gear switching due to lower rockfish bycatch rates relative to line gears. This proposal contemplated allowing longline-endorsed limited entry permit holders to switch gears from longlines to pots to take advantage of liberalized management measures (i.e., greater RCA access or higher cumulative landing limits). However, gear switching could only go one way since switching from pots to longlines would exacerbate rockfish bycatch concerns.

This idea generated some support and some condemnation from fishermen. Some supported the measure since there could be expanded areas open to fishing that have been closed since 2003. Others condemned the proposal for fear that more pot gear on a given piece of ground would cause gear conflicts with other fishermen. However, if more access to the RCA was allowed, this could help mitigate gear conflicts on the grounds. Some fishermen with pot-endorsed fixed gear permits also expressed concern that their permits would lose value under this proposal if longline-endorsed permit holders could switch gears to pots. These costs may or may not outweigh the potential benefits of greater RCA access and/or higher cumulative landing limits.

The GMT consulted with Enforcement Consultants to understand potential enforcement concerns with liberalizing the non-trawl RCA. Their initial input was this might be enforceable under the following conditions:

- fishermen should declare which gear they intend to fish before each trip,
- only one type of gear can be on board on any trip,
- no mixed strategy can be done on a trip (i.e., a fisherman cannot work a different gear previously set on a trip that is different than the declared gear for that trip),
- RCA boundaries should be specific management lines defined by coordinates in regulations, and
- if the two different gear types are deployed in a two-month cumulative limit period, then the lower cumulative limit should be specified for the entire period.

Another potential liberalization is higher cumulative landing limits for fishermen deploying pot gear. Lingcod are a valuable target species, are readily caught in pots, and currently under-utilized due to rockfish bycatch concerns. Higher limits could be considered for lingcod using pots given the low rockfish bycatch.

Mandatory Logbooks

There is no current Federal logbook requirement in any of the west coast groundfish fixed gear fisheries and the states vary in their requirements. Oregon has a mandatory requirement, Washington has a voluntary program, and California has no requirement but did do a pilot study to investigate the feasibility of a nearshore logbook. The purpose of the coastwide mandatory logbook program is to improve management and monitoring of the fixed gear groundfish fisheries by gathering information on the timing and location of fishing catch and effort. A mandatory program is necessary because participation in a voluntary program would likely not be high enough to produce information that is adequately representative of the fisheries.

[12] These observations did show a negligible observed yelloweye bycatch using pot gears of 7 lbs. of yelloweye for 1,548,261 lbs of retained sablefish, which compares to 1,741 lbs of yelloweye for 2,643,162 lbs of retained sablefish using longline gear (Table 4-23).

Logbook information has a number of uses for management. Logbooks have long been in place in the limited entry non-whiting trawl fishery and provide important information for the modeling of inseason management adjustments to trip limits and RCA boundaries and also for producing estimates of total catch. Logbooks could serve a similar role in the fixed gear fisheries and provide managers with new information they can use to craft and evaluate the effectiveness of gear-specific and finer scale time and area management measures. Such measures will become increasingly important in the west coast fixed gear groundfish fisheries because of the need to minimize bycatch of yelloweye rockfish and other rebuilding stocks.

Logbooks, if sufficiently reliable and collected over a number of years, can improve stock assessments by providing a time series of catch-per-unit-effort (CPUE) and information on the species composition of discards and landed catch. The WCGOP can also use logbooks to analyze potential differences between fishing locations of observed and unobserved trips (i.e., the “observer effect”) and to provide observers with an additional estimate of retained and discarded catch by set. Lastly, logbooks can also be designed to collect information not available from landings receipts (“fish tickets”), such as trip length and crew size, which can be used to analyze the economic impact of fishing regulations.

The GMT reviewed the west coast trawl logbook, Washington and Oregon fixed gear logbooks, the Oregon nearshore logbook, and Alaska federal fixed gear logbooks and identified an initial set of data elements to be further examined during design and implementation (Table 4-82).

Table 4-82. Data elements identified for a logbook proposed by the Groundfish Management Team for west coast fixed gear groundfish fisheries.

Category	Element	Description
Vessel and permit information	Captain's signature	Verification that information provided in the logbook is complete, accurate, and truthful.
	Crew size per trip	Number of crew, including captain, on each trip. Useful for economic data collection.
	Observer name	If observer is onboard, record the observer's name.
	Observer cruise number or unique identifier	If applicable, could be used to link observer data to logbook data.
	State document number	Used to link the logbook record to a state fish ticket.
	Federal limited entry permit number	The limited entry permit number for each permit used for each trip, if applicable.
	State nearshore limited entry permit number	The state limited entry permit number for each permit used for each trip, if applicable.
Sale information	Port of landing	The port name where the vessel landed; this may or may not be the same port where the fish are sold.
	Buyer	Name(s) of the company buying the fish from this trip.
	Delivery date	Date on the fish ticket.
	Fish ticket number	Record the state fish ticket identification number.
	Set numbers associated with fish ticket	The unique set numbers which were hauled during the trip.
Effort, space, time, data	Dimensions of gear	If longline is fished, print the average length in feet of longline gear fished (Example: 300ft). If pots, barrels, or buckets are fished, print the size of the pots, barrels, or buckets fished in feet (Example 5′ x 3′ x 4.5′).
	Escapement hole size	If pots, barrels, or buckets are fished, print the size in inches of the escapement hole/ring and the average number of holes/rings.
	Hook size and type	For hook and line gear, identify size and type of hook used.
	Pot/barrel/hook spacing	The number of feet that the pots, barrels, buckets, or hooks are placed apart.
	Bait	Identify bait used.
	String or set no.	Consecutive identifying number, used by the fisher to identify each particular string of pots, barrels, buckets, stings of hooks, etc.
	Number of pots or hooks per string	The number of pots, barrels, buckets, or hooks per string used in calculating catch-per-unit effort.
	Date of set and retrieval	Print the month and day the gear was set (Set) and retrieved (Up) in the box next to "Set" and "Up" (set and retrieve may be a different day).

Table 4-82. Data elements identified for a logbook proposed by the Groundfish Management Team for west coast fixed gear groundfish fisheries (continued).

Category	Element	Description
Effort, space, time, data	Time	Print the time of day the gear was set (Set) and retrieved (Up) for each set of gear. Use 24 hour clock.
	Depth (fathoms)	Print the bottom depth (in fathoms) where the gear is set for the start of the string (Start) and for the end of the string (End).
	Latitude & longitude or LORAN	Record both latitude and longitude in Degrees & Decimal Minutes or LORAN Channels & Microseconds where the gear was set for the start of the string (Start) and for the end of the string (End). Other methods (e.g., ODFW's block system) could be used for vessels without electronic navigation systems.
	Target species	Species that the set intended to target.
	Estimated weight of retained	The species name or code and estimated pounds retained.
	Estimated weight of discard	The species name or code and estimated pounds discarded.
	Reason for discard	Reason why fish was discarded. Reasons could include such categories as unmarketable, predation, sublegal size, etc.
Misc.	Marine Mammal/Seabird interactions	By set, document any marine mammal or seabird interactions.
	Comments	This space is provided for things of interest to the captain, such as weather, sea conditions, fish behavior, markets, etc.

The primary objective of the fixed gear logbook program should be to collect gear-appropriate information at the level of an individual set or haul. To accomplish this, the program will have to take into account the diversity of gears and strategies used in the fixed gear fisheries. The GMT identified potential complexities stemming from this diversity that should be explored during development of the program. For example, defining a longline set by space and time is relatively straightforward, considering that buoys are used to demarcate the start and end of the string. However, it is not as straightforward in the live fish fishery where rod and reel is the primary gear and jigging is commonly used. Calculating CPUE is also very different in these two fisheries. If these complexities cause significant challenges for standardized data elements and logbooks, separate logbooks by fishery or gear may be more appropriate.

Additionally, management of the nearshore fishery in Oregon and California is primarily implemented by the state under more conservative management measures than are in place in federal regulation. In Oregon a state nearshore logbook is used to inform this management and the current log includes elements that may not be useful in a federal logbook program (e.g., state management area). Additionally, the state logbook collects disposition information on the retained catch (i.e., alive, dead). These data elements would not be useful in other fixed gear fisheries, like sablefish and dogfish. Requiring the fleet to use both a federal and state logbook would be an unnecessary burden; yet care must be taken when incorporating both state and federal data elements in one log so that the log is not overly complex.

The appropriate format of the logbook should also be explored during design and implementation. Electronic logbooks are used in North Pacific fixed gear fisheries and are preferable for management because of their enhanced accuracy, speed, and data processing capabilities. The Pacific States Marine Fisheries Commission has developed an electronic logbook pilot project for the west coast trawl fishery that is currently being tested by a handful of vessels. If development of electronic logbooks is not feasible for 2009-10, the GMT recommended that the logbook program be designed to accommodate electronic logbooks in future cycles or even some limited use in 2009-10. However, paper logbooks will likely also need to be available even if the program is primarily electronic. Many vessels in the California and Oregon nearshore fisheries are small and some may not even be equipped with the requisite systems needed for an electronic logbook. In addition, California has an ethnically diverse fishing fleet where participants do not always speak English as their first language. Logbooks may need to be printed in multiple languages in order to successfully gather data for assessment and management from these participants.

Other logistical issues that that need to be worked out during the design and implementation include requirements for when logbooks need to be filled out and submitted. For the trawl logbook, these requirements are currently set forth in state law.

4.5.2.4 *Directed Open Access*

2009-2010 Area Restricion Alternatives

Fishing opportunities in the directed open access sector in 2009-10 will also be limited by the available yield of yelloweye rockfish. There are two fishing strategies in the directed open access sector that incidentally catch yelloweye – the offshore sablefish DTL fishery and the nearshore commercial fisheries off California and Oregon. Adjustments to the seaward non-trawl RCA affect yelloweye impacts in the DTL fishery and adjustments to the shoreward boundary affect yelloweye impacts in the nearshore fisheries. Alternatives for the 2009-10 open access DTL fishery are based on the same adjustments to the seaward boundary of the non-trawl RCA north of 40°10' N latitude as the limited entry fixed gear fishery (Table 2-35).

Alternatives for the nearshore commercial fisheries are ranged by alternatively adjusting either the shoreward boundary of the northern non-trawl RCA from the status quo 30 fm line to the 20 fm line or by progressive reduction of trip limits to avoid yelloweye (Table 2-36). Table 2-36 also provides the predicted landed catch amounts of target nearshore groundfish species and depleted groundfish species associated with each alternative. From that table, it is clear that extending the northern RCA shoreward to 20 fm provides far more benefits to the fishery than trip limit reductions for the same amount of yelloweye bycatch savings.

Trip limits are also reduced in concert with shoreward RCA extensions under the nearshore alternatives to achieve yelloweye bycatch impacts down to the minimal levels required under low yelloweye OYs and the 2005 catch sharing scenario. While the Council guidance to use the shares under the 2005 and 2007 bycatch scorecards is helpful for initial analysis of management measures, there are some caveats regarding the data informing those scorecards that apply directly to the open access sector. At the end of 2004 when the initial 2005 scorecard was developed, there were few WCGOP observations of the nearshore commercial fleets; therefore, the 2005 catch shares may not be representative of actual bycatch rates in the fishery. The yelloweye impacts for the directed open access sector, which are largely in the nearshore fisheries, are much lower in the 2005 scorecard than the 2007 scorecard. At the end of 2006 when the initial 2007 scorecard was developed, many more observations of the nearshore commercial fishery were available. Also, the 2005 scorecard shows some yelloweye impact in the limited entry whiting trawl fishery (0.4 mt), while the 2007 scorecard shows no yelloweye bycatch in the whiting fisheries. The GMT believes the latter situation is much more plausible for the whiting fishery given that whiting are targeted by midwater small footrope trawls that would be destroyed in the high relief habitats where yelloweye occur. For these reasons, the GMT believes the yelloweye catch shares in the 2007 scorecard for the open access sector are much more representative of actual conditions.

The GMT also examined a 20 fm shoreward RCA line adjustment between 40°10' N latitude and Cape Blanco while maintaining the status quo 30 fm shoreward RCA line north of Cape Blanco to the Columbia River. Since WCGOP observer data indicate 96.2% of the yelloweye impacts occur in the area between 40°10' N latitude and Cape Blanco (Table 4-83), the GMT concluded that maintaining the more liberal status quo RCA might be accommodated north of Cape Blanco without resulting in increased yelloweye impacts. However, they noted that there is sparse data to project impacts north of Cape Blanco.

Table 4-83. Overview of observed sets from the West Coast Groundfish Observer Program in commercial nearshore fisheries north of Pt. Conception by area during the period January 2003 to April 2007 and associated yelloweye rockfish bycatch.

Area	Number of Sets				Observed Yelloweye Catch			
	Observed Sets	% of Observed Coastwide Sets	Observed Sets with Yelloweye		Observed Catch (lb)	% of Observed Coastwide Catch	Rate per Retained Target Species	Area % by 3 Highest Vessels
			Number	% of Area				
Columbia River (46.27° N lat.) to Cascade Head, OR (44.9° N lat.)	197	12.1%	5	2.5%	18	1.7%	0.1%	86%
Cascade Head, OR to Cape Blanco, OR (43° N lat.)	17	1.0%		0.0%				
Cape Blanco, OR to OR/CA Border (42° N lat.)	558	34.2%	34	6.1%	**423**	**40.3%**	0.6%	50%
OR/CA Border to Cape Mendocino (40.16° N lat.)	347	21.2%	48	13.8%	**587**	**55.9%**	0.7%	80%
Cape Mendocino to Pt. Arena (38.95° N lat.)	62	3.8%	1	1.6%	10	0.9%	0.3%	100%
Pt. Arena to Pt. San Pedro (37.6° N lat.)	61	3.7%	4	6.6%	12	1.1%	0.2%	100%
Pt. San Pedro to Pt. Lopez (36° N lat.)	53	3.2%		0.0%			0.0%	100%
Pt. Lopez to Pt. Conception (34.45° N lat.)	338	20.7%		0.0%			0.0%	
North of Pt. Conception	1,633	100.0%	351	21.5%	1,049		0.5%	52%

The yelloweye impacts associated with the open access DTL and nearshore fisheries are compared against the yelloweye yields available to the entire sector under alternative catch shares and yelloweye OYs in Table 4-84. While this table compares the yelloweye impacts by alternative against the available yields in Table 2-9 independently for the DTL and nearshore fisheries, it is noted that the available yields in Table 2-9 are for the entire directed open access sector. Therefore, impacts from DTL and nearshore alternatives should be combined to determine whether alternatives for the entire sector stay within available yelloweye yields.

Table 4-84. The 2009-10 open access DTL and nearshore management alternatives predicted to meet yelloweye impacts (denoted "*") under alternative catch sharing scenarios and OYs.

Sector	Management Measure Alternative	Catch Sharing Scenario	Predicted Total Catch (mt)	Yelloweye OY Alternatives							
				OY Alt. 2		OY Alt. 3		OY Alt. 4		OY Alt. 5	
				2009 13 mt	2010 14 mt	2009 17 mt	2010 14 mt	2009 15 mt	2010 15 mt	2009 17 mt	2010 17 mt
Directed Open Access (DTL sablefish)	No Action	2005%	0.4	~~Fails~~	~~Fails~~	*	~~Fails~~	*	*	*	*
		2007%		*	*	*	*	*	*	*	*
	OA DTL Alt. 1	2005%	0.1	*	*	*	*	*	*	*	*
		2007%		*	*	*	*	*	*	*	*
	OA DTL Alt. 2	2005%	0.2	*	*	*	*	*	*	*	*
		2007%		*	*	*	*	*	*	*	*
	OA DTL Alt. 3	2005%	0.2	*	*	*	*	*	*	*	*
		2007%		*	*	*	*	*	*	*	*
	OA DTL Alt. 4	2005%	0.2	*	*	*	*	*	*	*	*
		2007%		*	*	*	*	*	*	*	*
	OA DTL Alt. 5	2005%	0.3	*	*	*	*	*	*	*	*
		2007%		*	*	*	*	*	*	*	*
	OA DTL Alt. 6	2005%	0.3	*	*	*	*	*	*	*	*
		2007%		*	*	*	*	*	*	*	*
Directed Open Access (OR, CA Nearshore)	No Action	2005%	1.3	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~
		2007%		*	*	*	*	*	*	*	*
	OA NS Alt. 1	2005%	0.5	~~Fails~~	~~Fails~~	*	~~Fails~~	~~Fails~~	~~Fails~~	*	*
		2007%		*	*	*	*	*	*	*	*
	OA NS Alt. 2	2005%	0.5	~~Fails~~	~~Fails~~	*	~~Fails~~	~~Fails~~	~~Fails~~	*	*
		2007%		*	*	*	*	*	*	*	*
	OA NS Alt. 3	2005%	0.5	~~Fails~~	~~Fails~~	*	~~Fails~~	~~Fails~~	~~Fails~~	*	*
		2007%		*	*	*	*	*	*	*	*
	OA NS Alt. 4	2005%	0.6	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~
		2007%		*	*	*	*	*	*	*	*
	OA NS Alt. 5	2005%	0.6	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~
		2007%		*	*	*	*	*	*	*	*
	OA NS Alt. 6	2005%	0.8	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~
		2007%		*	*	*	*	*	*	*	*

4.5.2.5 *Incidental Open Access*

Incidental Catch of Lingcod in the Salmon Troll Fishery

At the April 2008 meeting, the Council approved two options for public review that would allow retention of lingcod in the 2009-10 salmon troll fishery:

- Option 1: Allow the retention of 1 lingcod for every 15 Chinook salmon, plus one additional lingcod, not to exceed 10 lingcod per trip, up to a maximum limit of 400 lbs/month.
- Option 2: Allow the retention of 1 lingcod for every 20 Chinook salmon, plus one additional lingcod, not to exceed 10 lingcod per trip, up to a maximum limit of 400 lbs/month.

Both options would change current regulations to allow retention of lingcod caught inside the RCA. Neither option would permit retention of lingcod caught in Washington state waters. The number of lingcod that could be retained under both options at different levels of Chinook landed is displayed in Table 4-85.

Table 4-85. Number of lingcod allowed and Chinook-to-lingcod ratio based on Chinook landed in the salmon troll fishery under 2009-10 options for lingcod retention.

Chinook Caught on Trip	15	25	30	40	50	60	75	100	135	150	200
Option 1: 15-to-1, +1											
Lingcod allowance	2	2	3	3	4	5	6	7	10	10	10
Chinook per lingcod	7.5	10.0	10.0	13.3	12.5	12.0	12.5	14.3	13.5	15.0	20.0
Option 2: 20-to-1, +1											
Lingcod allowance	1	2	2	3	3	4	4	6	7	8	10
Chinook per lingcod	15.0	12.5	15.0	13.3	16.7	15.0	18.8	16.7	19.3	18.8	20

A similar retention allowance of 1 lingcod for every 10 Chinook was considered during the 2007-08 management measures process. The Council rejected that proposal out of concern that it might lead salmon trollers to target lingcod (PFMC 2006). Targeting is of concern because it would presumably increase bycatch of canary and yelloweye based on the known co-occurrence of the three species and the salmon troll fishery is not restricted to areas outside the RCA. No information would be available to quantify or monitor the magnitude of these presumed impacts because the salmon troll fleet is not covered by the WCGOP.

Some empirical information on the rate of lingcod bycatch in the salmon troll fishery is available from a WDFW study that deployed observers in the commercial salmon troll fleet off the Washington coast during the 2003, 2004 and 2005 fishing seasons. Observed effort represented approximately 4 percent of the total WA troll effort and landed Chinook over the three-year period of the study. The observed ratios of Chinook-to-lingcod were 24-to-1 in 2003, 14-to-1 in 2004, and 7-to-1 in 2005. The average ratio across all three years of the study was 12-to-1. Because lingcod retention was prohibited during the study, these observed ratios can be assumed to represent truly incidental catches of lingcod. However, the representativeness of the data to the entire coast and current conditions is questionable given the limited observer coverage, geographic area, and duration of the study.

The "plus 1" feature of Option 1 and Option 2 causes the effective Chinook-per-lingcod ratio of the two options to vary depending on the amount of Chinook caught (Table 4-85). A gap between this ratio and the "true" incidental Chinook per lingcod bycatch rate would create the potential for targeting. However, for this potential to occur, there would also need to be an economic incentive to target. Large revenues from retained lingcod combined with low costs of the extra fishing activity required to catch them would create a strong incentive. In contrast, small revenues and high costs of targeting would translate into a weak incentive.

The cost side of the equation cannot easily be evaluated. Targeting could involve additional travel and search time, yet it is also feasible that trollers could target lingcod at little or no additional cost.

Revenues, on the other hand, can be evaluated. Revenue available to trollers from a retention allowance would be foremost a function of the number of lingcod that could be retained with only non-incidental lingcod contributing to the incentive to target. Table 4-86 shows what the maximum non-incidental catch of lingcod would be for Option 1 and Option 2 under four alternative scenarios of the natural or "true" Chinook per lingcod bycatch ratio.

Catch per unit effort (CPUE) in the troll fishery was 21 Chinook per boat day fished in 2005, 10 Chinook per boat day in 2006, and 11 Chinook per boat day in 2007 (PFMC 2008a). A Chinook trip can last longer than a single day but landings of more than 50 Chinook have been rare under these recent CPUE levels. In Washington, the west coast state with the highest CPUE during the period, 95-99 percent of the landings consisted of less than 50 fish; and, the majority of landings consisted of less than 15 fish (Table 4-87). And in 2008, Washington and northern Oregon trollers are fishing under trip limits of 50 or 35 Chinook. If these regulations or CPUE levels continue in 2009-10, then the most non-incidental lingcod expected on a Chinook trip would be four fish under Option 1 or three fish under Option 2. Under the WDFW observed average ratio, the majority of landings would result in one non-incidental lingcod under Option 1 and zero under Option 2.

Table 4-86. Estimated non-incidental catch ("+") and regulatory discard ("-") of lingcod for Option 1 and Option 2 under four scenarios of the "true" Chinook-to-lingcod bycatch rate.

Chinook caught on Trip	15	25	30	40	50	60	75	100	135	150	200
Zero incidental catch											
Lingcod encountered	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Option 1	+2	+2	+3	+3	+4	+5	+6	+7	+10	+10	+10
Option 2	+1	+2	+2	+3	+3	+4	+4	+6	+7	+8	+10
12-to-1 incidental catch (WDFW observed average)											
Lingcod encountered	*1*	*2*	*2*	*3*	*4*	*5*	*6*	*8*	*11*	*12*	*16*
Option 1	+1	0	+1	0	0	0	0	-1	-1	-2	-6
Option 2	0	0	0	0	-1	-1	-2	-2	-4	-4	-6
30-to-1 incidental catch (low natural bycatch)											
Lingcod encountered	*0*	*0*	*1*	*1*	*1*	*2*	*2*	*3*	*4*	*5*	*6*
Option 1	+2	+2	+2	+2	+3	+3	+4	+4	+6	+5	+4
Option 2	+1	+2	+1	+2	+2	+2	+2	+3	+3	+3	+4
7-to-1 incidental catch (high natural bycatch)											
Lingcod encountered	*2*	*3*	*4*	*5*	*7*	*8*	*10*	*14*	*19*	*21*	*28*
Option 1	0	-1	-1	-2	-3	-3	-4	-7	-9	-11	-18
Option 2	-1	-1	-2	-2	-4	-4	-6	-8	-12	-13	-18

Table 4-87. Chinook salmon landing frequency statistics from 2005-07 salmon troll fisheries in Washington, Oregon, and California.

Chinook Landed	2005			2006			2007		
	Number of Landings	Percent of Landings	Cumulative Percent	Number of Landings	Percent of Landings	Cumulative Percent	Number of Landings	Percent of Landings	Cumulative Percent
Washington Salmon Troll Fisheries									
15	1,490	65.5%	65.5%	1,504	82.3%	82.3%	1,476	83.0%	83.0%
30	425	54.2%	84.2%	244	75.5%	95.7%	237	78.5%	96.3%
50	241	30.7%	94.8%	63	19.5%	99.1%	61	20.2%	99.8%
75	71	9.1%	97.9%	6	1.9%	99.5%	4	1.3%	100.0%
100	46	5.9%	100.0%	8	2.5%	99.9%	0	0.0%	100.0%
>100	1	0.1%	100.0%	2	0.6%	100.0%	0	0.0%	100.0%
Total	784			323			302		
Oregon Salmon Troll Fisheries									
15	8,622	72.8%	72.8%	3,833	84.9%	84.9%	4,494	88.9%	88.9%
30	1,481	46.0%	85.3%	473	69.4%	95.4%	398	71.2%	96.8%
50	821	25.5%	92.2%	179	26.2%	99.3%	106	19.0%	98.9%
75	435	13.5%	95.9%	28	4.1%	100.0%	37	6.6%	99.6%
100	217	6.7%	97.7%	2	0.3%	100.0%	12	2.1%	99.9%
>100	268	8.3%	100.0%	0	0.0%	100.0%	6	1.1%	100.0%
Total	3,222			682			559		
California Salmon Troll Fisheries									
15	4,064	48.3%	48.0%	2,827	64.5%	64.0%	3,179	58.6%	59.0%
30	1,426	17.0%	65.0%	837	19.1%	84.0%	987	18.2%	77.0%
50	882	10.5%	76.0%	437	10.0%	94.0%	656	12.1%	89.0%
75	627	7.5%	83.0%	198	4.5%	98.0%	332	6.1%	95.0%
100	442	5.3%	89.0%	83	1.9%	100.0%	148	2.7%	98.0%
>100	966	11.5%	100.0%	3	0.1%	100.0%	126	2.3%	100.0%
Total	8,407			4,385			5,428		

The average price paid per fish is the second major factor to consider in evaluating possible revenues. According to PacFIN 2005-2007 landings data, the price of troll and other hook and line caught lingcod on the west coast ranged from $0.40 per pound to $3.08 per lb with an average of $1.24 per lb. The best available information on the average size of lingcod comes from the 2004 NMFS Trawl Survey where males averaged 48.9 cm in length and females 51 cm (Keller et al. 2007). Using the length-weight conversion from the latest stock assessment (Jagielo and Wallace 2006), these lengths correspond to average weights of 2.4 lbs for males and 2.6 lbs for females. However, lingcod encountered in the salmon troll fishery in 2009-10 would likely be larger because of growth in the population since 2004. Table 4-88 displays potential revenue that could be earned from a single lingcod based on a range of fish weights and exvessel prices.

Table 4-88. Potential revenue earned per lingcod under various possible average weights and exvessel prices.

Avg. Price/lb Weight	$0.80	$1.30	$1.60	$1.80	$2.25
2.5 lb	$2.00	$3.25	$4.00	$4.50	$5.63
5.0 lb	$4.00	$6.50	$8.00	$9.00	$11.25
8.0 lb	$6.40	$10.40	$12.80	$14.40	$18.00
10.0 lb	$8.00	$13.00	$16.00	$18.00	$22.50
12.0 lb	$9.60	$15.60	$19.20	$21.60	$27.00
15.0 lb	$12.00	$19.50	$24.00	$27.00	$33.75

Applying the per lingcod revenues from Table 4-88 to the estimates of non-incidental catch in Table 4-86 establishes some bounds on what the overall economic incentives to target could be Option 1 and Option 2. For example, if the Option 2 retention allowance were adopted and 95-99 percent of salmon troll trips continued to land less than 50 Chinook, then revenues available from targeting would be between $0 and $101.25 (three, 15 lb lingcod at $2.25 per lb).

Given the decision to target lingcod occurs on a trip-by-trip basis, the 400 lb monthly lingcod limit included in Option 1 and Option 2 would not have much influence on the incentive to target unless a troller was near enough to the limit that it affected how many lingcod could be retained on a trip. At an average weight of 15 lb, it would take 27 lingcod to exceed the 400 lb limit. And with a landing of 50 Chinook or less, the highest number of lingcod a troller could retain is four. Under such circumstances, the 400 lb limit might affect the incentive to target if a troller makes more than six trips in a month.

Table 4-87 shows that the majority of west coast landings consist of less than 15 Chinook and over 90% consist of less than 50. Chinook abundance has been relatively low over this time period; however, if similar patterns held in 2009-10, then the “zero incidental catch” scenario in Table 4-86 shows that no more than 4 lingcod would be available for targeting on 90% of salmon troll trips. Under a bycatch rate of 1 lingcod for every 12 Chinook, no more than 1 lingcod would be available to target and land.

This lingcod retention allowance may pose a greater risk in the California salmon troll fishery than in Washington or Oregon. State landing receipts indicate that the amount of lingcod landed with salmon is extremely low, which could be indicative of a low bycatch rate. If so, the proposed ratio of lingcod retention may be too large for California and could induce targeting. In addition, the most recent lingcod stock assessment indicated that the southern portion of the stock (south of 43° N latitude) has a much lower depletion level than in the north. As such, precautionary management measures are in place to protect the southern stock and allowing increased incidental take of lingcod could have the unintended consequence of overfishing the southern lingcod stock. The risk posed by the retention analysis may also be greater for California because both the total number of Chinook landings and the number of large landings of Chinook (50 or more) were greater on average than in Washington or Oregon during 2005-07.

4.5.2.6 *Tribal*

The overfished species impacts associated with the proposed 2009-10 tribal management measures are provided in Table 2-5.

4.5.2.7 *Washington Recreational*

The WDFW is proposing to allow incidental groundfish retention caught in deeper waters in Marine Areas 3 and 4 on days when Pacific halibut fishing is allowed. The regulation is due to the habitats where halibut are caught off the north Washington coast and the distribution of rockfish and lingcod there. The distribution of rockfish on the Washington coast is directly linked to the bottom topography. The northern coast is characterized by high relief rocky habitat with many offshore rocks, pinnacles and canyons. The rocky habitat transitions through rock/cobble bottom to a sandy/muddy flat bottom as you move south toward the Columbia River. Lingcod tend to inhabit the same areas as halibut off the north coast, which often results in their incidental catch when anglers are targeting halibut. Off the central and southern coast, halibut can be found on flat, sandy bottom offshore, whereas lingcod tend to occur in rocky areas closer to shore. Anglers fishing the south coast will typically target halibut in one area, and then change their location to target lingcod. Regulations are in place in Marine Areas 1 and 2 (along Washington’s southern coast) that prohibit the retention of lingcod and rockfish during halibut trips. These rules are intended to discourage targeting of lingcod offshore where yelloweye rockfish may occur. However, as noted above, because lingcod and yelloweye are commonly encountered while targeting halibut in the northern area, such regulations would likely not accomplish the same result.

The predicted total catches of canary and yelloweye rockfish by 2009-10 alternative Washington recreational management measures are shown in Table 4-89.

Table 4-89. Predicted total catches (mt) of canary and yelloweye rockfish by 2009-10 alternative management measures for the Washington recreational fishery.

2009-10 Washington Recreational Alternatives	Marine Area	Predicted Total Catches (mt)	
		Canary	Yelloweye
No Action Alt.	3 & 4 (N. Coast)	0.97	2.25
	2 (S. Coast)	0.05	0.23
	1 (Col. River)	0.01	0.02
	Total	1.0	2.5
WA Rec. Alt. 1	3 & 4 (N. Coast)	0.59	1.51
	2 (S. Coast)	0.04	0.20
	1 (Col. River)	0.01	0.02
	Total	0.6	1.7
WA Rec. Alt. 2	3 & 4 (N. Coast)	0.63	1.54
	2 (S. Coast)	0.04	0.21
	1 (Col. River)	0.01	0.02
	Total	0.7	1.8
WA Rec. Alt. 3	3 & 4 (N. Coast)	0.70	1.70
	2 (S. Coast)	0.04	0.21
	1 (Col. River)	0.01	0.02
	Total	0.7	1.9

The yelloweye impacts associated with the alternative Washington recreational management measures are compared against the available yelloweye yields under alternative catch shares and yelloweye OYs in Table 4-90. The No Action Alternative exceeds the available yelloweye yield under OYs less than 17 mt and Washington Recreational Alternatives 2 and 3 under the 2005 catch sharing scenario exceed the available yelloweye yields under the 13 mt yelloweye OY.

Table 4-90. The 2009-10 Washington recreational management alternatives predicted to meet yelloweye impacts (denoted "*") under alternative catch sharing scenarios and OYs.

Sector	Management Measure Alternative	Catch Sharing Scenario	Predicted Total Catch (mt)	Yelloweye OY Alternatives							
				OY Alt. 2		OY Alt. 3		OY Alt. 4		OY Alt. 5	
				2009 13 mt	2010 14 mt	2009 17 mt	2010 14 mt	2009 15 mt	2010 15 mt	2009 17 mt	2010 17 mt
Washington Recreational	No Action		2.5	~~Fails~~	~~Fails~~	*	~~Fails~~	~~Fails~~	~~Fails~~	*	*
	WA Rec. Alt. 1	2005%	1.7	*	*	*	*	*	*	*	*
		2007%		*	*	*	*	*	*	*	*
	WA Rec. Alt. 2	2005%	1.8	~~Fails~~	*	*	*	*	*	*	*
		2007%		*	*	*	*	*	*	*	*
	WA Rec. Alt. 3	2005%	1.9	~~Fails~~	*	*	*	*	*	*	*
		2007%		~~Fails~~	*	*	*	*	*	*	*

4.5.2.8 *Oregon Recreational*

Management measures proposed under the action alternatives and the Council-preferred Alternative serve to constrain the Oregon recreational fishery due primarily to yelloweye rockfish impacts that are lower than those allowed in 2007-08 (3.3 mt) under the "ramp down" management approach (Table 4-91). These measures also restrict the catch of target species. For example, due to the extensive offshore closures the opportunity to target yellowtail rockfish, considered abundant and healthy, is restricted. The predicted total catches of important groundfish species by 2009-10 alternative Oregon recreational management measures are shown in Table 4-91.

Table 4-91. Predicted total catches (mt) of important groundfish species by 2009-10 alternative management measures for the Oregon recreational fishery.

Category	Species	2009-10 Oregon Recreational Alternatives							
		No Action Alt.	OR Rec. Alt 1	OR Rec. Alt 2	OR Rec. Alt 3	OR Rec. Alt 4	OR Rec. Alt 5	OR Rec. Alt 6	OR Rec. Preferred
Depleted Species	Canary	2.3	1.7	2.0	2.2	2.3	2.6	2.5	2.3
	Yelloweye	2.2	1.6	1.8	2.0	2.2	2.5	2.5	2.2
Other Nearshore Rockfish Complex (ONSR)	Blue	28.8	24.5	33.4	33.4	28.8	21.7	22.2	32.9
	Brown	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	China	3.3	3.3	3.8	3.8	3.3	2.5	2.5	3.8
	Copper	6.5	6.3	7.2	7.2	6.5	5.3	5.3	7.2
	Grass	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.3
	Quillback	5.6	5.6	6.5	6.5	5.6	4.1	4.2	6.4
	Total ONSR	45.7	41.2	52.4	52.4	45.7	35.1	35.7	51.7
Target Species	Black	371.8	356.5	430.1	430.1	371.8	278.5	283.6	426.6
	Lingcod	119.1	104.8	119.1	119.1	119.1	119.1	119.1	134.1
	Kelp Greenling	19.7	19.5	20.4	20.4	19.7	18.5	18.6	20.1
	Cabezon	29.8	28.3	34.4	34.4	29.8	22.7	23.0	33.7
Bag Limits	Marine Daily Bag	8	10	10	10	8	6	6	10
	Lingcod Daily Bag	2	3	2	2	2	2	2	3

The yelloweye impacts associated with the alternative Oregon recreational management measures are compared against the available yelloweye yields under alternative catch shares and yelloweye OYs in Table 4-92.

Table 4-92. The 2009-10 Oregon recreational management alternatives predicted to meet yelloweye impacts (denoted "*") under alternative catch sharing scenarios and OYs.

Sector	Management Measure Alternative	Catch Sharing Scenario	Predicted Total Catch (mt)	Yelloweye OY Alternatives							
				OY Alt. 2		OY Alt. 3		OY Alt. 4		OY Alt. 5	
				2009 13 mt	2010 14 mt	2009 17 mt	2010 14 mt	2009 15 mt	2010 15 mt	2009 17 mt	2010 17 mt
Oregon Recreational	No Action		2.2	Fails	Fails	*	Fails	Fails	Fails	*	*
	OR Rec. Alt. 1	2005%	1.6	*	*	*	*	*	*	*	*
		2007%		*	*	*	*	*	*	*	*
	OR Rec. Alt. 2	2005%	1.8	Fails	*	*	*	*	*	*	*
		2007%		Fails	*	*	*	*	*	*	*
	OR Rec. Alt. 3	2005%	2.0	Fails	Fails	*	Fails	*	*	*	*
		2007%		Fails	Fails	*	Fails	*	*	*	*
	OR Rec. Alt. 4	2005%	2.2	Fails	Fails	*	Fails	Fails	Fails	*	*
		2007%		Fails	Fails	*	Fails	*	*	*	*
	OR Rec. Alt. 5	2005%	2.5	Fails	Fails	*	Fails	Fails	Fails	*	*
		2007%		Fails	Fails	*	Fails	Fails	Fails	*	*
	OR Rec. Alt. 6	2005%	2.5	Fails	Fails	*	Fails	Fails	Fails	*	*
		2007%		Fails	Fails	*	Fails	Fails	Fails	*	*

4.5.2.9 *California Recreational*

The 2008 California recreational groundfish season is shown in Figure 2-13. The predicted total catches of important groundfish species by 2009-10 alternative California recreational management measures are shown in Table 4-93.

The yelloweye impacts associated with the alternative California recreational management measures are compared against the available yelloweye yields under alternative catch shares and yelloweye OYs in Table 4-94.

Table 4-93. Predicted total catch (mt) of important groundfish species by alternative 2009-10 management measures for the California recreational fishery.

Species	Mgt. Area	2009-10 California Recreational Alternatives					
		CA Rec. Alt 1	CA Rec. Alt 2	CA Rec. Alt 3	CA Rec. Alt 4	CA Rec. Alt 5	CA Rec. Alt 6
Canary	N	0.1	0.3	0.5	0.5	0.6	0.5
	NCN	0.0	0.1	0.3	0.3	0.4	0.9
	NCS	2.4	3.8	3.8	3.8	3.8	3.8
	SC - Mont	1.4	1.5	1.4	1.4	1.4	1.5
	SC - Morro	0.7	0.8	0.7	0.7	0.7	0.8
	S	0.3	0.3	0.3	0.3	0.3	0.3
	Total	4.9	6.8	7.0	7.0	7.2	7.8
Yelloweye	N	0.1	0.4	0.6	0.7	0.8	0.7
	NCN	0.1	0.2	0.4	0.4	0.6	1.4
	NCS	0.3	0.5	0.5	0.5	0.5	0.5
	SC - Mont	0.0	0.0	0.0	0.0	0.0	0.0
	SC - Morro	0.0	0.0	0.0	0.0	0.0	0.0
	S	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.5	1.1	1.5	1.6	1.9	2.6
Black	N	16.2	52.5	58.9	74.3	80.4	74.3
	NCN	1.6	3.1	5.3	5.3	7.5	11.9
	NCS	27.6	31.2	31.2	31.2	31.2	31.2
	SC - Mont	6.2	6.5	6.2	6.2	6.2	6.5
	SC - Morro	2.8	2.9	2.8	2.8	2.8	2.9
	S	0.0	0.0	0.0	0.0	0.0	0.0
	Total	54.4	96.2	104.4	119.8	128.1	126.8
Blue	N	0.9	3.1	3.5	4.4	5.3	4.4
	NCN	0.9	1.7	3.0	3.0	4.2	6.7
	NCS	48.8	72.2	72.2	72.2	72.2	72.2
	SC - Mont	17.8	20.0	17.8	17.8	17.8	20.0
	SC - Morro	48.2	54.1	48.2	48.2	48.2	54.1
	S	11.3	11.4	11.4	11.4	11.4	11.4
	Total	127.9	162.5	156.1	157.0	159.1	168.8
Bocaccio	N	-	-	-	-	-	-
	NCN	0.0	0.0	0.0	0.0	0.0	0.1
	NCS	2.0	3.1	3.1	3.1	3.1	3.1
	SC - Mont	2.9	3.0	2.9	2.9	2.9	3.0
	SC - Morro	3.4	3.5	3.4	3.4	3.4	3.5
	S	34.5	39.9	39.9	39.9	39.9	39.9
	Total	42.8	49.5	49.3	49.3	49.3	49.6
Cabezon	N	1.3	2.3	2.7	3.3	3.7	3.3
	NCN	0.7	0.7	1.3	1.3	1.9	3.0
	NCS	4.7	5.4	5.4	5.4	5.4	5.4
	SC - Mont	0.7	0.8	0.7	0.7	0.7	0.8
	SC - Morro	1.7	2.0	1.7	1.7	1.7	2.0
	S	7.6	7.6	7.6	7.6	7.6	7.6
	Total	16.7	18.8	19.4	20.0	21.0	22.1

Table 4-93. Predicted total catch (mt) of important groundfish species by alternative 2009-10 management measures for the California recreational fishery (continued).

Species	Mgt. Area	2009-10 California Recreational Alternatives					
		CA Rec. Alt 1	CA Rec. Alt 2	CA Rec. Alt 3	CA Rec. Alt 4	CA Rec. Alt 5	CA Rec. Alt 6
Cowcod	N	-	-	-	-	-	-
	NCN	0.0	0.0	0.0	0.0	0.0	0.0
	NCS	0.0	0.0	0.0	0.0	0.0	0.0
	SC - Mont	0.0	0.0	0.0	0.0	0.0	0.0
	SC - Morro	0.0	0.0	0.0	0.0	0.0	0.0
	S	0.1	0.1	0.1	0.1	0.1	0.1
	Total	0.1	0.1	0.1	0.1	0.1	0.1
Widow	N	0.0	0.0	0.0	0.0	0.0	0.0
	NCN	0.0	0.0	0.0	0.0	0.0	0.0
	NCS	0.3	0.7	0.7	0.7	0.7	0.7
	SC - Mont	2.3	2.5	2.3	2.3	2.3	2.5
	SC - Morro	0.0	0.0	0.0	0.0	0.0	0.0
	S	1.1	2.8	2.8	2.8	2.8	2.8
	Total	3.7	6.0	5.8	5.8	5.8	6.0
Shallow NS	N	-	-	-	-	-	-
	NCN	0.5	0.9	1.5	1.5	2.1	3.3
	NCS	14.2	20.4	20.4	20.4	20.4	20.4
	SC - Mont	8.8	9.5	8.8	8.8	8.8	9.5
	SC - Morro	14.2	15.3	14.2	14.2	14.2	15.3
	S	8.5	8.6	8.6	8.6	8.6	8.6
	Total	46.2	54.7	53.5	53.5	54.1	57.1
Deeper NS	N	-	-	-	-	-	-
	NCN	2.0	3.9	6.8	6.8	9.7	15.5
	NCS	97.1	145.4	145.4	145.4	145.4	145.4
	SC - Mont	40.2	44.6	40.2	40.2	40.2	44.6
	SC - Morro	72.9	80.8	72.9	72.9	72.9	80.8
	S	53.1	53.4	53.4	53.4	53.4	53.4
	Total	265.3	328.1	318.7	318.7	321.6	339.7
Other Minor North Rockfish	N	1.2	8.3	9.4	11.8	14.1	9.4
	NCN	-	-	-	-	-	-
	NCS	-	-	-	-	-	-
	SC - Mont	-	-	-	-	-	-
	SC - Morro	-	-	-	-	-	-
	S	-	-	-	-	-	-
	Total	1.2	8.3	9.4	11.8	14.1	9.4
CA Scorpionfish	N	-	-	-	-	-	-
	NCN	0.0	0.0	0.0	0.0	0.0	0.0
	NCS	0.0	0.0	0.0	0.0	0.0	0.0
	SC - Mont	0.0	0.0	0.0	0.0	0.0	0.0
	SC - Morro	0.0	0.0	0.0	0.0	0.0	0.0
	S	43.4	43.5	43.5	43.5	43.5	43.5
	Total	43.4	43.5	43.5	43.5	43.5	43.5

Table 4-93. Predicted total catch (mt) of important groundfish species by alternative 2009-10 management measures for the California recreational fishery (continued).

Species	Mgt. Area	2009-10 California Recreational Alternatives					
		CA Rec. Alt 1	CA Rec. Alt 2	CA Rec. Alt 3	CA Rec. Alt 4	CA Rec. Alt 5	CA Rec. Alt 6
Greenlings	N	0.3	0.5	0.6	0.7	0.8	0.7
	NCN	0.6	0.6	0.9	0.9	1.3	2.0
	NCS	1.5	2.1	2.1	2.1	2.1	2.1
	SC - Mont	0.4	0.4	0.4	0.4	0.4	0.4
	SC - Morro	0.1	0.1	0.1	0.1	0.1	0.1
	S	0.0	0.0	0.0	0.0	0.0	0.0
	Total	2.9	3.7	4.1	4.2	4.7	5.3
Lingcod	N	10.9	20.4	24.4	29.9	34.9	29.9
	NCN	3.8	3.8	7.1	7.1	7.1	16.9
	NCS	57.3	80.4	80.4	80.4	80.4	80.4
	SC - Mont	8.2	9.1	8.2	8.2	8.2	9.1
	SC - Morro	22.4	24.7	22.4	22.4	22.4	24.7
	S	33.8	34.8	34.8	34.8	34.8	34.8
	Total	136.4	173.2	177.3	182.8	187.8	195.8

Table 4-94. The 2009-10 California recreational management alternatives predicted to meet yelloweye impacts (denoted "*") under alternative catch sharing scenarios and OYs.

Sector	Management Measure Alternative	Catch Sharing Scenario	Predicted Total Catch (mt)	Yelloweye OY Alternatives							
				OY Alt. 2		OY Alt. 3		OY Alt. 4		OY Alt. 5	
				2009 13 mt	2010 14 mt	2009 17 mt	2010 14 mt	2009 15 mt	2010 15 mt	2009 17 mt	2010 17 mt
California Recreational	No Action	2005%	4.1	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~
		2007%		~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~
	CA Rec. Alt. 1	2005%	0.5	*	*	*	*	*	*	*	*
		2007%		*	*	*	*	*	*	*	*
	CA Rec. Alt. 2	2005%	1.1	*	*	*	*	*	*	*	*
		2007%		~~*~~	*	*	*	*	*	*	*
	CA Rec. Alt. 3	2005%	1.5	*	*	*	*	*	*	*	*
		2007%		~~Fails~~	~~Fails~~	*	~~Fails~~	~~Fails~~	~~Fails~~	*	*
	CA Rec. Alt. 4	2005%	1.6	*	*	*	*	*	*	*	*
		2007%		~~Fails~~	~~Fails~~	*	~~Fails~~	~~Fails~~	~~Fails~~	*	*
	CA Rec. Alt. 5	2005%	1.9	~~*~~	*	*	*	*	*	*	*
		2007%		~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~
	CA Rec. Alt. 6	2005%	2.6	~~Fails~~	~~Fails~~	*	~~Fails~~	~~Fails~~	~~Fails~~	*	*
		2007%		~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~	~~Fails~~

4.5.3 Discussion of the Council-Preferred Alternative

4.5.3.1 *Limited Entry Non-Whiting Trawl*

The Council-preferred alternative management measures for the 2009-10 limited entry non-whiting trawl fishery are provided in Table 2-40a and the associated impacts projected for target and depleted species are provided in Table 2-40b. The fishery will be largely constrained by yelloweye and darkblotched in the north and cowcod in the south.

The Council recommends extending the time period that the petrale sole areas are in effect by one month to occur during January through March to avoid a petrale sole market glut. This measure was compelled by testimony from trawl fishermen and processors who claimed that the bad weather in January and February in the north limited the days that petrale could be targeted and landed, resulting in a few days during those months that petrale are landed. When a valuable target species like petrale are landed in volume during a short period of time, the fresh markets are often saturated, which leads to lower retail and exvessel prices. Also many fishermen testified that petrale sole are still aggregated in these petrale fishing areas in March, when the weather can be calmer. This measure should add economic value to the fishery without resulting in significant bycatch.

The Council considered, but rejected the proposal to allow only one bottom trawl gear on board north of 40°10' N latitude. The GMT recommended reconsideration of this measure in the future when the potential costs and benefits of this regulation can be better explored. Trawl fishermen testified that fishermen do not deploy large footrope gear shoreward of the RCA and the Council is not aware of any enforcement actions that would challenge this.

4.5.3.2 *Limited Entry Whiting Trawl*

The Council-preferred alternative recommends NMFS close any non-tribal sector of the whiting fishery upon projection of a total catch bycatch limit. Current practice is to close the fishery once a bycatch limit is attained. This practice guarantees exceeding the bycatch limit since NMFS has to give advance notice before closing the fishery. Once notice is given, there is a race to get as much of the whiting allocation as possible before the fishery closes, which can exacerbate bycatch. While it is difficult to accurately project attainment of a bycatch limit given the sporadic and largely unpredictable disaster tows that lead to significant bycatch, this measure will certainly reduce bycatch which is a Magnuson-Stevens Act mandate.

The Council's preferred alternative is to specify sector-specific bycatch limits for the three non-tribal sectors of the whiting fishery. As explained above, this measure will allow each sector to plan their fishing strategies to their best advantage without feeling compelled to race to attain their whiting allocation before a shared bycatch limit is attained and the fishery closes. The Council chose to apportion the sector-specific bycatch limits according to the pro-rata distribution of the whiting allocation. While there may be some inequities associated with this method of apportionment (i.e., some sectors may receive a higher or lower bycatch limit than they need to attain their whiting allocation), no one method for apportioning these limits meets every need. Further, representatives of each sector of the whiting industry recommended this measure to the Council in June 2008 with no dissension as their preferred alternative, which made that decision easier for the Council. The recommendation to rollover any unused bycatch limit yields to the remaining sectors of the whiting fishery that are still fishing once a whiting allocation or a bycatch limit is attained using the same pro-rata distribution may mitigate difficulties for sectors to manage their fishery with their own smaller bycatch limits. This may also result in strategies to fish later in the season when whiting are larger, more marketable, and more aggregated for those sectors that can flexibly change their fishing strategies accordingly. Those observations of late season whiting fishing efforts, albeit limited, have shown less of a bycatch rate of rockfish species of concern, as well as Chinook salmon.

The Council-preferred alternative also recommends depth-based management of individual non-tribal sectors of the whiting fishery if a bycatch limit is attained inseason prior to attainment of the sector's whiting quota. This measure gives NMFS automatic authority to restrict the depths that the affected sector or sectors can fish to seaward of any of the prescribed RCA management lines between the 75 fm line and the 150 fm line. This measure mitigates the negative impacts associated with prematurely closing a sector of the whiting fishery upon attainment of a bycatch limit. The Council-preferred alternative also maintains NMFS authority to implement the Ocean Salmon Conservation Zone, which would restrict the fishery to depths seaward of the 100 fm line if needed to reduce Chinook impacts inseason.

The Council-preferred alternative recommends 100% monitoring of all whiting catcher vessels that fish in the RCA. Amendment 10 regulations are anticipated to require 100% electronic monitoring for all catcher vessels in the shoreside sector and catcher-processors already are required to have 100% observer coverage. While motherships are also required to carry observers (2) 100% of the time, catcher vessels delivering to motherships would not otherwise be subject to a 100% monitoring requirement.[13] The concern was that wholesale discarding at sea by opening codends could occur by catcher vessels in the mothership sector if a high bycatch of a limiting species like canary, darkblotched, or widow were to occur. The Council's preferred alternative obviates that concern. Further, the Council recommended a more stringent maximized retention regulation that would apply to all whiting vessels and not just the shoreside whiting vessels that are the subject of Amendment 10 regulations.

Concern about unobserved shoreside whiting vessels that sort their catch at sea was also addressed in the Council's preferred alternative with the recommended requirement that there be 100% observer coverage for all such fishing strategies, with the cost of this observer coverage borne by the vessel owner. While few vessels are currently engaging in this practice, the potential increases with the increasing value of whiting in the world market. And, with the small bycatch limits for canary, darkblotched, and widow, all discards need to be fully accounted to effectively manage with bycatch limits and thereby minimize bycatch.

Some fishermen are discovering niche markets for whiting that command higher exvessel revenues with some added processing and preparation of catch at sea. The Council's recommended exemption from the at-sea processing rules for small shoreside whiting vessels (≤ 75 ft in length) that allows tailing and freezing of whiting at sea (heading and gutting are already allowed) encourages fishermen ingenuity and allows for a value added product to be landed. If the exvessel revenues associated with this practice are high enough, the added overhead cost of funding observers may be reasonably absorbed by fishermen who opt to sort and process their whiting at sea.

4.5.3.3 *Limited Entry Fixed Gear*

The Council's preferred alternative for all the commercial fixed gear (and recreational) fisheries was driven by the need to reduce yelloweye bycatch under the harvest rate ramp-down rebuilding strategy. This is the first biennial management cycle when enough WCGOP data have been available to consider finer tuned RCA management approaches than varying the seaward non-trawl RCA boundary only for

[13] Amendment 10 monitoring requirements are anticipated to only apply to shoreside whiting vessels. If they could apply to at-sea whiting vessels as well, it is likely the biennial management measures that are part of this proposed action will be implemented sooner than Amendment 10 regulations.

areas north and south of 40°10' N latitude. With the ability to adjust the RCA in four subareas north of 40°10' N latitude, there is much more flexibility to fashion fishing opportunities for the fixed gear fleets under stringent yelloweye OYs. Areas with observed higher yelloweye bycatch rates (i.e., between Cape Blanco and Cascade Head or north of Pt. Chehalis) can now have more conservative RCA configurations to reduce yelloweye bycatch. Otherwise, the bycatch savings needed would require moving the entire RCA seaward in all areas north of 40°10' N latitude, which would close off areas that do not have significant concentrations of yelloweye and could cause a significant diminishment in the ability of these fleets to target sablefish, Pacific halibut and other deeper water species. In this era of higher fuel prices, more of the fleet would have to travel farther and absorb more of a fuel bill to target these species, which would make the fishery less profitable.

Of the two northern subareas identified as having a higher observed yelloweye bycatch rate, the Council chose to move the seaward boundary to deeper waters to avoid yelloweye in the area between Cape Blanco and Cascade Head. This was considered less of an impact to the fleet since closing the area north of Pt. Chehalis would close more valuable fishing grounds, may cause Puget Sound vessels to transit farther to open grounds, and would eliminate the dogfish fishery. The Council may still close these areas if needed to reduce yelloweye bycatch, but the potential costs and benefits favored closing the more southerly areas at the start of 2009. The one potentially significant cost of closing the area between Cape Blanco and Cascade Head out to 125 fm could have been the loss of some Pacific halibut opportunity. However, this is mitigated by specifying a 100 fm seaward RCA boundary on days when the directed halibut fishery is open. Since this fishery is only open 3-6 days/year on average and a smaller portion of the fleet targets halibut in this area (most halibut caught by limited entry fixed gear fishermen are caught in waters north of Pt. Chehalis), it is not believed that this measure will result in a significant yelloweye bycatch.

The Council considered, but ultimately did not recommend a gear switching strategy for limited entry fixed gear fishermen that would have allowed longline-endorsed fixed gear permittees to switch to pots and traps. Fishermen opinions varied widely on this proposal as discussed above and the GMT recommended more analysis of this proposal to better understand the socioeconomic and management implications. Also, this measure would have required an FMP amendment, which, added to the regulatory burdens of other measures recommended in the Council's preferred alternative, could have jeopardized the timeliness of implementing 2000-10 regulations and other Council initiatives that are currently contemplated. The Council did express an interest in pursuing a gear switching strategy for the limited entry fixed gear fleet in the future since this is a potentially effective strategy for targeting sablefish and lingcod with gear that incidentally catches rockfish species of concern at a significantly lower rate.

The Council recommends the design and implementation of a Federal logbook for west coast limited entry and open access fixed gear groundfish fisheries as their preferred alternative. The Council further requested the GMT to help in the design of a new fixed gear logbook (see Table 4-82). Many industry representatives from the fixed gear sectors recommended logbooks since the lack of these data limits the ability to predict effort shifts and model area-specific effects of proposed regulations. This is one of the reasons that there has been less seasonal variation in the non-trawl RCA configurations recommended relative to RCA management in the trawl fishery since the GMT had no way of modeling effects. Logbook information promises to refine modeling of fixed gear fishery regulations and fine tune area management strategies. Information from the NMFS Northwest Region indicates that the fixed gear logbook program would be implemented after January 1, 2009, through a trailing regulatory amendment. The Region will lead the design process, in coordination with the states, and will implement the requirement through a notice and comment rulemaking.

4.5.3.4 *Directed Open Access*

In order to reduce yelloweye rockfish impacts in the open access nearshore fisheries, the Council preferred alternative includes moving the shoreward RCA from 30 fm to 20 fm north of 40°10' N latitude to 43°10' N latitude near Cape Blanco, Oregon. A review of WCGOP data from 2003 to January 2007 indicate that 96.2% of the yelloweye rockfish impacts in coastwide commercial nearshore fisheries occur in this area (Table 4-83). Yelloweye bycatch rates in this area range from 0.21 to 0.77 yelloweye rockfish pounds per target species pound. Rates north of Cape Blanco are significantly less, ranging from 0.11 to 0.13 yelloweye rockfish pounds per target species pound. The amount of effort north and south of Cape Blanco is also significantly different, with the greatest effort occurring south. Therefore, adjusting the RCA boundary in the south provides the greatest reduction in yelloweye rockfish impacts. The lack of effort north of Cape Blanco is also reflected in the observer data; fewer trips are observed in the north than in the south. As such, care must be taken when projecting impacts in the north. However, the lower yelloweye rockfish commercial nearshore bycatch rates in the north are consistent with observations seen in the Oregon recreational fisheries. Therefore, the observer data appear representative.

The Council's preferred alternative also took into consideration feedback gathered at public meetings conducted by the CDFG and the ODFW. In California and in Oregon, the recommended management measure to reduce yelloweye rockfish impacts was to adjust the RCA boundaries, as opposed to trip limit reductions. Most participants felt that trip limit reductions would put most nearshore fishermen out of business. In southern Oregon, public testimony indicated that a 20 fm RCA boundary would be manageable given the dependence on the high-value nearshore live fish fishery, which primarily occurs in waters shallower than 20 fm. However, there are fewer fishermen that hold state limited entry permits with nearshore endorsements north of Cape Blanco. Thus, dependence on the live fish fishery is less and more effort occurs deeper for such species as lingcod.

The Federal logbook requirement for the limited entry fixed gear fleet also applies to vessels in the directed open access sector under the Council's preferred alternative. The same rationale for this recommendation applies to these vessels as well.

4.5.3.5 *Incidental Open Access*

The Council adopted a lingcod retention allowance in all west coast salmon troll fisheries of 1 lingcod for every 15 Chinook salmon landed, plus one additional lingcod, not to exceed 10 lingcod per trip, up to a maximum limit of 400 lbs/month (Option 1). Salmon trollers will not be subject to RCA restrictions, but their vessels will need to be equipped with NMFS type-approved VMS units to land any groundfish, including lingcod, in 2009-10 under the preferred alternative. In addition, consistent with Washington's commercial bottomfish closure, salmon trollers will not be permitted to retain lingcod caught within state waters (i.e., within 3 nm of shore north of 46º16' N latitude).

4.5.3.6 *Washington Recreational*

The Washington recreational groundfish seasons for bottomfish and lingcod adopted under the Council's preferred alternative (see section 2.2.6.7 and Figure 2-50) are expected to stay within Washington's share of the combined Washington-Oregon recreational yelloweye harvest guideline of 2.7 mt (Tables 2-11 and 2-43). The fishery is more depth-restricted in the north where yelloweye are more abundant (open only within 20 fm from May 21-September 30 in Marine Areas 3 and 4 except on days when the halibut fishery is open).

The groundfish retention restriction in waters deeper than 20 fm is lifted on halibut days in Marine Areas 3 and 4 because yelloweye are difficult to avoid when targeting halibut in waters off northern Washington. In other areas, the concern is that halibut anglers may target lingcod and rockfish offshore after catching their halibut. This could lead to a higher yelloweye bycatch. However, in waters off the northern Washington coast, halibut, lingcod, and yelloweye occur in the same areas- more so than in west coast areas further south. This is because the distribution of rockfish on the Washington coast is directly linked to the bottom topography. The northern coast is characterized by high rocky relief habitat with many offshore rocks, pinnacles and canyons. The rocky habitat transitions through rock/cobble bottom to a sandy/muddy flat bottom as you move south toward the Columbia River. Lingcod tend to inhabit the same areas as halibut off the north coast, which often results in their incidental catch when anglers are targeting halibut. Off the central and southern coast, however, halibut can be found on flat, sandy bottom offshore, whereas lingcod tend to occur in rocky areas closer to shore. As such, anglers fishing the south coast will typically target halibut in one area, then change their location to target lingcod. Regulations are in place in Marine Areas 1 and 2 (along Washington's southern coast) that prohibit the retention of lingcod and rockfish during halibut trips; these rules are intended to discourage targeting of lingcod offshore where yelloweye rockfish may occur. However, as noted above, because lingcod and yelloweye are commonly encountered while targeting halibut in the northern area, such regulations would likely not accomplish the same result.

The adoption of the Westport Offshore YRCA (Figure 2-49) also closes an area where yelloweye recreational bycatch has been high for anglers targeting lingcod, rockfish, and Pacific halibut.

4.5.3.7 *Oregon Recreational*

The season structuring and depth restriction proposed in Oregon Recreational Alternative 4 was adopted as the final Council-preferred alternative for the Oregon recreational groundfish fishery in 2009 and 2010 (Table 2-44 and Figure 2-37). Details and rationale concerning the management measures associated with the Council-preferred Alternative are detailed below.

Season structure

Under the Council-preferred Alternative, the Oregon recreational groundfish fishery will be open offshore year-round, except from April 1 to September 30 when fishing is only allowed shoreward of 40 fm (Table 2-44). Closing the fishery from April 1 to September 30, months where yelloweye rockfish harvest is highest, mitigate the impacts to depleted yelloweye rockfish. The shorebased fishery will be open year-round as depleted yelloweye rockfish are not impacted.

Bag limits

A marine fish daily-bag-limit of ten fish in aggregate was adopted under the Council-preferred Alternative. The marine fish daily-bag-limit includes all species other than lingcod, salmon, steelhead, Pacific halibut, flatfish, surfperch, sturgeon, striped bass, pelagic tuna and mackerel species, and bait fish such as herring, anchovy, sardine and smelt. This daily-bag-limit provides the flexibility to make necessary adjustments through the yearly state process, reflecting the progression of the current year's fishery. The state process will likely reduce the marine fish daily-bag-limit from ten fish in aggregate to manage the harvest of "other nearshore" rockfish complex within the recreational fishery state ocean boat landing cap which is adopted in the yearly state process. Reducing the marine fish daily-bag-limit will also affect black rockfish harvest rates and may prevent the fishery from harvesting its total allocation. The status of black rockfish was assessed in 2007 as healthy and the final Council adopted preferred OY was 1,000 mt for the area off Oregon and California with an Oregon harvest guideline of 580 mt, which is a considerable increase over recent years. Assuming the recreational share continues to be seventy-six percent as determined through the state process, the harvest guideline for black rockfish would be 440.8 mt. Reductions in the marine fish daily bag limit is not expected to reduce yelloweye rockfish impacts, as data showed little difference in trip hours under 10, 8, 6, or 5 fish bag limits.

A lingcod daily-bag-limit of three fish was adopted under the Council-preferred Alternative. This daily-bag-limit provides the flexibility to make necessary adjustments through the yearly state process, reflecting the progression of the current year's fishery. The state process will likely reduce the lingcod bag limit to two fish for the opening of the 2009 season. In the event the Pacific halibut catch allocation is reduced significantly from 2008 levels or the marine bag limit is further reduced inseason, the lingcod daily bag limit could be increased to three fish so long as the harvest guidelines for depleted yelloweye rockfish and canary rockfish are not exceeded.

A flatfish daily-bag-limit of 25 fish in aggregate was approved under the Council-preferred Alternative and is consistent with the status quo management measures effective since 2007. The flatfish daily-bag-limit consists of all soles and flounders except Pacific halibut. Adoption of the flatfish daily-bag-limit of 25 fish in aggregate promotes simplicity in regulations and provides the flexibility to create additional regulations specific to flatfish (i.e. allowed retention of flatfish in the Pacific halibut fishery, or allowed targeting of flatfish in the event of a closure due to rockfish harvest guideline attainment).

Shared Harvest Guidelines

The Council-preferred Alternative included shared recreational fishery harvest guidelines for yelloweye rockfish and canary rockfish between Oregon and Washington. The 5.2 mt yelloweye rockfish harvest guideline consists of a 2.5 mt target for Oregon and a 2.7 mt target for Washington. The 20.9 mt canary rockfish harvest guideline consists of 16.0 mt target for Oregon and a 4.9 mt target for Washington.

Minimum Length Limits

The Council-preferred Alternative includes minimum length limits for lingcod, cabezon and kelp greenling of 22 inches, 16 inches and 10 inches, respectively. This management measure is consistent with the status quo management measures effective in 2007 and 2008. These length limits are effective tools in reducing harvest of these species, primarily in the shore and estuary fishery.

Area Closures

Under the Council-preferred Alternative, targeting and retaining groundfish and Pacific halibut will be prohibited year-round in the Stonewall Bank Yelloweye Rockfish Conservation Area (YRCA), a high relief rocky habitat residing approximately 15 miles offshore from Newport, Oregon (Figure 2-26). In 2007 and 2008, targeting and retaining Pacific halibut and groundfish within the Stonewall Bank was prohibited to reduce yelloweye rockfish impacts attributed to those fisheries.

Two other alternative Stonewall Bank YRCA closure areas (Figure 2-26) were not adopted under the Council-preferred Alternative because the extent of yelloweye rockfish incidental catch in the expanded area(s) has not been determined. Public comment expressed concern over enlargement of the YRCA as the present size is already very disruptive to the groundfish and halibut fishery out of Newport. Concern was expressed that if the YRCA area is increased, the potential may be lost for future opportunity to target healthy species such as yellowtail rockfish in the event that gear is developed to allow a targeted fishery, while avoiding yelloweye rockfish encounters.

Groundfish Retention in the All-Depth Pacific Halibut Fishery

Since 2005, only sablefish may be retained in the Pacific halibut fishery at any depth in the area from Cape Falcon to Humbug Mountain, Oregon. Since 2007 in the area North of Cape Falcon, both sablefish and Pacific cod may be retained at any depth during the Pacific halibut fishery. It is expected that groundfish retention in the all-depth Pacific halibut fishery will be similarly constrained in 2009 and 2010.

Inseason Management Tools

Oregon has a responsive port based monitoring program through their Ocean Recreational Boat Survey (ORBS) and regulatory processes in place to track harvest and take actions inseason if necessary. The following are suggested management measures that could be implemented inseason if the 2009 (or 2010) fishery does not proceed as expected.

Inseason management action may be implemented in 2009 or 2010 to reduce the impacts of the Oregon recreational groundfish fishery. Inseason management tools, designed to mitigate impacts, include bag limit adjustments (including non retention), length limit adjustments, gear restrictions, and season, days per week, depth, and area closures.

Season, depth, days open per week, and area closures are the primary inseason tools for limiting yelloweye rockfish and canary rockfish impacts, since retention of this species is prohibited. If catch rates indicate that the harvest targets for yelloweye rockfish will be reached prematurely, offshore depth closures may be implemented inseason at 30, 25, or 20 fm as these two species are less abundant nearshore and release survival rates are higher in shallow waters. Additionally, days per week may also be closed to reduced impacts. ODFW will monitor inseason progress toward recreational harvest targets for canary rockfish and yelloweye rockfish. If inseason catch projections indicate that one or both of the state harvest targets may be exceeded, ODFW and WDFW will review the Oregon-Washington catch data and determine if management response is necessary to avoid exceeding the shared harvest guideline of yelloweye rockfish or canary rockfish. The appropriate agency(ies) will then implement inseason management actions to reduce catches. Regulations will depend upon the timing of the determination for their need.

Adjustments to the marine fish daily-bag limit to no more than 10 fish may be implemented to achieve season duration goals in the event of accelerated or decelerated black rockfish or other nearshore rockfish harvest. The lingcod daily bag limits may be adjusted to no more than 3 fish in the event the marine bag limit changes or the halibut catch limit is reduced from 2008 levels. Season and/or area closures may also be considered if harvest targets are projected to be attained. Closing one or more days per week is an inseason tool that could be used to limit impacts for any managed species. Closing certain days each week would help lengthen the duration of a fishery approaching a harvest guideline. Non-retention and length restrictions are the likely inseason tools to use for cabezon and greenling as release survival is very high. They may also be used to reduce impacts on nearshore species, such as black rockfish and other nearshore rockfish species.

Gear restrictions and/or release technique requirements may be implemented to reduce the impact of depleted rockfish species if successful techniques are developed, researched, reviewed, and accepted. Research in this area is currently being conducted and will continue into 2009-10, testing the effectiveness and selectivity of various gears and the survivability of rockfish released at depth.

Directed yellowtail rockfish and/or flatfish fisheries may be implemented inseason, as were implemented in 2004, in the event of a closure of the recreational groundfish fishery due to attainment federal or state harvest guidelines or targets. Specific gear restrictions may be implemented in the event that yellowtail rockfish and/or flatfish fisheries remain open during a groundfish closure. Additionally, the fishery may be expanded to waters seaward of the RCA, promoting directed yellowtail rockfish opportunity. Directed flatfish fisheries would be legal year round and open shoreward of 40 fm during any period the groundfish fishery has any depth restrictions (i.e. 40, 30, 25, and 20 fathom lines). The flatfish fishery would not have any depth restrictions when the groundfish fishery has no depth restrictions. Fisheries will be monitored to ensure that impacts to yelloweye and canary rockfish are within the harvest targets/guidelines.

In the event that the duration of total season is reduced from 12 months; the nearshore waters are closed to groundfish fishing due to management of nearshore species; or the Pacific halibut catch limit is reduced from 2008 levels, the fishery may be expanded to waters seaward of the RCA that is in effect at the time, promoting directed yellowtail rockfish and offshore lingcod opportunity. Fisheries will be monitored to ensure that impacts to yelloweye rockfish and canary rockfish are not in excess of the harvest targets/guidelines.

Projected Impacts

Projected impacts for depleted species and target species under the various Alternatives, including the Council preferred-Alternative, are detailed in Table 4-91. The impacts are based on the season duration, depth restriction and bag limits for each alternative. The season duration and depth restrictions are described in 2.2.4.2 and illustrated in Figures 2-34 through 2-39.

4.5.3.8 *California Recreational*

Harvest Guidelines

In recent years, canary rockfish has been the most constraining species for the California recreational fishery north of Point Conception. With the increase in the OY for canary rockfish from 44 mt to 105 mt under the Council-preferred alternative, canary rockfish will no longer be as constraining for the California recreational fishery under the resulting 22.9 mt harvest guideline. The widow rockfish OY will increase in 2009 and 2010 under the Council-preferred alternative resulting in an 11.1 mt HG, which is in excess of the projected impacts for the season under the preferred alternative. Under the Council-preferred OY alternative of 17 mt for yelloweye rockfish in 2009 and 2010, the HG for the California recreational fishery is 2.8 mt. The preferred combined recreational and commercial HG for blue rockfish of 220 mt represents a tentative catch sharing, providing 182 mt of blue rockfish needed for the recreational fishery to prosecute the Council-preferred season alternative. The Council-preferred cowcod OY alternative is the status quo of 4 mt, which results in a 0.3 mt HG for the California recreational fishery. The cowcod HG has not been exceeded under the status quo regulations and is well above the projected impacts for the Council-preferred management measure alternatives. The Council-preferred OY alternative for bocaccio is 278 mt and the amount of bocaccio available to the recreational fishery would be 87 mt, increased from 66.3 mt in 2008 assuming the 2008 catch sharing.

Due to the past variability in the recreational catch of blue rockfish and the concerns regarding impacts on other sectors should the California recreational fishery exceed their harvest guideline for yelloweye rockfish, the catch of these two species will be tracked closely inseason to ensure that their harvest guidelines are not exceeded.

Discussion of the Council-Preferred Alternative

The Council-preferred alternative for the California recreational groundfish fishery in 2009 and 2010 is described in Section 2.2.4.2. CDFG will continue recreational management measures described under the status quo alternative regarding area closures, bag limits, etc. with the following exceptions to the season and depth changes described below and other measures. In all management areas, under California laws, divers and shore-based anglers would continue to be exempt from the seasonal closures and depth restrictions. Additionally, California would continue to provide an exemption to allow year-round fishing for leopard sharks in specified enclosed bays and estuaries. California would also continue to provide for retention and possession of sanddabs and species in the Other Flatfish complex during the seasonal and depth closures that generally apply to all federal groundfish. The state would also continue with the prohibition on recreational groundfish fishing inside 10 fm at the Farallon Islands and other previously identified areas. Details and rationale concerning the management measures associated with the Council-preferred Alternative are detailed below.

Subdivision of the North-Central Management Area

As described in section 2.2.4.2, the CDFG proposes subdivision of the North-Central Management Area at Point Arena into what will be referred to as the North-Central North of Point Arena and North-Central South of Point Arena Management Areas. This action has been taken to minimize the spatial extent of restrictions to season and depth restrictions to reduce yelloweye rockfish impacts.

Season Structure

The California recreational alternative 6 season structuring and depth restriction was adopted as the final Council-preferred Alternative for the California recreational groundfish fishery in 2009 and 2010 (Figure 2-45). The season and depth restrictions in Figure 2-45 are the result of efforts to minimize impacts on constraining species while maximizing fishing opportunity in each management area. Yelloweye rockfish is the most constraining species in the Northern and North-Central North of Point Arena Management Areas. Blue rockfish is the most constraining species in the Morro Bay South-Central Management Area, Monterey South-Central Management Area and North-Central South of Pt. Arena Management Area. Cowcod and bocaccio are the most constraining species in the Southern Management Area. The impacts resulting from the preferred alternative are provided in Table 4-95.

Bag Limits

The Council-preferred alternative includes an increase of the statewide bag limit for cabezon from one to two fish within the ten fish rockfish, cabezon and greenling (RCG) bag limit. The statewide bag limit for cabezon was one fish in the 2007-08 seasons. CDFG analyzed the possibility of increasing the cabezon bag limit from one to two fish using the methods described in section 4.1.5.9. The projected increase in impacts indicates that the bag limit can be increased without exceeding the harvest guideline. The statewide projected catch with the increase in the bag limit is 28 mt out of the 42 mt statewide recreational allocation. Increasing the bag limit will provide additional fishing opportunity for recreational anglers. Though the increased bag limit may result in increased targeting, there should be sufficient buffer between the projected impacts and the recreational allocation to account for targeting concerns.

The Council-preferred alternative includes an increase in the bag limit for bocaccio south of Cape Mendocino at 40°10' N latitude from one to two fish within the ten fish RCG bag limit. The bag limit for bocaccio in the Northern Management Area was two fish in the 2007-08 seasons and CDFG recommends that this status quo bag limit remain in place. CDFG analyzed the possibility of increasing the bocaccio bag limit from one to two fish in the balance of the state using the methods described in section 4.1.5.9. Assuming a proportional increase in the recreational harvest guideline, with a 278 mt OY, the amount of bocaccio available to the recreational fishery would be 87.6 mt. The impacts projected for the recreational fishery with a two fish bag limit statewide is 67.3 mt, providing a buffer between the projected impacts and potential harvest guidelines. Bocaccio are primarily encountered in depths deeper than 30 fm and the depth dependent mortality rates developed by the GMT ascribe a 100% mortality rate to fish discarded in depths greater than 30 fm. The proposed action would reduce impacts on other fish that would be caught to replace discarded fish and decrease wastage of discarded dead bocaccio. The action would also simplify regulations by providing a consistent statewide two fish sub bag limit for bocaccio within the ten fish RCG bag limit.

Gear Restrictions

The Council-preferred alternative includes the elimination of weight and hook size/number gear restrictions when fishing for sanddabs and other flatfish. CDFG has analyzed the efficacy of the gear restrictions implemented in 2004 in reducing impacts on depleted species while recreationally fishing for sanddabs and other flatfish. The analysis revealed that there has been no appreciable change to impact rates on depleted species and species of the genus *Sebastes* before and after gear restrictions were implemented and that impacts are presently negligible. The methods and results of this analysis are found in section 4.5.1.9.

Area Closures

The YRCAs described in section 2.2.4.2 and depicted in Figures 2-31 to 2-33 were adopted by the Council for use inseason to reduce impacts on yelloweye rockfish if the catch is tracking high without closing entire Management Areas. YRCA-specific yelloweye rockfish catch reductions have been calculated as a percentage for each area (see section 4.5.1.9) and provide a basis for selection of areas, and catch reductions can be applied to inseason projections if necessary. If implemented inseason, it is recommended that the reduction in the projected catch should be prorated for the remaining season to provide a conservative estimate of projected impacts.

Inseason Catch Tracking for Species of Concern

In order to address concerns regarding the inseason tracking of yelloweye, canary and blue rockfish catch in the California recreational fishery, the CDFG will be using the following means to track the catch of these species inseason in 2009 and 2010.

1. *Use of weekly reports of cumulative sampled catch and estimated catch from previous years to produce a tool for tracking inseason catch yelloweye, canary and blue rockfish.*
A regression of the estimated catch with the cumulative sampled catch of each species from 2005-07 has be derived to allow the current sampled catch to be used to provide an indication of the anticipated estimated catch. A threshold sampled catch can be identified by identifying the sampled catch at which the anticipated estimated catch was equal to the present Harvest Guideline for yelloweye, canary or blue rockfish and noting when that level of catch was reached in previous seasons,. This threshold sampled catch will be set at a cumulative sampled catch corresponding to an anticipated catch estimate that is below the harvest guideline and provides sufficient time to take action before the harvest guideline is exceeded. This threshold will provide time for CDFG to consider appropriate action prior to confirmation of the estimated catch with the CRFS catch estimate. While this method provides indication of current estimated catch, it would only be used to provide an early warning and will not be used as the basis for taking inseason action.

2. *Use of weekly cumulative sampled catch through time to compare the relative rates of inseason catch accrual between years.*
The current cumulative sampled catch can be compared to a line chart of the cumulative sampled catch by month in previous years as an indicator of relative rate of inseason catch tracking. The current cumulative sampled catch can be compared to the cumulative sampled catch corresponding to the harvest guideline (from 1. above) to provide criteria for determining if management action may be necessary.

3. *CRFS catch estimates on a one month lag and adjustment of RecFish catch projections based on previous months estimated catch.*
The CRFS program provides preliminary catch estimates on a one month lag (i.e., preliminary catch estimates from May would be available on July 1). The preliminary catch estimates are subject to revision by the CRFS staff to provide final catch estimates on a two month lag (i.e., final catch estimates from May would be available on Aug 1). The preliminary and final catch estimates seldom differ significantly. Thus the CDFG will make use of the preliminary catch estimates in estimating the catch of yelloweye and canary rockfish inseason.

The preliminary catch estimates in addition to the projected catch for the remainder of the season from the RecFISH catch projection model provide the projected total annual catch. Monthly RecFISH catch projections will be adjusted to reflect the apparent catch trend in previous months (e.g., if previous months' estimates are tracking lower than their corresponding projections, then future projections will be adjusted downward.) Projection adjustments will be done by management area then summed for all areas to produce the state wide adjusted total projected catch for comparison to the harvest guideline. If this adjusted total catch is projected to exceed the harvest guideline, pre-emptive inseason action would be taken.

Projected Impacts

Projected impacts for depleted species and species of concern under the Council-preferred alternative are found in Table 4-95. The impacts are based on the season duration, depth restriction and bag limits described in section 2.2.4.2. The season duration and depth restriction for each management area are illustrated in Figure 2-45.

Table 4-95. Projected total impacts (mt) of important groundfish species by management area in the California recreational fishery resulting from the management measures adopted under the 2009-10 Council-preferred alternative.

Species	Northern	North-Central N. of Point Arena	North-Central S. of Point Arena	Monterey South-Central	Morro Bay South-Central	Southern	Total
Canary	0.6	0.8	4.0	1.5	0.8	0.3	**7.8**
Yelloweye	0.8	1.1	0.6	0.0	0.0	0.0	**2.6**
Black	72.7	11.3	33.6	6.4	2.8	0.0	**126.8**
Blue	4.7	6.8	89.7	18.8	50.8	11.4	**182.2**
Bocaccio	-	0.1	4.2	3.1	3.8	56.1	**67.3**
Cabezon	4.7	3.3	7.3	0.8	2.5	9.3	**27.9**
Cowcod	-	0.0	0.0	0.0	0.0	0.1	**0.1**
Widow	0.0	0.0	1.0	2.4	0.0	2.8	**6.2**
Northern Minor Nearshore Rockfish	12.9	-	-	-	-	-	**12.9**
Southern Minor Nearshore Rockfish	-	10.9	117.2	32.7	40.9	50.6	**252.3**
Greenling	0.7	1.9	2.4	0.4	0.1	0.0	**5.5**
Lingcod	32.1	15.5	98.0	8.7	23.6	34.8	**212.7**

CHAPTER 5 PROTECTED SPECIES

Four different laws designate a species or stock as "protected" within U.S. waters: the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), the Migratory Bird Treaty Act (MBTA), and EO 13186.

NMFS and PFMC have published recent NEPA documents that describe protected species found in the West Coast EEZ. The June 2008 Final EA on "A Limited Entry Program for the Non-Tribal Sectors of the Pacific Whiting Fishery" (FMP Amendment 15 EA) and the December 2005 Final EIS on "Pacific Coast Groundfish Fishery Management Plan Essential Fish Habitat Designation and Minimization of Adverse Impacts" (EFH EIS) (NMFS 2005) provided descriptions of West Coast EEZ species protected under the ESA, the MMPA, and the MBTA and EO 13186 at Section 3.2 and 3.4, and Section 4.6, respectively, and provided information on fisheries interactions, where available and applicable. The December 2006 Final EIS on "Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2007-08 Pacific Coast Groundfish Fishery" (PFMC 2006) provided descriptions of west coast EEZ species protected under these same laws at Chapter 6, and analyzed the effects of the groundfish fisheries on these species.

- No new scientific analyses on the interactions between the groundfish fisheries and seabirds have been completed since the publication of the FMP Amendment 15 EA, the EFH EIS, or the 2007-08 Specifications EIS. NMFS is compiling observer data on fisheries interactions with seabirds to develop a long-term assessment of the effects of the groundfish fisheries on migratory seabirds.
- No new scientific analyses on the interactions between the groundfish fisheries and sea turtles have been completed since the publication of the FMP Amendment 15 EA, the EFH EIS, or the 2005-06 Specifications EIS (PFMC 2004c). Four sea turtle species have been sighted off the U.S. West Coast: loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), and olive ridley (*Lepidochelys olivacea*). Under the ESA, green, leatherback, and olive ridely sea turtles are listed as endangered; loggerheads are listed as threatened. NMFS has reviewed WCGOP data for fisheries interactions with sea turtles and WCGOP has not observed any sea turtle interactions in the groundfish fisheries.

Based on these NEPA implementing regulations, the relevant content of the aforementioned EAs and EISs are incorporated by reference.

The 2006-05 and 2007–08 groundfish biennial harvest specifications EISs did not find that the proposed actions would result in significant impacts to protected species, based on a qualitative evaluation of the alternatives. Although there was insufficient spatio-temporal information to predict interactions under different alternatives, projected catch, as a gross proxy for overall fishing effort, was used to comparatively evaluate the alternatives. Declining groundfish fishing effort is a predictable response to lowered OYs and more restrictive management measures imposed to reduce bycatch of depleted groundfish. Furthermore, because OYs for some depleted species—principally yelloweye rockfish—have not increased, it is likely that fishing effort in 2007 and 2008, and the 2009–10 biennium will continue a declining trend.

Combined with the conclusion of no significant impact in the previous EIS, and the lack of new information suggesting otherwise, it is reasonable to conclude that the range of alternatives in the current EIS will not result in significant impacts to protected species. NMFS is currently in the process of analyzing available data on the interactions of the groundfish fishery with marine mammals and seabirds.

5.1 Affected Environment

According to the ESA, NMFS may conduct a "section 7 consultation" on a Federally-authorized activity, such as fishing in EEZ waters, in order to determine whether that activity is likely to jeopardize the continued existence of an ESA-listed species. In 1990, NMFS conducted its first ESA section 7 consultation on Chinook salmon take in the groundfish FMP. Subsequent NMFS section 7 consultations in 1991, 1992, and 1993 concluded that Chinook was the ESA-listed salmon species most likely to be affected by the groundfish fisheries. Groundfish fishery interception of salmon species other than Chinook is negligible and infrequent (NMFS 2006). Of the ESA-listed Chinook Evolutionary Significant Units (ESUs), NMFS has concluded that the ESUs most likely to be affected by the groundfish fisheries are: Snake River fall Chinook (threatened), Upper Willamette River Chinook (threatened), Lower Columbia River Chinook (threatened), Puget Sound Chinook (threatened), Sacramento River winter-run Chinook (endangered), California coastal Chinook (threatened), and Central Valley spring-run Chinook (threatened). The 1992 Biological Opinion also concluded that groundfish gear types other than trawl gear are either unlikely to affect salmon, or to have no salmon bycatch at all (NMFS 1992). The incidental take statements for this and subsequent section 7 consultations established a consultation standard of 11,000 Chinook salmon caught in Pacific whiting fisheries. In other words, Chinook salmon bycatch exceeding this number in a given year would be a basis for re-initiating consultation to determine whether this new information indicates the action would jeopardize the continued existence of listed ESUs and considering further mitigation measures to reduce bycatch. The 1992 biological opinion estimated the take of salmon in other, non-whiting groundfish trawl fisheries at 6,000-9,000 fish annually, with most of these taken in waters north of 43° N latitude. As with the whiting fishery, almost all of these were estimated to be Chinook salmon. Historically, the non-whiting groundfish trawl sector has not been comprehensively monitored for protected species bycatch and no similar re-initiation standard was established for this sector. With the implementation of the WCGOP; however, it has become possible to estimate salmon bycatch in the non-whiting groundfish trawl sector more precisely.

The 11,000 fish threshold for re-initiation has been breached three times since 1991, most recently in 2005. In response, the latest supplemental biological opinion (NMFS 2006) was prepared. The evaluation of impacts to protected species (focusing on listed Chinook salmon ESUs) substantially relies on this and previous opinions. Like the biological opinion, effects are considered in terms of two sectors: whiting and non-whiting groundfish trawl. Other groundfish fishery sectors are not considered, based on the conclusion in this and previous biological opinions that salmon bycatch is negligible in these sectors.

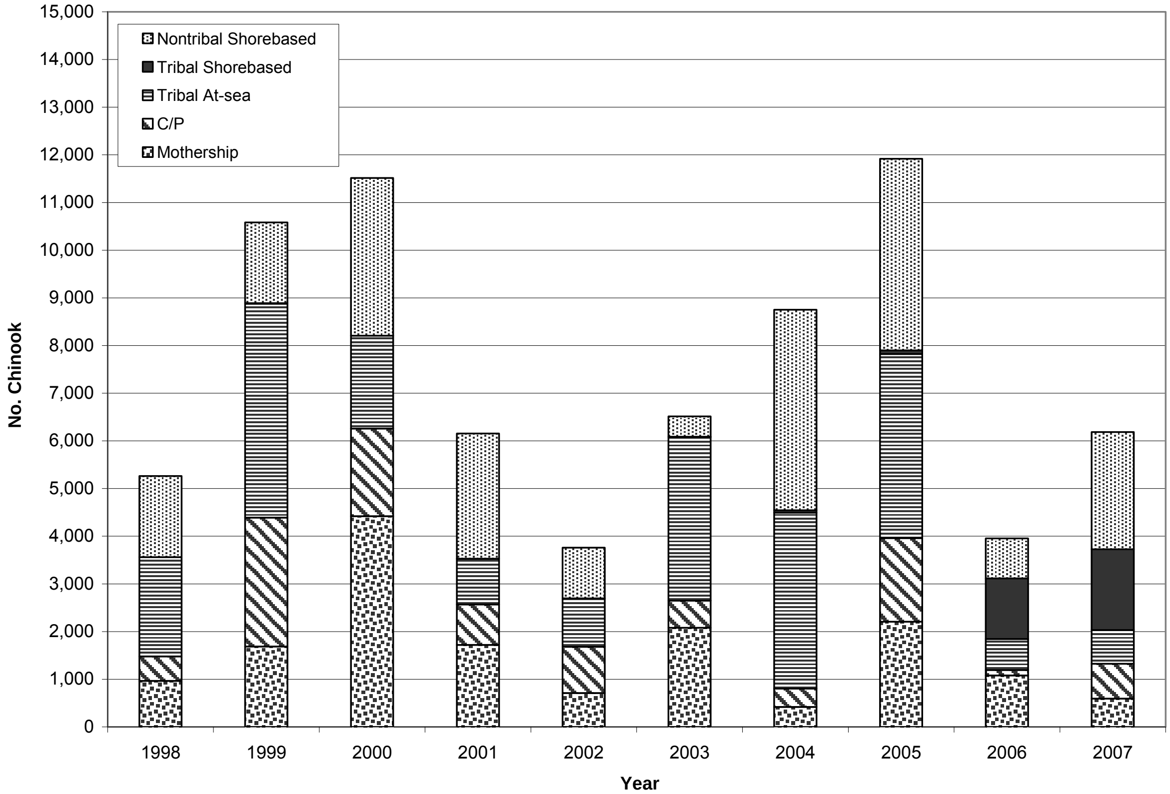
5.1.1 Salmon in the Limited Entry Whiting Trawl Fishery

Chinook bycatch has generally been well below the 11,000 fish consultation standard (averaging 7,459 since 1998); although, as noted above, it has been exceeded three times: in 1995 (14,533 fish), 2000 (11,513 fish), and 2005 (11,916 fish) (Table 5-1). Figure 5-1 breaks out the Chinook bycatch by the various whiting sectors over time.

Table 5-1. Annual bycatch of salmonids in the whiting fishery.

Year	Salmonid Species							
	Chinook	Coho	Pink	Chum	Sockeye	Steelhead	Unidentified	Total
1998	5,261	122	4	35	1	0	NA	5,423
1999	10,584	122	507	465	0	0	NA	11,678
2000	**11,513**	101	18	19	2	0	18	11,671
2001	6,154	138	303	87	3	0	312	6,997
2002	3,759	183	0	148	0	0	4	4,094
2003	6,512	186	3,774	20	0	0	192	10,684
2004	8,751	216	0	109	0	0	9	9,085
2005	**11,916**	467	480	28	0	0	8	12,899
2006	3,954	48	0	90	0	0	NA	4,092
2007	6,186	475	595	291	0	0	NA	7,547
Average	7,459	206	568	129	1	0	91	8,417

a/ Available at: https://pcts.nmfs.noaa.gov/pls/pcts-pub/sxn7.pcts_upload.summary_list_biop?p_id=29401.
b/ Available at: http://www.dfw.state.or.us/MRP/hake/Main%20Pages/SHOP%20Publications/SHOP_2006rpt.pdf
c/ Available at: http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Whiting-Management/Whiting-Hake-2007.cfm.



NOTE:
2002 shore-based landings do not include 432 mt of whiting or salmon taken in the trip limit fishery.
2003 shore-based landings do not include 195 mt of whiting or salmon taken in the trip limit fishery.
2004 shore-based landings do not include 1,644 mt of whiting or salmon taken in the trip limit fishery (first year of video monitoring at-sea).
2005 shore-based landings do not include 310 mt of whiting or salmon taken in the trip limit fishery.

Figure 5-1. Summary of Chinook salmon bycatch in the Pacific whiting fishery by sector in numbers of fish, 1998-2007.

Both the absolute and relative effects of the different whiting sectors may be considered in describing past impacts. Table 5-2 shows, for the entire 1998–2007 period, both the bycatch rate (number of Chinook/mt whiting) and the percent of all Chinook caught for each subsector (number of Chinook caught by subsector/number caught in all sectors). The rate can be considered a measure of relative impact, or the intensity of the impact of a given subsector, while the percent of total indicates the absolute magnitude of impact for each subsector. It can be seen that the tribal mothership sector has the highest relative impact (0.1199 Chinook/mt,) but ranks second to last in terms of absolute impact. The nontribal shorebased sector has had the highest absolute impact (31.39 percent) and the third-highest relative impact (0.0301 Chinook/mt). The tribal shorebased sector has the lowest overall bycatch rate for the period (0.0066 Chinook/mt) and the lowest proportion of overall bycatch (4.35 percent). The tribal shorebased sector has only operated since 2003 and thus accounts for a very small share of total bycatch for the period. Chinook catch has increased from 9 Chinook in 2003 to 1,690 Chinook in 2007.

Table 5-2. Relative impact (average Chinook salmon/mt whiting) and absolute impact (percent of all Chinook caught 1998–2007) by whiting sector.

Sector	Relative Impact Rate (Ave. Chinook/mt Whiting)	Absolute Impact (% all Chinook)
Mothership	0.0465	22.31%
Catcher/Processor	0.0194	14.65%
Nontribal Shorebased	0.0310	31.39%
Tribal Mothership	0.1199	27.29%
Tribal Shorebased	0.0066	4.35%

Figure 5-1 illustrates that a larger proportion of the Chinook salmon catch was taken by the shorebased tribal fishery in 2006 and 2007 compared to earlier years. This is likely due to the shift in tribal whiting catch from the tribal mothership sector to the developing tribal shorebased sector. The tribal shorebased fishery began in 2003, and at that time the shorebased sector took approximately 20 percent of the tribal whiting that was harvested. Between 2003 and 2006, whiting catch was shifted from the mothership sector to the shorebased sector and in 2007 the shorebased sector took approximately 80 percent of the tribal whiting that was harvested. In 2009-10, the tribes have proposed a change in the methodologies used to establish the annual whiting tribal set-aside which may increase the amount of whiting taken in the tribal fishery. It is likely that an increase in the Makah tribal whiting fishery will show a similar distribution between the mothership and shorebased sectors. If an increase in the tribal set-aside was taken in a distribution similar to status quo, whiting would be taken primarily in the tribal shorebased fishery, and it would likely result in similar Chinook salmon impacts relative to Status Quo, because this sector has a moderate relative impact rate to Chinook salmon when compared to the other non-tribal sectors. The Quileute Tribe estimates that they will take 8,000 mt of whiting in 2009. It is likely that catches of Chinook salmon will follow a similar pattern as in the Makah whiting fishery. If the Quileute harvest whiting in the tribal mothership sector, this could increase Chinook salmon impacts because that sector has the highest relative impact rate (Table 5-2). If the Quileute harvest whiting in the tribal shorebased sector, this would have a lesser impact because of the lower relative Chinook impact rate by this sector.

The supplemental biological opinion summarizes previous work to identify causative factors that would account for variations in salmon bycatch (NMFS 2006). On an annual basis there is some temporal and spatial variation in bycatch that can be accounted for by the behavior and biology of Chinook salmon and Pacific whiting. Bycatch rates tend to be higher closer to shore and earlier in the season. This may explain, for example, the high bycatch rate for the tribal mothership sector, since these vessels fish within the U&As, and thus have less flexibility to make spatial adjustments in response to salmon bycatch. Similarly, the shorebased sector, for cost and operational reasons, tends to fish closer to shore. However, no such factors adequately account for inter-annual variation in bycatch. Previous work found no "obvious or consistent correlation" between annual Chinook abundance and bycatch (NMFS 2006). Ocean conditions may play a role but specific causative factors, at least any that can be used predicatively, cannot be identified.

Although the 11,000 fish threshold is used as a trigger to re-initiate consultations, the biological opinions produced in the course of these consultations have concluded that occasionally exceeding this threshold (as occurred in 1995, 2000, and 2005) is not by itself a basis for making a jeopardy determination. In its 2006 supplemental biological opinion, NMFS reaffirmed this conclusion with respect to the 2005 fishery. Catches of Chinook since 2005 have been well below the 11,000 fish threshold.

During the 2005 fishery, when it became apparent to NMFS that the whiting fishery could exceed the 11,000 Chinook level, the agency took emergency action to close the fishery shoreward of a boundary line approximating the 100 fm depth contour (70 FR 51682, August 31, 2005). This mitigation measure was analyzed and implemented in the 2007-08 Groundfish Harvest Specifications and Fishery Management Measures (71 FR 78638, December 29, 2007), and allows NMFS to invoke a 100 fm depth closure inseason if bycatch of Chinook threatens to exceed the 11,000 fish threshold. The approach of applying this mitigation measure in response to conditions in the fishery allows industry and NMFS to trade off the impacts of salmon bycatch (more prevalent in inshore waters) and bycatch of the three depleted rockfish species (which occur more often in offshore waters). The 100 fm depth contour, or the Ocean Salmon Conservation Zone, has not been necessary in the whiting fishery since 2005 to avoid exceeding the 11,000 Chinook threshold, but is available as if needed for 2009-10.

5.1.2 Salmon in the Limited Entry Non-Whiting Trawl Fishery

Data from the WCGOP were used to estimate that 18,361 salmon were caught in 2002, 13,915 fish in 2003, 2,057 fish in 2004, 804 fish in 2005, and 115 fish in 2006. Virtually all of the salmon caught were Chinook salmon (see Table 11 in NMFS 2006b). When bycatch levels in 2002 and 2003 exceed the previous estimate of 6,000–9,000 Chinook specified in previous incidental take statements, NMFS reinitiated its consultation on the Groundfish FMP and included an evaluation of salmon catch in the non-whiting limited entry trawl fishery in the 2006 supplemental biological opinion (NMFS 2006).

The magnitude and distribution of bycatch in the trawl fishery from 2002-06 was affected by significant changes in regulation and management of the fishery to protect depleted groundfish stocks. Between 1999 and 2002, NMFS declared eight groundfish species as overfished pursuant to the MSA. In response, one of the Council's major tools for reducing incidental interception of overfished groundfish has been the RCAs, large-scale marine area closures. The last several years have been a period of significant change for the fishery because it has had to adjust to the need to manage under the strict harvest limits for a complex of depleted species. Because of changing regulations, shifts in fishing areas, reductions in trawl fishery effort from the December 2003 trawl vessel and permit buyback program, and implementation of overfished species rebuilding plans, it is difficult to pinpoint which of these various factors may be affecting Chinook bycatch negatively or positively.

The 2006 supplemental biological opinion evaluated Chinook salmon bycatch by latitudinal and depth strata based on estimates from WCGOP data. In addition, a WCGOP data report on observed and estimated bycatch of salmon in the limited entry trawl fishery was released on March 4, 2008 (Bellman and Hastie 2008). Table 5-3 and Figure 5-2 display the aggregated 2002-06 observed Chinook bycatch data across the five years of available data. The highest amount bycatch occurs in depths shallower than 125 fm across all latitudinal strata with the highest overall amount of Chinook salmon bycatch occurring off the Oregon coast from Cape Falcon to Cape Blanco, followed by the region to the south to Cape Mendocino in northern California. Looking at latitudinal differences over the five years, 50 percent of estimated Chinook bycatch occurred in the Cape Falcon-Cape Blanco region; in 2003 two-thirds of the estimated bycatch was from that region. Due to the spatial distribution of catches, there may be a disproportionate impact on salmon stocks that occur off of the Oregon coast.

Table 5-3. Latitudinal and depth distribution of Chinook bycatch in the west coast non-whiting trawl fishery from WCGOP observations during 2002-06.

Depth	US/Canada Border to Cape Falcon	Cape Falcon to Cape Blanco	Cape Blanco to Cape Mendocino	Cape Mendocino to the US/Mexico Border
> 250 fm	30	37	47	0
125-250 fm	1,186	8,364	4,809	57
< 125 fm	4,995	8,923	5,345	915

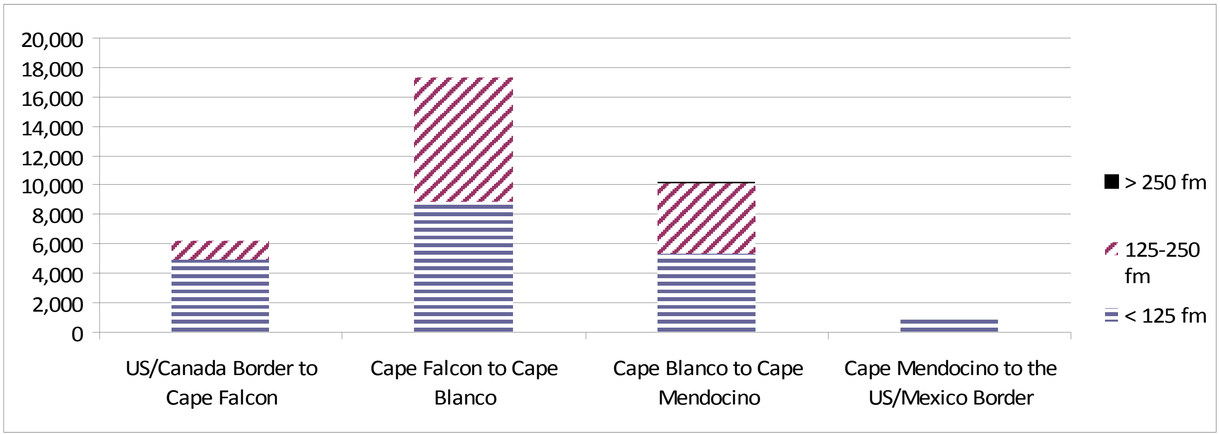


Figure 5-2. Latitudinal and depth distribution of Chinook bycatch in the west coast non-whiting trawl fishery from WCGOP observations during 2002-06.

The distribution of Chinook salmon impacts by depth are dramatically different in 2005-06 compared to the previous years. 2005-06 WCGOP data indicate that the catch of Chinook salmon in these years shoreward of 125 fm was much lower than in previous years. Table 5-4 and Figure 5-3 illustrate the 2005-06 catch distribution and, when compared to the depth distribution from the 2002-06 period, it is quite different. One management measure that went into effect that may impact Chinook salmon bycatch in the area shoreward of 125 fm is the implementation of regulations at the beginning of 2005 to require the use of selective flatfish trawl gear in the bottom trawl fishery operating shoreward of the trawl RCA. The proposed action would not change this requirement, so it is unlikely that, if the reduction in Chinook salmon catch is due in part to this management measure, the relative impacts from this regulation would be substantially different than what was observed in 2005-06.

Table 5-4. Latitudinal and depth distribution of Chinook bycatch in the west coast non-whiting trawl fishery from WCGOP observations during 2005-06.

Depth	US/Canada Border to Cape Falcon	Cape Falcon to Cape Blanco	Cape Blanco to Cape Mendocino	Cape Mendocino to US/Mexico Border
> 250 fm	0	0	0	0
125-250 fm	462	100	96	0
< 125 fm	20	16	13	40

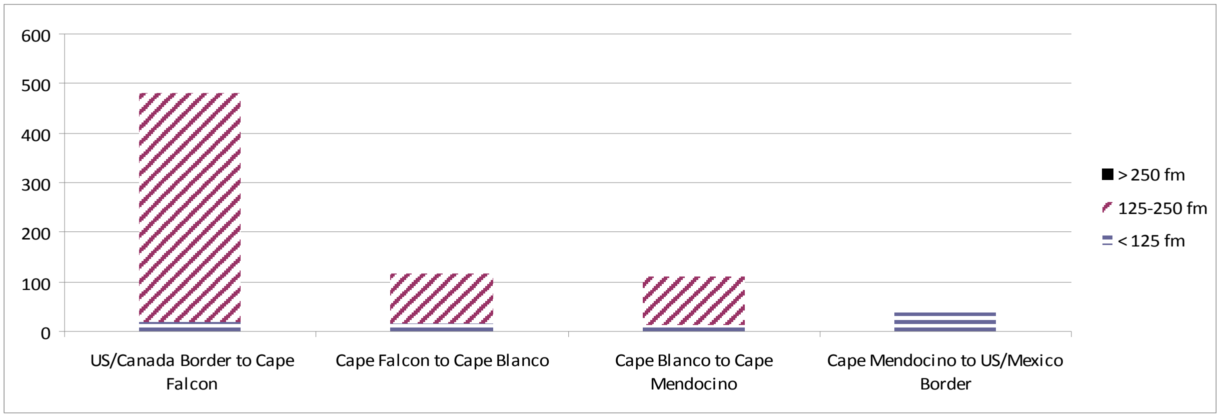


Figure 5-3. Latitudinal and depth distribution of Chinook bycatch in the west coast non-whiting trawl fishery from WCGOP observations during 2005-06.

In addition to the distribution of Chinook impacts between seaward and shoreward of 125 fm, there are differences in the Chinook salmon bycatch rates between years, by depth and latitude. When looking at the bycatch rates presented in Table 5-5, it appears that Chinook salmon impacts shoreward of 125 fm from 2002-06 are highly influenced by the high bycatch rate in 2003 of 7.5 Chinook salmon caught per mt of groundfish between Cape Falcon and Cape Blanco. It is not possible to pinpoint the management measures that resulted in the differences in Chinook bycatch rates by latitude, by depth, and by year, or how those management measures influence other ecosystem considerations, such as salmon biomass.

Although the estimated bycatch in 2002 and 2003 was substantially above the 6,000–9,000 expected salmon bycatch range articulated in the incidental take statement from the 1999 consultation, NMFS reaffirmed 9,000 Chinook as a benchmark for making a jeopardy determination in the 2006 supplemental biological opinion. As in the whiting fishery, exceeding this value in any one year is not by itself a reason for concluding jeopardy. NMFS therefore reaffirmed its prior determination that implementation of the Groundfish FMP is not likely to jeopardize the continued existence of any of the affected ESUs. Salmon bycatch since 2003 has been well below the 9,000 Chinook benchmark. However, in response to the larger than expected bycatch in two of five sample years, NMFS will continue to monitor the fishery and collect data to analyze take levels.

Table 5-5. Bycatch rates of Chinook salmon (# estimated Chinook per mt of groundfish) in the limited entry non-whiting trawl fishery by depth and latitude, 2002-06.

Depth	US/Canada Border to Cape Falcon	Cape Falcon to Cape Blanco	Cape Blanco to Cape Mendocino	Cape Mendocino to US/Mexico Border
		2006		
> 250 fm	0.000	0.000	0.000	0.000
125-250 fm	0.021	0.003	0.006	0.000
< 125 fm	0.004	0.000	0.000	0.111
		2005		
> 250 fm	0.000	0.000	0.000	0.000
125-250 fm	0.320	0.086	0.101	0.000
< 125 fm	0.001	0.014	0.021	0.011
		2004		
> 250 fm	0.005	0.002	0.002	0.000
125-250 fm	0.045	0.140	0.275	0.005
< 125 fm	0.118	0.910	0.217	0.144
		2003		
> 250 fm	0	0.018	0	0
125-250 fm	0.124	1.781	1.337	0.000
< 125 fm	0.283	7.504	2.594	0.294
		2002		
> 250 fm	0.017	0.000	0.017	0.000
125-250 fm	0.146	5.853	3.844	0.035
< 125 fm	0.280	2.081	3.282	0.574

5.1.3 Marine Mammals in the Commercial Sablefish Pot Fisheries

NMFS publishes an annual list of fisheries in the Federal Register, as required by the MMPA. This list of fisheries separates 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 currently designated as Category III fisheries, denoting a remote likelihood of, or no known, serious injuries or mortalities to marine mammals. However, the commercial sablefish pot fishery off Washington, Oregon, and California (both limited entry and open access, daily trip limit, and primary season) (73 FR 33761, June 13, 2008), along with other West Coast trap and pot fisheries, is proposed for recategorization from Category III to Category II based on interactions with humpback whales (*Megaptera novaeangliae*). Category III fisheries, the lowest category, have a rare or remote likelihood of seriously injuring or killing a marine mammal. Category II fisheries occasionally injure or kill marine mammals and Category I fisheries experience frequent marine mammal mortalities and serious injuries. The frequency of marine mammal mortality and serious injury is determined on a per stock basis depending on the status of the individual marine mammals stocks that interact with the fishery. The status of each marine mammal stock is assessed periodically to determine the population size and whether it is increasing, stabile, or decreasing. The status assessment includes a "potential biological removal" (PBR) calculation to determine a threshold below which serious injuries and mortalities will not affect the growth or productivity of the stock.

Humpback whale interactions with pot and trap gear fisheries off the West Coast (including the commercial sablefish pot gear fisheries) were documented in data available from the NMFS Large Whale Disentanglement Network. Based on analysis of this data, NMFS estimated that three humpback whales were seriously injured or killed between 2002 and 2006 due to entanglements with pot or trap gear, one of which was with sablefish pot gear in September 2006. A single serious injury or mortality of a humpback whale results in a level of take of 0.2 animals per year, or 8 percent of the potential biological removal. In addition to data from the Large Whale Disentanglement Network, NMFS also considered other factors prior to their proposal to recategorize the pot or trap gear fisheries from Category II to Category III, including: the type of gear being used; stranding records; and the distribution of marine mammals in the area of the fishery.

The commercial sablefish pot fisheries off Washington, Oregon, and California have been identified as causing one of the entanglements of humpback whales and they operate in the area and time when a humpback was reported entangled in sablefish pot gear. In a Category II fishery, the annual mortality and serious injury is greater than 1 percent and less than 50 percent of the PBR. Therefore, the sablefish pot fisheries off Washington, Oregon, and California, with an 8 percent PBR, are proposed to be up listed from Category III to Category II fisheries (73 FR 33760, June 13, 2008).

In the future, participants in the commercial (both limited entry and open access) sablefish fishery using pot gear (as defined at 50 CRF 600.10 "trap") may be subject to the requirements of a Category II fishery under the MMPA, pending NMFS final decision. Under the MMPA, fisheries in this category are required to: register with NMFS and obtain a marine mammal authorization to lawfully take a marine mammal incidental to commercial fishing; accommodate an observer aboard vessel(s) upon request; and comply with any applicable take reduction plans.

NMFS is currently in the process of analyzing available data on the interactions of the groundfish fishery with marine mammals.

5.1.4 Species Recently Listed Under the ESA

Lower Columbia River coho (70 FR 37160, June 28, 2005) and the Southern Distinct Population (DPS) of green sturgeon (71 FR 17757, April 7, 2006) have been listed as threatened under the ESA. As a consequence, NMFS has reinitiated its Section 7 consultation on the Council's FMP.

5.2 Criteria Used to Evaluate Impacts

Focusing on potentially significant impacts, the impact of incidental catches of ESA-listed Chinook is evaluated in this chapter, using the supplemental biological opinion (NMFS 2006) and previous opinions to provide a framework for evaluating impacts. Broadly, the threshold for significant impacts can be correlated with the thresholds used to assess jeopardy: 11,000 Chinook salmon in the whiting fishery and 9,000 fish in the non-whiting groundfish bottom trawl fishery. As noted, occasional bycatch over these thresholds is not by itself a reason to conclude jeopardy, and by the same token would not be a basis for concluding that a given alternative is likely to result in significant impacts to a listed Chinook salmon ESU. The supplemental biological opinion also proposes a variety of management measures, which would be implemented through this harvest specifications process, to reduce Chinook bycatch. This suggests that Chinook bycatch in any one year as high as 14,000 in the whiting fishery, which approximates the maximum bycatch, observed in 1995, would not be a significant impact but the likelihood that the 11,000 Chinook threshold will be exceeded several years could be considered a significant impact. This suggests the following criterion and threshold that could be used to evaluate the impacts on listed Chinook salmon ESUs:

- Is the alternative likely to result in bycatch in the whiting fishery of more than 14,000 Chinook in either 2009 or 2010 or would the average bycatch for the 2005–2010 period exceed 11,000 fish?

A similar criterion could be developed for the groundfish bottom trawl sector, based on the incidental take statement estimate and recent estimates of single-year bycatch. However, given that the 2002 maximum bycatch value is almost double the 9,000 fish benchmark, the data series is very limited, and there are wide confidence limits on the estimates due to the skewed nature of bycatch occurrence on a tow-by-tow basis, it would not be reasonable to use the maximum bycatch value in a similar fashion. The 1995 maximum in the whiting fishery is approximately one-third above the 11,000 fish consultation standard. This suggests a parallel criterion would be:

- Is the alternative likely to result in bycatch in the groundfish bottom trawl fishery of more than 12,000 Chinook in either 2009 or 2010 or would the average bycatch in the 2005–2010 period exceed 9,000 fish?

Using these criteria in a quantitative fashion, however, is not possible because no methods are available to predict the number of Chinook salmon that will be caught in either fishery. For example, the bycatch rate varies independently from the amount harvested and, as discussed in the supplemental biological opinion, is likely influenced by the interaction between ocean conditions and fishery response in terms of fishing strategy. Instead, the alternatives can be evaluated qualitatively based on the inclusion of management measures that may directly or indirectly mitigate the bycatch of Chinook salmon. For the 2007-2008 fishery, NMFS implemented an option to impose an automatic action that would require the fishery to operate offshore of a boundary line approximating the 100 fm depth contour (Ocean Salmon Conservation Zone) if the 11,000 Chinook limit is expected to be reached in season.

Establishing the harvest specifications for the whiting fishery is a separate although related action that occurs on an annual basis. For example, the development of harvest specifications for the 2009 whiting fishery will occur during the March–April 2009 time frame in the Council process. Bycatch information for the groundfish bottom trawl sector, gathered through the WCGOP, does not become available inseason as is the case for the whiting fishery; currently they become available in September or October of the following year. Thus, it is not possible to use the current incidental take statement benchmark of 9,000 fish as a trigger for inseason action. Instead, the alternatives can be evaluated based on possible direct or indirect effects of management measures on salmon bycatch. Given the current information on the spatio-temporal distribution of salmon bycatch, the following evaluation criteria are applied:

- Will the alternative likely result in an increase or decrease in groundfish bottom trawl effort shoreward of the inner RCA boundary? In the 2007–08 period, these boundaries varied seasonally and geographically between the shore and up to 100 fm, while the seaward boundary varied between 150 and 200 fm. Data from 2002-06 indicate that total Chinook salmon bycatch is highest, coastwide, shoreward of 125 fm. Data from 2005-06 indicates that Chinook salmon bycatch rates are higher between 125 and 250 fm North of Cape Mendocino, and that bycatch rates are higher shoreward of 125 fm south of Cape Mendocino (Figure XXb). RCA boundaries may be used as a proxy for a zone where Chinook bycatch is likely to be higher versus a zone where bycatch is likely to be low. However, there is considerable uncertainty based on the variability by depth between the years of WCGOP data. It is likely that the most recent years are most similar to what could be expected in 2009-10, because those years most closely represent the status quo fishery management measures, and preferred management measure alternatives for 2009-10.

- Will the alternative likely result in an increase or decrease in groundfish bottom trawl effort in the area between Cape Falcon and Cape Mendocino? Current data indicate higher bycatch rates in this region.

- Is the alternative likely to result in an overall increase or decrease in groundfish trawl effort? Other things being equal (such as the spatio-temporal distribution of effort,) reductions in overall fishing effort are likely to result in less salmon bycatch. Currently, it is not possible to predict fishing effort directly. As noted above, catch, which is projected in the modeling of alternatives, can be used as a gross proxy for fishing effort. Although less precise, this criterion is the most concrete tool for evaluating effects because it employs one of the few metrics for which projected estimates are available.

5.3 5.3 Discussion of Direct and Indirect Impacts

5.3.1 5.3.1 Harvest Limits (OY Alternatives)

Chapter 2 describes two sets of harvest limit alternatives, the rebuilding alternatives and the 2009–2010 OY alternatives. The rebuilding alternatives principally serve a heuristic function; there is no expectation that any one of them would by itself be chosen as the set of harvest limits (in combination with target species OYs) for the 2009–2010 period. Nonetheless, they deserve discussion because they provide a high degree of contrast in terms of overall strategy and as a consequence the overall distribution of fishing. As discussed above, the timing and geographic distribution of fishing are two factors that have a demonstrable relation to salmon bycatch. It is also likely that timing and geographic distribution of fishing are likely to have differential effects on other protected species. Furthermore, the general distribution of depleted groundfish species indirectly affects the distribution of fishing effort because management measures are crafted to discourage fishing in times and areas where incidental catch of these species is likely to be higher. Section 2.XXX describes the effect of the alternatives on regional and sectoral fishing opportunity, which is used below to describe the likely effect on the incidental take of Chinook salmon.

Although the resulting incidental take of Chinook salmon cannot be predicted, in 2009-10 it is likely to be within the range of incidental take experienced in the recent past.

Alternatives that would result in higher shelf fishing opportunities, and reduced fishing opportunity for bottom and midwater trawl sectors could result in reduced incidental take of Chinook salmon in comparison to status quo if fishing effort decreases in the bottom and midwater trawl sectors.

Alternatives that would result in slope, shelf, and midwater opportunities that are very similar to status quo could, subject to target species harvest limits, result in more fishing opportunity in the whiting fishery; however, more fishing effort would occur offshore. This could reduce the incidental take of Chinook salmon in comparison to the status quo.

Alternatives that would lower shelf, slope, and midwater fishing opportunities coastwide could result in the lowest incidental take of Chinook salmon in comparison to all of the other alternatives.

Alternatives that would result in higher shelf fishing opportunities coastwide and also higher slope and midwater fishing opportunities could result in increased incidental take of Chinook salmon in comparison to status quo. Absent mitigation measures, there would be an increased risk of exceeding the consultation thresholds for the whiting fishery.

The 2009–10 ABC/OY alternatives include the No Action alternative, which would establish the same OYs that were established for 2007–08, six action alternatives, and the Council-preferred alternative. No one of the six action alternatives (Alternatives 2–5) is by itself a viable alternative; they function to capture ranges of OYs for each of the stocks or stock complexes. Thus, in Table 2–XX it is possible to read across by row to see these ranges but reading down any one column for an alternative does not result in a meaningful set of OYs across all stocks. For depleted species, several intermediate values are presented, which are related to possible long-term rebuilding targets. The Council-preferred alternative contains a generally less restricted range of OYs for depleted species; final action by the Council will determine the specific OY for each of these stocks. Given this structure of the OY alternatives, it is not possible to simply compare each of the six action alternatives against each other or with the No Action or Council-preferred alternatives. For this reason, the discussion below focuses on the No Action alternative, the effects of rebuilding in the shortest time possible (establishing zero OYs for depleted species), and the depleted species OYs in the Council-preferred alternative. Although OYs are ranged for target species, these differences are not likely to have a discernable effect on Chinook salmon at the level of analysis possible in this EIS. The one possible exception is the OY for Pacific whiting. However, selecting an OY for Pacific whiting is not part of the proposed action. A range of potential OYs, based on the recent past, is included within the OY alternatives primarily as an aid for forecasting possible impacts to depleted species and revenue projection for the groundfish fisheries as a whole. The effects of differences in the magnitude and distribution of fishing effort related to this range of the potential Pacific whiting OY is likely to be slight, considering other mitigation factors, such as strategies to minimize depleted species bycatch and mitigation measures that may be implemented to reduce Chinook salmon bycatch (see below).

The No Action alternative would continue 2007–08 OYs into the next biennium. They would be implemented along with existing management measures, thus resulting in fishing opportunity experienced in the current biennium. Chinook incidental take would likely be similar to the recent past, below the 20,000 Chinook salmon incidental take authorized in the 1999 biological opinion (11,000 for the whiting trawl fishery and 9,000 for the non-whiting trawl fishery).

Alternatives that set the OYs for one or more depleted species to zero or near zero would have a variable effect, depending on which depleted species harvests are so constrained. Table 2–X shows the projected total catch of depleted groundfish species across groundfish sectors in 2008. Note that the non-tribal whiting fisheries are operating under a total catch limit for canary, darkblotched and widow rockfish. The principal depleted species caught in the Pacific whiting fishery are canary, darkblotched, and widow rockfish, and POP, although in much smaller quantities than the bottom trawl sector as a whole. Further constraints on harvest limits for these species, moving toward zero, would first tend to change fishing behavior in order to avoid bycatch and at still lower levels require reductions in the target species quota to minimize bycatch. The response in terms of fishing behavior, and resulting effects on Chinook incidental take would depend on which species were constrained. Darkblotched rockfish and POP are shelf species, so avoidance strategies could involve moving closer inshore, and/or a change in fishing strategy, for example from the DTS fishery to targeting flatfish. Based on 2002-2004 data, this could increase the risk of Chinook take, however, based on the most recently available data, impacts to Chinook salmon may not increase relative to status quo. Widow rockfish are semi-pelagic but favor rocky outcrops on the shelf, while canary rockfish are strongly associated with this type of habitat; but in both cases their distribution can be temporally variable. For that reason, there may be a less clear cut change in fishing strategy associated with the Alternative OYs for these species, and thus the effects on Chinook incidental take are not possible to reliably predict. The depleted bocaccio stock and cowcod are principally encountered in central and southern California waters and thus eliminating catch of these species would principally affect bottom trawl fisheries in those areas, leaving the whiting fishery largely unaffected. Few Chinook salmon are encountered south of Cape Mendocino, therefore changes in Chinook incidental take would therefore likely be minimal in response to changes in bottom trawl effort in this area. Setting zero OYs for all depleted species would likely require closure of most, if not all, groundfish fisheries (and other fisheries with groundfish incidental catch). In that case, incidental take of Chinook salmon in West Coast groundfish fisheries would be effectively eliminated.

The Council's preferred OY alternatives for overfished species would establish depleted species OYs that are, with the exception of the proposed 2009-10 yelloweye rockfish OY, higher than the projected 2008 catch of these species shown in Table 2–27. If the preliminarily preferred combination of rebuilding OYs were adopted, it would likely increase trawl opportunities due to increased availability in of canary rockfish, which was the most constraining overfished species in the trawl fisheries during 2007 and 2008. The management measure alternatives have been developed to fall at or below these OYs in terms of projected depleted species catch. Therefore, the projected catches under these alternatives, discussed below, combined with any mitigating measures identified, provide a clearer picture of the likely impacts of the proposed action on Chinook salmon.

Target species OYs also have some influence on fishing opportunity, although less so than the constraining OYs of the depleted species. In particular, the OY for Pacific whiting is relevant to Chinook take in the whiting fishery. Selection of this OY is not part of the proposed action, but a range of possible OYs, represented by the values under alternatives 1, 2 and 3 are presented for analytical purposes. Subject to constraints imposed by depleted species OYs, particularly canary, widow, and darkblotched rockfish, a higher Pacific whiting OY would allow greater fishing opportunity in this sector, contributing to the potential for Chinook salmon incidental take.

Based on information available for the December 2005 EFH FEIS (section 4.6.2), seabird interactions in the West Coast groundfish fishery were described as "rare and infrequent". NMFS prepared a Biological Opinion in 1990 that concluded the groundfish fisheries are not likely to jeopardize the continued existence of listed seabirds. The effects of the harvest limit alternatives on endangered and threatened seabird species are unknown. NMFS is currently in the process of analyzing available data on the interactions of the groundfish fishery with seabirds.

NMFS prepared a Biological Opinion in 1990 that concluded the groundfish fisheries are not likely to jeopardize the continued existence of listed marine mammals. Species specific discussions are available in the EFH FEIS (section 4.6.3). The effects of the harvest limit alternatives on endangered and threatened marine mammal species are unknown. NMFS is currently in the process of analyzing available data on the interactions of the groundfish fishery with marine mammals.

Based on information available for the December 2005 EFH FEIS (section 4.6.4), trawl and longline fisheries, as occur in the West Coast groundfish fishery, could adversely effect sea turtles; however, the relative effects of fisheries occurring under the Groundfish FMP on sea turtles are difficult to assess. Species specific discussions are available in the EFH FEIS (section 4.6.4). There is very little information available to estimate total mortalities of sea turtles, with the exception of the drift gillnet fishery, which is not a part of the Groundfish FMP, therefore the effects of the harvest limit alternatives on endangered and threatened sea turtle species are unknown. NMFS prepared a Biological Opinion in 1990 that concluded fisheries conducted under the groundfish FMP are not likely to jeopardize the continued existence of listed sea turtles.

The Southern DPS of green sturgeon were listed as threatened under the ESA in 2006 (71 FR 17757, April 7, 2006). The effects of the harvest limit alternatives on threatened green sturgeon are unknown. NMFS has reinitiated its Section 7 consultation on the Council's groundfish FMP.

5.3.2 2009-10 Management Measure Alternatives

Management measure alternatives can affect Chinook bycatch in two ways. For the groundfish bottom trawl sector, trip limits and other management measures can affect the overall amount of fishing effort. This is not an issue in the whiting fishery, because target catch is managed by quota. But the size of total catch limits (bycatch caps) for selected depleted species, as were applied in 2007-08, act as a constraint on overall fishing effort when they force early closure of the fishery, as occurred on July 26, 2007. Second, depending on the mix of trip limits, area closures, depth restrictions, and the whiting fishery bycatch caps, the timing and location of fishing behavior could be affected.

As discussed in the supplemental biological opinion and in Section 5.1, historically there has been no clear correlation between fishing opportunity, harvest, and Chinook take in the whiting fishery. Similarly, the data available from the groundfish bottom trawl sector show a large difference between the 2002-03 estimates, the 2004 estimates, and the 2005-06 estimates, that cannot be obviously correlated with characteristics of the fishery in those years. The 2009-10 management measure alternatives have been structured to meet the suite of "preferred" OYs identified by the Council at their April and June meetings. The Council-preferred management measure alternative is in many respects similar to the current suite of management measures in the non-whiting trawl fishery. In the whiting fishery, however, will be somewhat different in that the bycatch limits for canary, darkblotched and widow rockfish will be divided amongst the various non-tribal whiting sectors, instead of a single larger limit that applies to all of the non-tribal whiting sectors. It is not possible to quantifiably predict any differential effect of the management measure alternatives in terms of Chinook take. Given that the preferred management measures offer a fairly narrow range in terms of fishing opportunity, and that the Council-preferred alternative implements management measures very similar to No Action, take is likely to be consistent with levels experienced in the recent past, with some unquantified likelihood that the consultation standards established for the two sectors could be exceeded during the 2009-10 period. Additional mitigation measures, discussed below, could be implemented to address the risk of higher Chinook take.

For 2009 and beyond, the Council is considering establishing automatic action authority under 50 CFR 660.370 (d) to implement depth based area closures in the non-tribal whiting fishery. These depth based area restrictions can be implemented to shift fishing effort to different depths based on catches and availability of depleted species managed with sector-specific bycatch limits, as well as catches of Chinook salmon, as discussed in section 4.5.3.2. Beginning in 2007, NMFS established automatic action authority to implement an Ocean Salmon Conservation zone in response to Chinook catches observed in 2005-06. When NMFS projects the catch of Chinook salmon in the Pacific whiting fishery will exceed the 11,000 fish threshold, the Ocean Salmon Conservation Area could be put in place for all sectors of the whiting fishery though a single Federal Register notice. Catches of Chinook salmon in the whiting fishery was below the 11,000 fish threshold in 2007-08 and the Ocean Salmon Conservation Zone mitigation measure was not implemented during this biennium. The Ocean Salmon Conservation Zone will still be available in 2009 and beyond, should the 11,000 fish threshold be reached.

There is considerable uncertainty about bycatch of salmon in the bottom trawl fishery. The magnitude and distribution of bycatch in the trawl fishery since 2002 has been affected by significant changes in management measures to protect overfished groundfish stocks, including: implementation of regulations for use of selective flatfish trawl gear; smaller scale spatial closed area management; and closing trawl fishing in some areas shoreward of the RCA. The uncertainty will remain until more years of observer data are available and changes in groundfish fishery management and effort distribution are analyzed in relation to the incidental take of salmon.

The effect of the management measure alternatives on seabirds (listed and non-listed) may be negative if fishing effort intensifies in areas where seabirds congregate. However, the effects of the alternatives on effort displacement are not predictable and the effects of the alternatives are unknown. NMFS is currently in the process of analyzing available data on the interactions of the groundfish fishery with seabirds.

The effect of the management measure alternatives on marine mammals may be negative if fishing effort intensifies in areas where they congregate. However, the effects of the alternatives on effort displacement are not predictable and the effects of the alternatives are unknown. NMFS is currently in the process of analyzing available data on the interactions of the groundfish fishery with marine mammals.

There is very little information available to estimate total mortalities of sea turtles, with the exception of the drift gillnet fishery, which is not a part of the Groundfish FMP, therefore the effects of the management measure alternatives on endangered and threatened sea turtle species are unknown. The effect of the management measure alternatives on sea turtles may be negative if fishing effort intensifies in areas where sea turtles congregate. However, the effects of the alternatives on effort displacement are not predictable and the effects of the alternatives are unknown.

The effect of the management measure alternatives on the Southern DPS of green sturgeon may be negative if fishing effort intensifies in areas where they congregate. However, the effects of the alternatives on effort displacement are not predictable and the effects of the alternatives are unknown. NMFS has reinitiated its Section 7 consultation on the Council's groundfish FMP.

5.4 Discussion of Cumulative Impacts

This section briefly identifies two categories of actions that have effects that when combined with the effects of the proposed action, could result in significant impacts to ESA-listed Chinook salmon, and impacts to marine mammals, seabirds, green sturgeon, and sea turtles. First are actions occurring in the past or the present (which is defined as the period through December 31, 2008) that will have effects persisting into the period when the proposed action is implemented (i.e., January 1, 2009) and possibly beyond. Second are reasonably foreseeable effects, which will be implemented on or after January 1, 2009 and combine with the direct and indirect effects of the proposed action to produce potentially significant cumulative effects. Section 5.5 then describes the overall or cumulative effect on protected species resulting from the direct, indirect, and external effects on protected species.

Past and present actions with persistent effects:

<u>Groundfish harvest specifications and management measures, 1998-2008</u>: The 1998–08 period is identified for comparison because it marks a substantial reduction in groundfish harvest limits in comparison to earlier years. During this period rebuilding plans were developed and adopted for depleted groundfish species. Selection of a rebuilding strategy for each stock narrows the range of OYs that may be chosen for those stocks and has required the implementation of various constraining management measures to limit catches of these stocks. Past groundfish management measures authorized fishing, indirectly affecting the incidental take of Chinook salmon, as described in Section 5.1. The groundfish fishery, even with management measures in place to reduce impacts to Chinook salmon, has a persistent effect on stock productivity; however, given the life cycle of Chinook salmon, fishing mortality in more recent years would have a much greater contributory effect on population

status. NMFS in the process of analyzing available data on the interactions of fisheries conducted under the Pacific Coast groundfish FMP with marine mammals and seabirds. NMFS has reinitiated its Section 7 consultation on the Council's groundfish FMP for the Southern DPS of green sturgeon. There is very little information available to estimate total mortalities of sea turtles, with the exception of the drift gillnet fishery, which is not a part of the Groundfish FMP, therefore the cumulative effects of fisheries conducted under the Pacific Coast groundfish FMP on endangered and threatened sea turtle species are unknown.

<u>West coast non-groundfish fisheries</u>: Commercial and recreational salmon fisheries target nonlisted salmon but incidentally take listed Chinook. All fisheries have a similar persistent effect, contributing to total fishing mortality and attendant effects on stock productivity. Commercial and recreational salmon fisheries are managed to optimize harvest of hatchery-produced fish while keeping the take of wild, ESA-listed stocks within limits that will ensure their continued existence. Thus, in managing these stocks, all sources of fishing mortality are estimated or accounted for, including incidental take in groundfish fisheries. Humpback whale interactions have been documented in fisheries using pot and trap gear off the West Coast, including the West Coast crab fisheries (See Section 5.1.3). Additional species specific information on other fisheries is available in the EFH FEIS in Section 4.6.3. Green sturgeon are caught incidentally in estuaries by the white sturgeon fishery (NMFS 2002 - *NMFS 2002. Status Review for North American Green Sturgeon, Acipenser medirostris. National Marine Fisheries Service Southwest Fisheries Science Center. 110 Shaffer Road, Santa Cruz, California.*). Sea turtle capture has been documented in purse seines, gillnets, and other types of fishing gear that are not commonly used or are not authorized for use in fisheries conducted under the groundfish FMP.

<u>Nonfishing actions</u>: Salmon are vulnerable to human-caused degradation of freshwater habitat used for spawning. These effects are generally well known and diverse. They include physical barriers to migration (dams), changes in water flow and temperature (often a secondary effect of dams or water diversion projects), and degradation of spawning environments due to increased silt in the water due to adjacent land use. A very large proportion of the long-term, and often permanent, declines in salmon stocks are attributable to this class of impacts. For a detailed summary of nonfishing impacts to salmon habitat see Section 3.2.5 of the EFH Appendix in Amendment 14 to the Pacific Coast Salmon FMP. 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 strikes. In addition, seabirds may be exposed to at-sea garbage dumping and the diesel and other oil discharged into the water associated with commercial fisheries. As stated in Section 4.6.4 of the EFH FEIS, numerous human-induced factors have adversely effected sea turtle populations in the North Pacific.

Reasonably foreseeable future actions:

<u>Groundfish harvest specifications and management measures, 2010-11 and beyond</u>: As with past harvest specifications, future harvest specifications are likely to have an indirect effect on the incidental take of listed Chinook salmon, which in combination with incidental take during 2009-10 will have cumulative effects on year classes intercepted by the fisheries during that time; however it is unlikely that impacts to listed Chinook salmon will exceed the 20,000 fish threshold for multiple years. This cumulative effect will only persist as long as the affected year classes. For 2009-10 harvest specifications and management measures this is of relatively short duration. Projected rebuilding times for depleted species are much longer and rebuilding alternatives are thus likely to affect groundfish harvest levels, and thus indirectly effect interactions with Chinook salmon, seabirds, marine mammals, green sturgeon, and sea turtles for decades. However, it is likely that rebuilding strategies will continue to be modified in the future based on new information, so it is probably unrealistic to expect that any strategy adopted as part

of this proposed action will remain unchanged for the duration of a given rebuilding period. Nonetheless, in very general terms groundfish fishing effort is likely to be constrained to mitigate depleted species catch for the foreseeable future.

Trawl Rationalization – Amendment 20 to the FMP: Rationalization of the trawl fishery is not expected to fundamentally change the mixed stock fishery structure where catch of healthy species will be constrained in order to meet rebuilding requirements for overfished groundfish species. It will increase flexibility of fishers to harvest their quotas, however, this increase in flexibility will also increase uncertainty in predicting Chinook salmon, seabird, marine mammal, green sturgeon, and sea turtle interactions due to the changes that are likely to occur in fishing behavior due to changes in management measures that will regulate the trawl fishery under the new quota system.

West Coast non-groundfish fisheries: Similar to groundfish fisheries, future take in non-groundfish fisheries (i.e., on or after January 1, 2009) contributes to year-class-specific total fishing mortality of Chinook salmon, and will have persistent effects to other ESA listed species that are encountered incidentally.

Non-fishing actions: Adverse impacts to freshwater salmon habitat are likely to continue for the foreseeable future. Indirect effects to seabirds by commercial fisheries are likely to continue for the foreseeable future.

5.5 Summary of Impacts

5.5.1 Harvest Limits (OY Alternatives)

This section is intended summarize in comparative fashion the overall impact of each of the alternatives considering both direct and indirect impacts and the effects of other past, present, and reasonably foreseeable future actions. Previous harvest specifications and harvest specifications and rulemakings established in periods beyond the next biennium are likely to have a modest or negligible effect on total fishing mortality for a given Chinook stock year class or cohort over and above the direct and indirect effects of fishing in 2009-10. This is because Chinook salmon are relatively short-lived species so the year classes intercepted in 2009-10 would only experience fishing mortality from groundfish fisheries in the biennia immediately preceding and following 2009-10. Furthermore, most of the Chinook taken in the groundfish trawl fisheries are 2-year olds; mortality on this age class has less effect on stock productivity than the removal of mature fish.

Modification of rebuilding plans has a long-term effect on fishing opportunity because adopted targets determine harvest levels in future years. As stocks rebuild, constraining OYs for depleted species will increase, allowing more fishing opportunity. Unless mitigation measures are considered and implemented, increased groundfish fishing opportunity would likely increase fishing effort, and may increase incidental catches of Chinook salmon. However, it is not possible to quantifiably predict the effect changes in fishing effort will have on Chinook take.

As discussed above, in-river habitat modifications affecting reproductive success and fishing mortality in other fisheries have a large cumulative effect on Chinook salmon. Generally, these effects are assessed through Council management of directed harvest of non-listed salmon and other processes at the state and federal level.

It is not possible to distinguish how the various actions described above would interact differentially with the alternatives to produce relatively different effects on Chinook salmon, marine mammals, seabirds, sea turtles, and green sturgeon, in comparison to the description of direct/indirect effects described in Section 5.3.1.

5.5.2 2009–10 Management Measure Alternatives

As with the OY alternatives, there is no information to indicate how other actions contributing to cumulative effects might combine with direct/indirect effects on Chinook salmon, marine mammals, seabirds, sea turtles, and green sturgeon, described in Section 5.3.2, to produce relative differences in effects among the alternatives.

CHAPTER 6 DESCRIPTION OF THE FISHERIES MANAGEMENT REGIME

This chapter summarizes information provided in the 2007-08 groundfish harvest specifications and the groundfish SAFE document. The information is incorporated by reference and briefly summarized here.

6.1 Current Biennial Management

Starting in 2005 and 2006, harvest specifications (ABCs and OYs) and management measures are established for two years. This new cycle extends Council decision-making over three meetings. At its November meeting, 14 months before the start of the biennium, the Council identifies preliminary ABCs and OYs. At the following April and/or March meeting, the Council finalizes these harvest specifications and identifies a preliminary range of management measures. The Council makes its final decisions on these management measures at the June meeting preceding the next biennium. This schedule allows enough time for NMFS to publish a proposed rule in the *Federal Register* and take public comment before its final decision on whether to approve the Council recommendations. More time is also available to meet the procedural and documentary requirements of NEPA. Finally, this cycle accommodates an "off-year" during which the Council and NMFS would be less occupied with ongoing management of the groundfish fishery and could spend more time on long-term initiatives such as developing better assessment models and surveys.

6.2 Catch Monitoring and Accounting

Various state, Federal, and tribal catch monitoring systems are used in West Coast groundfish management. These are coordinated through the Pacific States Marine Fisheries Commission (PSMFC). PacFIN is the commercial catch monitoring database, and RecFIN is the database for recreational fishery catch monitoring. There are two components to total catch: (1) catch landed in port, and (2) catch discarded at sea. Discards occur for regulatory reasons (i.e., catch in excess of trip and/or landing limits) and market reasons (i.e., catch of unmarketable species or size).

Management measures are normally imposed, adjusted, or removed at the beginning of the biennial fishing period, but may, if the Council determines it necessary, be imposed, adjusted, or removed at any time during the period. As described in Section 6.2 of the Groundfish FMP, four different categories of management actions are authorized, ranging from automatic actions initiated by NMFS to full rulemaking actions requiring a minimum of two Council meetings. Inseason adjustments typically fall under the category of notice actions that are routine (as defined by the FMP) in nature and usually require one Council meeting and one *Federal Register* notice. Federal and/or state responses to management goals varies according to the specification of the harvest targets and are largely governed by the definitions in the FMP and Federal Regulations.

6.3 Standardized Bycatch Reporting Methodologies

Establishing a standardized bycatch reporting methodology and limiting bycatch to the extent practicable are MSA mandates. Effective bycatch accounting and control mechanisms are also critical for staying within target total catch OYs. The first element in limiting bycatch is accurately measuring bycatch rates by time, area, depth, gear type, and fishing strategy. Current programs, described in detail in the 2007-08 harvest specifcations EIS and the groundfish SAFE are:

- West Coast Groundfish Observer Program
- At-Sea Pacific Whiting Observer Program
- Shore-based Pacific Whiting Observation Program
- Central California Marine Sport Fish Project
- Oregon Marine Recreational Observation Program
- WDFW Groundfish At-Sea Data Collection Program
- WDFW Ocean Sampling Program
- Tribal Observer Program

6.4 Exempted Fishing Permits

An EFP is a NMFS-issued Federal permit that authorizes a vessel to engage in an activity that is otherwise prohibited by the MSA or other fishery regulations for the purpose of collecting limited experimental data. EFPs can be issued to Federal or state agencies, marine fish commissions, or other entities, including individuals.

The specific objectives of a proposed exempted fishery may vary. The groundfish FMP provides for EFPs to promote increased utilization of underutilized species, realize the expansion potential of the domestic groundfish fishery, and increase the harvest efficiency of the fishery consistent with the MSA and the management goals of the FMP. However, EFPs are commonly used to explore ways to reduce effort on depressed stocks, encourage innovation and efficiency in the fisheries, provide access to constrained stocks while directly measuring the bycatch associated with those fishing strategies, and to evaluate current and proposed management measures.

Proposed EFPs are considered by the Council at the June meeting of the management year to allow the Council the opportunity to set-aside OY for EFPs it has tentatively approved. Final approval of EFPs for any given year occurs at the November Council meeting. For additional information on EFP protocols, visit the Council web site and review Council Operating Procedure 19 (www.pcouncil.org/operations/cops.html).

6.5 Research Fisheries

The reduction in directed fisheries and overall landings has resulted in less information available to fishery managers compromising efforts to assess stock abundance and recovery. There is an increasing reliance on fishery-independent sources of information such as research fisheries and surveys. This is particularly true for depleted species such as widow rockfish, yelloweye rockfish, cowcod, bocaccio, and canary rockfish since fisheries are designed to avoid areas inhabited by these species. There is a relatively sparse amount of data available for widow rockfish because widow rockfish directed fisheries have been eliminated and the Pacific whiting sectors have modified their behavior to avoid encounters with widow rockfish. Assessment scientists will continue to rely on research fisheries as landings, age composition, and logbook catch rate data from many fishery sources decreases. A summary of long-term research fisheries and resource surveys can be found in Appendix A, Section 1.1.1.3. of the 2005–06 groundfish harvest specifications FEIS (PFMC 2004d).

6.5.1 Stock Assessment Process and Rebuilding Analyses

The Council process for setting groundfish harvest levels and other specifications depends on periodic assessments of the status of groundfish stocks, rebuilding analyses of those stocks that are depleted and managed under rebuilding constraints, and a report from an established assessment review body or a STAR Panel. As appropriate, the SSC recommends the best available science for groundfish management decision-making in the Council process. The SSC reviews new assessments, rebuilding analyses, and STAR Panel reports and recommends the data and analyses that should be used to set groundfish harvest levels and other specifications for the following biennial management period.

In the case of depleted species, stock assessment results form the basis of a rebuilding analysis, which in turn is used to develop rebuilding policies and choose the rebuilding target identified in each rebuilding plan. The elements of rebuilding analyses are described in the SSC Terms of Reference for Rebuilding Analyses (SSC 2005). The MSA mandates these rebuilding periods need to be the shortest time possible while taking into account the status and biology of the depleted stock, the needs of fishing communities, and the interaction of the depleted stock within the marine ecosystem.

6.6 Vessel Monitoring System

In response to increasingly complex fishery regulations, and particularly the use of closed areas like the RCAs, NMFS implemented a vessel monitoring system (VMS) monitoring program, which includes satellite tracking of vessel positions and a declaration system for those vessels legally fishing within an RCA. VMS was initially implemented on January 1, 2004, for all vessels participating in the groundfish fishery with a limited entry permit. In 2007 the VMS requirement was expanded to all commercial vessels that take and retain, possess or land federally-managed groundfish species taken in Federal waters or in state waters prior to transiting Federal waters, which includes all directed and incidental groundfish open access fisheries. VMS is also required on California halibut, sea cucumber, and ridgeback prawn trawl vessels fishing in Federal waters or transiting through state waters to fish in Federal waters, even if not landing groundfish. The broader requirements help to enforce groundfish essential fish habitat closed area. The EA prepared by NMFS for this action contains detailed description and analysis of the VMS monitoring program (NMFS 2003).

CHAPTER 7 SOCIOECONOMIC ENVIRONMENT

7.1 Affected Environment

7.1.1 Introduction

The Pacific Coast groundfish fishery is a multi-species fishery (over 90 groundfish species) taking place off the coasts of Washington, Oregon, and California where groundfish are harvested as target catch or indirectly as bycatch in other fisheries. Groundfish fishermen themselves participate in other fisheries as well. These other fisheries include salmon, highly migratory species, CPS, shrimp, and crab. All of these fisheries contribute to a wide range of commercial, recreational, and treaty activities that have economic, social, and cultural significance to those engaged in harvesting fish resources. Fish buyers and processors, suppliers of commercial and recreational fishing equipment and services, and fishing communities depend on these fisheries. The aim of this chapter is to describe these activities and relate them to the conservation and management measures being proposed, particularly in the context of the effects of reducing the bycatch of the seven overfished species. Information will also be provided relating to maintaining year-round groundfish fishing, which is another FMP objective.

The information and organization of this discussion of the socio-economic environment draws upon the following documents—in many instances repeating or summarizing the relevant information, and, in other instances, updating the information provided:

The final EIS for the 2005-06 groundfish specifications document (PFMC 2004a)

The Bycatch EIS (NMFS 2004)

The Groundfish EFH document (NMFS 2005),

The final EIS for the 2007-08 groundfish specifications document (PFMC 2006)

The 2008 Groundfish SAFE document, volume 1 (PFMC 2008b)

7.1.1.1 *Management Context*

The industry and community descriptions and impact analyses found in this chapter are shaped by the typical analyses undertaken to address the setting of harvest quotas and associated management measures, but also by the recent ruling of the Ninth Circuit Court of Appeals concerning rebuilding plans for overfished species. Therefore, is useful to summarize the basic context of the current FMP and the important directions for management provided by the Ninth Circuit.

Current FMP

The Council allocates harvest specifications (OYs) between the limited entry and open access categories. Most of the Pacific coast commercial groundfish harvest is taken by the limited entry fleet. Commercial harvest rates of groundfish are constrained by annual harvest guidelines, two-month or one-month cumulative period landing limits, individual trip limits, size limits, species-to-species ratio restrictions, area closures, and other measures. This program is designed to control effort so that the allowable catch is taken at a slow enough rate to stretch the season over the full year. Cumulative period catch limits are set by comparing current and previous landings rates with the year's total available catch and predicted participation.

The groundfish limited entry program applies to bottom and midwater trawl, longline, and trap (or pot) gears. Each limited entry permit is endorsed for a particular gear type and that gear endorsement cannot be changed, so the distribution of permits among gear types has been fairly stable. Each permit also has a vessel length endorsement. The total number of permits has typically changed only when multiple permits have been combined to create a new permit with a longer length endorsement. However, in December 2003, a buyback program permanently retired 91 trawl permits, roughly 35 percent of the total. Limited entry permits can be sold and leased by their owners, so the distribution of permits among the three states often shifts. At the beginning of 2003, roughly 39 percent of the limited entry permits were assigned to vessels making landings in California, 37 percent to vessels making landings in Oregon, and 23 percent to vessels making landings in Washington.

Other non-treaty commercial fisheries, which either target groundfish or catch them incidentally, but do not hold Federal groundfish limited entry permits, are considered "open access." Gears used by participants in open access commercial fisheries include longline, vertical hook and line, troll, pot, setnet, trammel net, shrimp and prawn trawl, California halibut trawl, and sea cucumber trawl gears. Open access trawl gear may not target groundfish, but may land incidental groundfish caught while targeting other species. Open access trap/pot and longline vessels may target groundfish under certain restrictions. Open access vessels may possess limited entry licenses for other, state-managed nongroundfish fisheries such as pink shrimp or Dungeness crab.

Members of the Makah, Quileute, Hoh, and Quinault tribes participate in treaty commercial, ceremonial and subsistence fisheries for groundfish off the Washington coast according to their treaty rights. Participants in the treaty commercial fishery use similar gear to non-treaty commercial fishers who operate off Washington, and groundfish caught in the treaty commercial fishery is typically sold through the same markets as non-treaty commercial groundfish catch. There are set treaty 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. Management of treaty fisheries is conducted by the individual tribes in accordance with their treaty regulations.

In addition to commercial and treaty fisheries, there are recreational fisheries associated with the groundfish fishery. Marine recreational fisheries consist of charter vessels, private vessels, and shore anglers. Charter vessels are larger vessels for hire, which typically can fish farther offshore than most vessels in the private recreational fleet. Shore-based anglers often fish in intertidal areas, within the surf, or off jetties. Recreational fisheries are managed by a series of seasons, area closures, and bag limits.

Ninth Circuit Court of Appeals

Since 2000, the management of west coast groundfish fisheries has been heavily centered on the need to rebuild overfished groundfish species. A species is considered overfished when its biomass is below 25 percent of its estimated unfished biomass level. West coast groundfish stocks are highly inter-mixed, meaning that overfished species co-occur and are caught in common with more abundant groundfish stocks. This inter-mixed nature of groundfish stocks means that eliminating the directed targeting of overfished species usually does not achieve the catch reductions needed to meet rebuilding goals. To adequately constrain total catch of overfished species, management must also constrain targeted fishing on healthy stocks that co-occur with overfished species in order to reduce incidental overfished species catch. This need to constrain harvest of healthy stocks has economic implications to sectors and communities engaged in fish harvesting and processing, because of the loss in landings and revenue that could have been derived from both overfished species and many target species that co-occur with those overfished species. The reader is referred to Table 2-1 for a full presentation of the harvest levels of overfished species and target species being considered in this EIS; chapter 2 also includes a discussion of the conservation and management measure alternatives proposed to constrain harvests so that these levels are not exceeded and burden of conservation and management across the various harvest groups is equitably distributed.

According to the MSA, when a fishery is overfished, any fishery management plan, amendment, or proposed regulations shall:

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

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

As indicated in chapter 2 (Section 2.1.1), in response to the August 2005 ruling by the Ninth Circuit Court of Appeals, the Council through this EIS is reconsidering its rebuilding plans for all overfished species to ensure they comply with the MSA as interpreted by the Court. The Court's interpretation of the rebuilding requirements of the MSA can be summarized to include the following directions: 1) the rebuilding periods must be as short as possible; 2) that short-term needs of fishing communities may be taken into account in setting rebuilding periods; and 3) to avoid disastrous short-term consequences, limited quotas may be set that allow for some fishing of plentiful species, despite the inevitability of bycatch.

For purposes of assessing the needs of fishing communities, the Council adopted the following general definition at its April 2006 meeting:

> Fishing Communities need a sustainable fishery that is safe, well managed, and profitable, that provides jobs and incomes, that contributes to the local social fabric,

culture, and image of the community, and helps market the community and its services and products.

This chapter will therefore provide detailed and focused socio-economic information and analyses relating to rebuilding species and fishing communities.

Overview of General Trends

In addition to the management context, it is important to understand the fisheries context that underlies the determination of the conservation and management measures being developed through this EIS. For purposes of discussion, the west coast groundfish fishery will be described in terms of overall landings as a means of describing recent trends and for describing alternative ways that various groundfish sectors are classified. Given that groundfish fishermen engage in fisheries other than groundfish and that groundfish communities depend on other fisheries as well, it is also important to discuss the groundfish fishery in relation to other west coast fisheries.

Groundfish Fishery

Harvest Sectors and Sub-sectors, Landings and Revenues

As discussed above, the groundfish fishery is made of many components. Table 7-1 summarizes sector trends in harvests from 1995 to 2007. These components are often summed in various ways depending on the management issue. For example, the non-treaty Pacific whiting fishery is composed of three sectors— at-sea catcher-processors, at-sea motherships, and shoreside whiting limited entry trawl. The total whiting fishery is made up of the non-treaty whiting sector and the treaty shore-based and at-sea whiting fisheries. Shore-based groundfish landings can be estimated by summing shoreside whiting limited entry trawl, shore-based non-whiting limited entry trawl, shoreside limited entry line gear, shoreside limited entry pot gear, shoreside directed open access, and shoreside incidental open access landings. Throughout the remainder of this chapter, the discussion will involve one or more of these components.

Some trends should be noted. Whiting harvests by the at-sea catcher-processors, at-sea treaty fishery, and shoreside whiting limited entry trawl fisheries peaked in 2005. At-sea mothership harvest and treaty shoreside whiting landings peaked in 2006, reflecting the recent introduction of a new shore-based treaty whiting fishery. Treaty whiting fisheries were first instituted in 1996 along with the at-sea treaty fishery. Harvests by the shoreside non-whiting limited entry trawl fleet reached their lowest level of less than 17,000 mt in 2006. This compares with historic highs of 49,000 mt in the mid 1990s. Non-trawl limited entry and open access fisheries were near all-time lows in 2007, along with recreational fisheries. The recent decline in groundfish landings reflects Council efforts to limit fishing in order to rebuild overfished species.

Table 7-1. Trends in total commercial, treaty, and recreational landings and deliveries of groundfish by sector (mt).

	Non-Treaty Sectors									Treaty Sectors			
	Trawl Sectors				Non-Trawl Sectors								
Year	At-Sea Catcher-Processors	At Sea Mothership	Shoreside Whiting LE Trawl	Shoreside Non-whiting LE Trawl	Shoreside LE Line Gear	Shoreside LE Pot Gear	Shoreside Directed OA	Shoreside Incidental OA	Recrea-tional	Shoreside Treaty	At-Sea Treaty	Total Groundfish	Total Non-Treaty, Non-whiting Shorebased
1995	61,589	40,175	75,458	48,510	3,000	780	3,769	810	2,407	832	0	237,330	59,276
1996	66,322	43,826	83,636	49,205	3,825	541	3,443	1,073	3,005	903	15,313	271,093	61,092
1997	71,175	50,546	87,762	44,010	3,780	440	3,256	834	3,087	846	25,079	290,815	55,406
1998	70,690	50,371	88,726	35,011	2,301	398	2,563	613	2,450	495	24,786	278,405	43,336
1999	68,357	47,870	84,139	34,299	2,581	719	1,499	666	2,934	778	26,549	270,391	42,698
2000	68,340	47,166	86,177	29,810	2,417	708	1,203	504	2,386	788	6,402	245,901	37,028
2001	59,006	35,798	73,612	23,250	1,959	565	1,223	443	2,729	825	6,330	205,739	30,169
2002	36,580	26,624	45,702	20,455	1,793	372	1,099	406	2,453	918	22,286	158,689	26,579
2003	41,315	26,027	51,296	21,008	1,872	611	1,219	281	3,479	5,452	19,674	172,233	28,470
2004	73,582	24,155	93,240	20,019	1,935	634	1,215	150	1,987	8,698	23,767	249,382	25,941
2005	79,093	48,599	97,974	18,882	2,171	626	1,496	50	2,091	13,698	23,912	288,593	25,316
2006	78,931	55,428	97,564	16,904	2,120	610	1,407	39	2,343	31,519	5,571	292,435	23,423
2007	73,338	47,884	73,691	19,604	1,882	457	1,024	44	1,952	26,573	5,167	251,616	24,963
	Share of Total Groundfish Landings and Deliveries												
1995	26.0%	16.9%	31.8%	20.4%	1.3%	0.3%	1.6%	0.3%	1.0%	0.4%	0.0%	100%	
1996	24.5%	16.2%	30.9%	18.2%	1.4%	0.2%	1.3%	0.4%	1.1%	0.3%	5.6%	100%	
1997	24.5%	17.4%	30.2%	15.1%	1.3%	0.2%	1.1%	0.3%	1.1%	0.3%	8.6%	100%	
1998	25.4%	18.1%	31.9%	12.6%	0.8%	0.1%	0.9%	0.2%	0.9%	0.2%	8.9%	100%	
1999	25.3%	17.7%	31.1%	12.7%	1.0%	0.3%	0.6%	0.2%	1.1%	0.3%	9.8%	100%	
2000	27.8%	19.2%	35.0%	12.1%	1.0%	0.3%	0.5%	0.2%	1.0%	0.3%	2.6%	100%	
2001	28.7%	17.4%	35.8%	11.3%	1.0%	0.3%	0.6%	0.2%	1.3%	0.4%	3.1%	100%	
2002	23.1%	16.8%	28.8%	12.9%	1.1%	0.2%	0.7%	0.3%	1.5%	0.6%	14.0%	100%	
2003	24.0%	15.1%	29.8%	12.2%	1.1%	0.4%	0.7%	0.2%	2.0%	3.2%	11.4%	100%	
2004	29.5%	9.7%	37.4%	8.0%	0.8%	0.3%	0.5%	0.1%	0.8%	3.5%	9.5%	100%	
2005	27.4%	16.8%	33.9%	6.5%	0.8%	0.2%	0.5%	0.0%	0.7%	4.7%	8.3%	100%	
2006	27.0%	19.0%	33.4%	5.8%	0.7%	0.2%	0.5%	0.0%	0.8%	10.8%	1.9%	100%	
2007	29.1%	19.0%	29.3%	7.8%	0.7%	0.2%	0.4%	0.0%	0.8%	10.6%	2.1%	100%	
	Share of Total Groundfish Non-Treaty, Non-whiting Landings and Deliveries												
1995				81.8%	5.1%	1.3%	6.4%	1.4%	4.1%				100%
1996				80.5%	6.3%	0.9%	5.6%	1.8%	4.9%				100%
1997				79.4%	6.8%	0.8%	5.9%	1.5%	5.6%				100%
1998				80.8%	5.3%	0.9%	5.9%	1.4%	5.7%				100%
1999				80.3%	6.0%	1.7%	3.5%	1.6%	6.9%				100%
2000				80.5%	6.5%	1.9%	3.2%	1.4%	6.4%				100%
2001				77.1%	6.5%	1.9%	4.1%	1.5%	9.0%				100%
2002				77.0%	6.7%	1.4%	4.1%	1.5%	9.2%				100%
2003				73.8%	6.6%	2.1%	4.3%	1.0%	12.2%				100%
2004				77.2%	7.5%	2.4%	4.7%	0.6%	7.7%				100%
2005				74.6%	8.6%	2.5%	5.9%	0.2%	8.3%				100%
2006				72.2%	9.0%	2.6%	6.0%	0.2%	10.0%				100%
2007				78.5%	7.5%	1.8%	4.1%	0.2%	7.8%				100%

Adapted from Groundfish Allocation Committee tables and recent PacFIN and NMFS reports.

Table 7-1 also shows each sector's percentage share of the total groundfish fishery. There has generally been a small decline in non-whiting limited entry trawl harvests as a share of total non-whiting non-treaty harvests, although this trend may have reversed in 2007. This trend has been matched by a slight increase in the recreational share, from 4 percent to 5 percent in 1995 and 1996 respectively to current levels above 8 percent. (Note: The sharp increases in recreational harvests in 1998 and 2003 were due to increases in Central and Northern California recreational harvests of lingcod, widow rockfish, and rockfish contained in the category "minor rockfish south.")

Tables 7-2a, 7-2b, and 7-2c list commercial sector landings for commercially important species on the west coast by round weight, exvessel revenue in current dollars, and exvessel revenue in inflation-adjusted dollars. Table 7-2a shows the large volume of Pacific whiting landings and the emergence of shore-based processing in the early 1990s. (Note that the at-sea sector includes joint venture fisheries occurring in the 1980s.) While total groundfish landings peaked in 1994, landings of species other than whiting continued a long-term declining trend during this period. Total groundfish landings measured by weight peaked in 1994 at 305,312 mt and then declined by nearly one-half through 2003. However, increases in whiting stocks have bumped the total groundfish harvests up significantly in recent years. Flatfish, sablefish, and rockfish landings all peaked in 1982, the first full year under Groundfish FMP management. (Note that some decline in landings is to be expected as standing stocks are fished down to MSY biomass.) Landings of non-whiting groundfish species declined steeply after 1998, when species began to be designated overfished. Rockfish landings have fallen by nine-tenths since the mid 1990s.

Table 7-2b shows total groundfish exvessel value peaking in 1997 at $101.2 million, three years after the peak in total groundfish landings. The difference between these trends is partly explained by the increase in exvessel prices for sablefish between 1994 and 1997 at a time when total sablefish landings were fairly stable. From the 1997 peak, total exvessel value of groundfish landings declined 50 percent to about $51 million in 2002, but has since increased to more than $80 million largely due to increased demand for whiting.

Table 7-2c adjusts the values in Table 7-2b for inflation, allowing a more direct comparison of the real value of landings between years. Measured in constant 2007 dollars, the value of rockfish landings fell by three-quarters between 1998 and 2007. The inflation-adjusted value of sablefish and flatfish landings remained fairly stable during this period. Measured in constant 2007 dollars, the value of total groundfish landings peaked in 1989 at $149 million. By 2001, the inflation adjusted value of total groundfish landings had fallen by more than one-half.

Whiting harvests reached an all time high in 2006 at about 266,000 mt whereas for non-whiting groundfish species there are significant declines in harvest starting in 1998, with recent years' harvests averaging around 25,000 mt. In terms of exvessel revenue, increased whiting harvests have brought total groundfish revenue up from a low of $51 million in 2002 to more than $80 million in 2006 and 2007. However, this is still below the 1981-1997 average of $115 million. (Note that totals include treaty harvests.) Non-whiting groundfish revenues have increased from a low of $38 million in 2002 to more than $44 million in 2006 and 2007 due to higher sablefish and flatfish revenues. However, this is still below the 1998-2007 inflation adjusted average of $52 million, and less than 60 percent of the 1981-1997 inflation-adjusted average of $80 million. (Note 1981-1997 is used for comparison because the sharp downward trends in lingcod and rockfish began in 1998 with the beginning of rebuilding efforts.)

Table 7-2a. Total domestic shoreside landings and at-sea deliveries (round weight mt) from west coast (WA, OR, CA) ocean area fisheries (0-200 miles) 1981-2007 (includes commercial treaty fisheries, based on PacFIN data and Council [1997]).

Year	Lingcod	Whiting, At Sea	Whiting, Shoreside	Flatfish	Sablefish	Rockfish	Other Groundfish	Total Groundfish	Total Groundfish - Less Whiting	Total Groundfish - Less At Sea Whiting	Pink Shrimp	Spot Prawn, Trawl	Spot Prawn, Pot	Ridgeback Prawn, Trawl	Pacific Halibut
1981	3,307	73,557	838	25,972	11,419	59,774	1,729	176,596	102,201	103,039	18,202	174	4	87	160
1982	3,822	67,465	1,027	32,613	18,625	61,470	1,277	186,299	117,807	118,834	12,704	162	8	61	164
1983	4,163	72,100	1,051	29,639	14,685	48,157	889	170,684	97,533	98,584	6,052	58	1	70	322
1984	4,060	78,889	2,721	27,703	14,077	40,020	1,079	168,549	86,939	89,660	4,488	29	0	259	598
1985	3,883	31,692	3,894	30,400	14,308	37,347	967	122,491	86,905	90,799	12,408	26	4	357	536
1986	1,894	81,639	3,463	26,127	13,290	37,012	661	164,086	78,984	82,447	26,330	12	13	130	748
1987	2,586	105,997	4,795	28,796	12,784	40,242	2,644	197,844	87,052	91,847	31,060	21	14	85	307
1988	2,656	135,781	6,867	27,043	10,876	40,980	3,788	227,991	85,343	92,210	32,334	23	41	55	260
1989	3,580	203,578	7,414	29,880	10,439	45,334	2,694	302,919	91,927	99,341	35,550	30	48	61	212
1990	2,932	175,685	8,115	27,701	9,179	43,265	1,813	268,690	84,890	93,005	24,553	19	101	34	153
1991	3,167	200,594	21,040	30,515	9,496	35,282	2,978	303,072	81,438	102,478	19,064	21	103	52	169
1992	1,883	148,186	56,127	24,796	9,360	37,000	3,255	280,607	76,294	132,421	35,710	35	65	27	217
1993	2,200	91,640	42,108	22,107	8,145	38,252	3,483	207,935	74,187	116,295	22,451	51	105	33	252
1994	2,834	162,923	73,611	19,284	7,661	35,361	3,638	305,312	68,778	142,389	14,981	133	66	71	179
1995	1,700	98,376	74,967	19,706	7,951	32,171	2,135	237,006	63,663	138,630	11,342	136	42	187	142
1996	1,790	123,419	85,127	20,807	8,339	30,487	2,559	272,528	63,982	149,109	13,800	178	54	264	150
1997	1,652	142,726	87,410	19,508	7,951	25,576	2,271	287,094	56,958	144,368	17,456	263	79	177	201
1998	506	144,961	87,627	16,722	4,410	22,619	2,180	279,025	46,437	134,064	4,342	257	117	197	223
1999	441	141,103	83,388	20,213	6,660	16,408	1,627	269,840	45,349	128,737	12,404	185	93	632	220
2000	145	120,906	85,563	16,315	6,296	11,702	1,498	242,425	35,956	121,519	14,653	121	81	705	223
2001	156	100,531	73,326	13,863	5,646	7,806	1,427	202,755	28,898	102,224	17,595	92	95	161	331
2002	205	84,727	45,276	13,220	3,830	5,974	2,115	155,347	25,344	70,620	25,302	99	79	215	422
2003	166	86,610	55,140	14,160	5,451	4,136	2,154	167,615	26,067	81,402	13,874	3	73	225	399
2004	115	120,590	95,005	13,726	5,848	3,340	2,770	241,394	25,799	120,804	8,969	2	101	27	451
2005	139	150,880	108,316	14,957	6,344	3,365	1,455	285,456	26,260	134,576	10,860	0	122	25	447
2006	260	139,764	126,515	12,628	6,197	3,063	992	289,420	23,141	149,656	8,400	0	146	73	378
2007	266	126,239	97,761	15,418	5,241	3,453	733	249,111	25,111	122,872	10,935	1	118	89	343
1981-2007 Avg	*1,871*	*118,910*	*49,574*	*21,993*	*9,056*	*28,504*	*2,030*	*231,929*	*63,453*	*113,034*	*17,253*	*79*	*66*	*161*	*304*
1991-2007 Avg	*1,037*	*128,481*	*76,371*	*18,114*	*6,754*	*18,588*	*2,192*	*251,526*	*46,686*	*123,068*	*15,420*	*93*	*90*	*186*	*279*
1998-2007 Avg	*240*	*121,631*	*85,792*	*15,122*	*5,592*	*8,187*	*1,695*	*238,239*	*30,836*	*116,647*	*12,733*	*76*	*102*	*235*	*344*

NOTE: For 1981-1990, at-sea whiting catch estimates are from Council 1997.

Table 7-2a. Total domestic shoreside landings and at-sea deliveries (round weight mt) from west coast (WA, OR, CA) ocean area fisheries (0-200 miles) 1981-2007 (includes commercial treaty fisheries, based on PacFIN data and Council [1997]) (continued).

Year	California Halibut	Salmon	Sea Cucumber	California Sheephead	Gillnet Complex	CPS Squid	CPS Wetfish	HMS	Dungeness Crab	Other Crus-taceans	Other Species	Total Non-groundfish	Total
1981	191	7,967	0	0	1,258	23,510	105,357	152,465	9,011	1,480	38,365	358,231	534,827
1982	180	8,831	63	0	1,173	16,360	79,436	115,923	7,623	1,233	46,247	290,168	476,468
1983	289	2,936	74	0	678	1,959	32,076	114,644	7,169	1,403	48,437	216,168	386,852
1984	239	2,180	24	0	829	993	38,084	85,203	6,239	1,849	37,260	178,274	346,822
1985	149	5,043	0	0	1,954	11,071	26,657	34,004	7,703	1,754	43,790	145,456	267,947
1986	197	7,384	35	0	1,801	21,290	28,817	36,916	7,402	1,567	51,113	183,755	347,841
1987	224	9,410	49	0	1,370	19,985	36,860	35,902	8,464	1,447	56,546	201,744	399,588
1988	249	12,518	72	0	1,082	37,232	37,902	36,616	16,715	1,430	59,874	236,403	464,392
1989	273	6,869	0	0	875	40,936	35,160	27,446	16,045	1,806	67,110	232,421	535,341
1990	190	4,682	67	0	775	28,447	39,198	16,088	13,529	2,223	49,672	179,731	448,422
1991	235	3,734	264	0	851	37,388	45,047	11,135	6,185	2,035	31,752	158,035	461,107
1992	272	2,049	0	0	379	13,116	39,219	13,899	15,125	1,607	26,641	148,361	428,968
1993	218	2,214	295	0	309	42,889	31,397	17,300	17,411	1,773	20,341	157,039	364,974
1994	188	1,802	298	118	208	55,489	26,669	20,349	17,682	1,221	17,421	156,875	462,186
1995	262	4,756	268	115	276	70,363	52,963	18,538	16,937	1,462	17,857	195,646	432,652
1996	306	3,306	381	115	347	80,715	49,154	29,396	24,564	1,498	18,931	223,159	495,685
1997	415	3,700	209	141	340	70,471	70,617	26,406	12,347	2,010	22,731	227,563	514,655
1998	415	1,850	349	119	255	2,931	68,576	29,640	11,748	1,720	10,671	133,410	411,294
1999	385	2,709	272	63	394	92,122	76,092	17,702	15,783	1,478	11,901	232,435	501,575
2000	218	3,707	291	79	333	117,984	103,360	14,534	13,015	1,619	13,496	284,419	526,692
2001	245	3,358	323	68	264	85,959	106,105	14,816	11,234	1,643	12,530	254,819	457,100
2002	309	4,660	426	52	353	72,958	106,754	12,908	15,505	1,465	16,639	258,146	413,493
2003	293	5,986	344	48	141	39,348	77,843	20,004	32,556	1,287	24,577	217,001	384,616
2004	458	5,662	261	40	174	40,068	103,288	15,117	27,542	631	17,218	220,008	461,401
2005	418	4,298	265	40	192	55,608	101,922	10,080	24,120	368	18,727	227,494	512,951
2006	327	1,190	215	39	221	49,180	107,308	13,473	35,117	1,265	10,594	227,926	517,346
2007	178	1,443	223	31	263	49,623	144,669	12,491	20,054	1,341	9,073	250,873	499,984
1981-2007 Avg	*271*	*4,602*	*188*	*40*	*633*	*43,629*	*65,575*	*35,296*	*15,438*	*1,504*	*29,612*	*214,650*	*446,488*
1991-2007 Avg	*302*	*3,319*	*276*	*63*	*312*	*57,424*	*77,117*	*17,517*	*18,643*	*1,437*	*17,712*	*210,189*	*461,569*
1998-2007 Avg	*325*	*3,486*	*297*	*58*	*259*	*60,578*	*99,592*	*16,077*	*20,667*	*1,282*	*14,542*	*230,653*	*468,645*

NOTE: For 1981-1990, at-sea whiting catch estimates are from Council 1997.

Table 7-2b. Total domestic shoreside landings and at-sea deliveries (exvessel revenue, thousands of current dollars) from west coast (WA, OR, CA) ocean area fisheries (0-200 miles) 1981-2007 (includes commercial treaty fisheries, based on PacFIN data and Council [1997]).

Year	Lingcod	Whiting, At Sea	Whiting, Shoreside	Flatfish	Sablefish	Rockfish	Other Groundfish	Total Groundfish	Total Groundfish - Less Whiting	Total Groundfish - Less At Sea Whiting	Pink Shrimp	Spot Prawn, Trawl	Spot Prawn, Pot	Ridgeback Prawn, Trawl	Pacific Halibut
1981	1,662	12,264	141	14,834	5,258	22,339	757	57,254	44,850	44,991	20,160	780	38	165	411
1982	2,088	11,863	182	19,727	10,282	26,479	695	71,315	59,271	59,452	14,278	811	87	157	433
1983	2,284	12,783	186	17,735	7,691	23,775	529	64,983	52,014	52,200	9,753	370	13	141	805
1984	2,184	11,739	406	16,361	6,684	22,111	637	60,122	47,977	48,383	4,526	217	1	327	1,105
1985	2,241	4,631	571	18,633	10,564	23,223	576	60,440	55,238	55,809	9,648	245	47	483	1,226
1986	1,321	10,605	452	17,425	10,985	25,675	479	66,943	55,886	56,338	30,975	118	117	234	2,489
1987	2,151	14,662	664	22,235	13,423	31,069	1,949	86,153	70,827	71,491	46,534	203	176	209	1,250
1988	2,137	22,440	1,136	20,796	12,499	29,323	2,241	90,572	66,996	68,132	29,129	240	444	154	1,106
1989	2,768	29,256	1,071	20,521	10,796	32,137	1,570	98,119	67,792	68,863	28,615	215	503	176	863
1990	2,290	22,583	1,049	17,253	9,661	32,496	983	86,315	62,683	63,732	26,577	159	1,101	101	905
1991	2,457	23,437	2,396	21,246	14,330	28,922	1,669	94,457	68,624	71,020	23,407	222	1,189	148	1,077
1992	1,617	17,968	5,885	16,452	13,633	31,616	1,838	89,009	65,156	71,041	27,293	433	878	131	1,037
1993	1,846	7,071	2,843	14,669	10,009	32,530	1,774	70,742	60,827	63,670	16,472	610	1,545	140	972
1994	2,421	12,931	4,904	13,069	13,970	35,811	2,023	85,130	67,294	72,198	19,326	1,713	1,000	212	908
1995	1,683	10,194	7,821	15,367	23,640	39,581	1,721	100,007	81,992	89,814	18,088	1,898	670	476	676
1996	1,821	13,604	5,107	15,597	25,897	33,805	1,940	97,770	79,060	84,167	18,171	2,578	844	777	764
1997	1,740	19,195	8,162	14,323	27,878	27,883	2,044	101,224	73,867	82,029	15,224	3,721	1,235	690	891
1998	718	13,538	4,845	12,514	11,380	24,997	2,946	70,938	52,554	57,400	5,052	3,697	1,859	762	794
1999	715	11,723	6,871	13,679	17,103	20,497	2,547	73,134	54,541	61,411	12,822	2,682	1,577	1,545	962
2000	345	10,885	7,969	13,980	20,325	17,398	2,639	73,540	54,686	62,656	12,951	2,182	1,635	1,793	1,209
2001	387	10,569	5,748	12,631	17,512	12,880	1,957	61,684	45,367	51,115	10,293	1,703	1,905	532	1,474
2002	506	9,119	4,540	11,828	11,810	11,066	2,615	51,485	37,825	42,365	15,358	1,755	1,592	633	1,818
2003	412	10,454	5,525	13,141	18,442	7,675	2,632	58,281	42,302	47,827	7,668	61	1,504	676	2,303
2004	432	9,663	7,724	12,792	16,973	6,832	3,108	57,524	40,137	47,861	7,623	2	122	27	2,636
2005	461	17,438	12,558	13,961	20,233	6,490	2,420	73,561	43,565	56,123	10,410	0	807	25	2,485
2006	581	18,715	16,941	13,076	22,833	6,803	1,386	80,334	44,678	61,619	6,611	2	3,508	325	2,650
2007	660	22,203	17,194	14,619	20,765	7,516	1,085	84,042	44,645	61,839	11,271	8	2,888	399	2,834
1981-2007 Avg	*1,479*	*14,501*	*4,922*	*15,869*	*14,984*	*22,997*	*1,732*	*76,484*	*57,061*	*61,983*	*16,972*	*986*	*1,011*	*424*	*1,336*
1991-2007 Avg	*1,106*	*14,042*	*7,473*	*14,291*	*18,043*	*20,724*	*2,138*	*77,815*	*56,301*	*63,774*	*14,002*	*1,369*	*1,456*	*546*	*1,499*
1998-2007 Avg	*522*	*13,431*	*8,992*	*13,222*	*17,738*	*12,215*	*2,333*	*68,452*	*46,030*	*55,022*	*10,006*	*1,209*	*1,740*	*672*	*1,917*

NOTE: For 1981-1990, at-sea whiting catch estimates are from Council 1997.

Table 7-2b. Total domestic shoreside landings and at-sea deliveries (exvessel revenue, thousands of current dollars) from west coast (WA, OR, CA) ocean area fisheries (0-200 miles) 1981-2007 (includes commercial treaty fisheries, based on PacFIN data and Council [1997]) (continued).

Year	California Halibut	Salmon	Sea Cucumber	California Sheephead	Gillnet Complex	CPS Squid	CPS Wetfish	HMS	Dungeness Crab	Other Crus-taceans	Other Species	Total Non-groundfish	Total
1981	567	31,772	0	0	2,082	5,080	14,183	199,799	18,259	3,401	28,852	325,547	382,801
1982	551	37,410	25	0	1,897	3,581	9,636	134,490	18,155	3,944	27,199	252,654	323,970
1983	929	9,090	26	0	1,161	838	5,460	117,933	23,427	3,827	28,978	202,751	267,735
1984	897	10,748	10	0	1,397	500	6,852	95,099	21,798	6,705	17,509	167,690	227,811
1985	592	20,869	0	0	2,669	4,065	4,880	42,061	24,628	4,180	22,910	138,503	198,943
1986	865	25,187	16	0	2,483	4,527	4,857	44,987	22,709	5,309	23,395	168,268	235,213
1987	1,067	46,073	23	0	2,282	3,960	5,508	49,233	25,735	5,178	29,109	216,541	302,694
1988	1,246	68,050	32	0	1,936	7,868	6,461	59,069	43,507	5,758	34,883	259,885	350,457
1989	1,340	26,754	0	0	1,919	6,962	6,020	39,944	39,896	6,308	40,777	200,290	298,409
1990	985	21,966	36	0	1,649	4,748	5,420	24,676	45,598	7,187	47,905	189,014	275,329
1991	1,247	14,203	187	0	1,766	6,086	7,063	17,225	21,446	6,860	51,898	154,024	248,481
1992	1,443	9,271	0	0	939	2,497	6,270	26,177	38,884	6,710	47,608	169,570	258,580
1993	1,146	8,931	353	0	904	10,194	3,824	31,130	42,735	5,966	38,135	163,057	233,797
1994	1,117	7,260	424	750	541	14,369	3,882	37,482	52,617	5,742	35,903	183,243	268,371
1995	1,566	15,443	416	701	797	22,342	5,368	27,140	63,482	7,567	38,784	205,413	305,419
1996	1,738	9,337	544	694	982	21,908	5,452	45,587	74,352	8,091	39,254	231,072	328,845
1997	2,180	10,105	232	860	1,315	20,707	8,259	40,516	51,854	10,528	34,802	203,120	304,343
1998	2,107	5,712	456	693	892	1,631	6,860	40,274	46,281	8,658	11,416	137,143	208,080
1999	2,080	9,688	418	452	1,482	33,405	7,408	33,021	67,236	6,167	17,862	198,807	271,944
2000	1,349	13,943	605	593	1,280	27,076	11,935	32,941	61,658	8,197	20,248	199,595	273,136
2001	1,545	10,578	581	515	1,095	16,866	12,322	31,505	51,301	8,515	17,890	168,620	230,303
2002	1,988	13,015	792	391	1,504	18,261	11,944	22,032	57,848	8,257	15,082	172,270	223,755
2003	1,920	20,906	689	381	660	23,068	8,404	33,592	113,039	7,917	37,383	260,171	318,452
2004	3,119	30,676	541	329	635	19,779	12,874	29,439	100,327	1,726	29,454	239,309	296,833
2005	2,844	24,092	665	361	815	31,556	12,090	23,148	81,147	1,019	30,560	222,024	295,585
2006	2,699	10,215	599	368	843	26,961	11,920	26,781	128,980	10,209	9,526	242,197	322,532
2007	1,834	12,783	671	301	1,179	29,204	15,703	25,155	103,069	9,242	9,265	225,806	309,848
1981-2007 Avg	*1,517*	*19,410*	*309*	*274*	*1,374*	*13,631*	*8,180*	*49,275*	*53,332*	*6,414*	*29,133*	*203,577*	*280,062*
1991-2007 Avg	*1,878*	*13,303*	*481*	*435*	*1,037*	*19,171*	*8,916*	*30,773*	*68,015*	*7,139*	*28,534*	*198,555*	*276,371*
1998-2007 Avg	*2,149*	*15,161*	*602*	*438*	*1,039*	*22,781*	*11,146*	*29,789*	*81,089*	*6,991*	*19,869*	*206,594*	*275,047*

NOTE: For 1981-1990, at-sea whiting catch estimates are from Council 1997.

Table 7-2c. Total domestic shoreside landings and at-sea deliveries (exvessel revenue, thousands of inflation adjusted dollars) from west coast (WA, OR, CA) ocean area fisheries (0-200 miles) 1981-2007 (includes commercial treaty fisheries, based on PacFIN data and Council [1997]).

Year	Lingcod	Whiting, At Sea	Whiting, Shoreside	Flatfish	Sablefish	Rockfish	Other Groundfish	Total Groundfish	Total Groundfish - Less Whiting	Total Groundfish - Less At Sea Whiting	Pink Shrimp	Spot Prawn, Trawl	Spot Prawn, Pot	Ridgeback Prawn, Trawl	Pacific Halibut
1981	3,364	24,823	285	30,026	10,642	45,217	1,532	115,890	90,781	91,066	40,806	1,578	76	335	832
1982	3,983	22,632	346	37,633	19,616	50,515	1,325	136,050	113,072	113,419	27,238	1,548	167	300	826
1983	4,191	23,459	342	32,547	14,115	43,631	970	119,254	95,453	95,795	17,898	679	24	259	1,477
1984	3,864	20,764	718	28,938	11,823	39,108	1,127	106,341	84,859	85,577	8,006	384	1	579	1,955
1985	3,846	7,950	981	31,984	18,134	39,863	989	103,747	94,816	95,797	16,561	420	80	829	2,105
1986	2,218	17,811	759	29,266	18,450	43,121	805	112,430	93,860	94,619	52,022	198	197	393	4,180
1987	3,516	23,969	1,085	36,351	21,945	50,794	3,186	140,847	115,792	116,877	76,076	332	288	342	2,044
1988	3,379	35,475	1,796	32,877	19,760	46,356	3,542	143,185	105,914	107,710	46,051	380	703	244	1,748
1989	4,216	44,566	1,632	31,260	16,445	48,954	2,392	149,464	103,267	104,899	43,588	328	766	268	1,314
1990	3,359	33,122	1,538	25,304	14,170	47,660	1,442	126,595	91,935	93,473	38,979	233	1,615	149	1,327
1991	3,482	33,212	3,395	30,108	20,307	40,986	2,365	133,854	97,247	100,642	33,171	315	1,685	209	1,526
1992	2,240	24,890	8,152	22,789	18,885	43,796	2,546	123,299	90,256	98,409	37,807	600	1,217	181	1,436
1993	2,499	9,574	3,850	19,861	13,552	44,044	2,401	95,782	82,358	86,207	22,302	825	2,092	190	1,315
1994	3,210	17,144	6,502	17,327	18,521	47,478	2,683	112,864	89,218	95,720	25,622	2,272	1,326	280	1,203
1995	2,186	13,243	10,161	19,965	30,713	51,423	2,236	129,929	106,524	116,686	23,500	2,466	870	618	878
1996	2,321	17,345	6,511	19,886	33,019	43,102	2,474	124,660	100,804	107,315	23,168	3,286	1,076	991	974
1997	2,182	24,073	10,236	17,963	34,963	34,970	2,564	126,951	92,642	102,878	19,093	4,667	1,549	865	1,117
1998	891	16,793	6,010	15,522	14,115	31,006	3,655	87,991	65,189	71,199	6,266	4,586	2,305	945	984
1999	874	14,334	8,401	16,726	20,912	25,062	3,114	89,422	66,687	75,088	15,678	3,280	1,928	1,889	1,177
2000	413	13,025	9,536	16,729	24,321	20,820	3,158	88,001	65,440	74,976	15,497	2,612	1,957	2,146	1,447
2001	452	12,351	6,717	14,761	20,465	15,052	2,287	72,084	53,016	59,733	12,028	1,990	2,226	622	1,723
2002	581	10,474	5,215	13,585	13,564	12,710	3,004	59,133	43,444	48,659	17,639	2,016	1,829	728	2,088
2003	464	11,756	6,213	14,778	20,741	8,631	2,960	65,543	47,574	53,787	8,623	69	1,691	761	2,590
2004	472	10,564	8,444	13,984	18,555	7,469	3,398	62,885	43,878	52,322	8,333	2	133	30	2,882
2005	488	18,466	13,299	14,784	21,426	6,873	2,563	77,899	46,134	59,433	11,024	0	855	26	2,632
2006	596	19,212	17,391	13,423	23,440	6,983	1,422	82,469	45,865	63,256	6,787	2	3,602	334	2,721
2007	660	22,203	17,194	14,619	20,765	7,516	1,085	84,042	44,645	61,839	11,271	8	2,888	399	2,834
1981-2007 Avg	*2,220*	*20,120*	*5,804*	*22,704*	*19,754*	*33,450*	*2,267*	*106,319*	*80,395*	*86,199*	*24,631*	*1,299*	*1,228*	*552*	*1,753*
1991-2007 Avg	*1,412*	*16,980*	*8,660*	*17,459*	*21,663*	*26,348*	*2,583*	*95,106*	*69,466*	*78,126*	*17,518*	*1,706*	*1,719*	*660*	*1,737*
1998-2007 Avg	*589*	*14,918*	*9,842*	*14,891*	*19,830*	*14,212*	*2,664*	*76,947*	*52,187*	*62,029*	*11,315*	*1,456*	*1,941*	*788*	*2,108*

NOTE: Values are adjusted to 2007 terms using the U.S. GDP Deflator (http://www.bea.gov/bea/dn/home/gdp.htm).
For 1981-1990, at-sea whiting catch estimates are from Council 1997.

Table 7-2c. Total domestic shoreside landings and at-sea deliveries (exvessel revenue, thousands of inflation adjusted dollars) from west coast (WA, OR, CA) ocean area fisheries (0-200 miles) 1981-2007 (includes commercial treaty fisheries, based on PacFIN data and Council [1997]) (continued).

Year	California Halibut	Salmon	Sea Cucumber	California Sheephead	Gillnet Complex	CPS Squid	CPS Wetfish	HMS	Dungeness Crab	Other Crus-taceans	Other Species	Total Non-groundfish	Total
1981	1,147	64,310	0	0	4,213	10,282	28,708	404,415	36,958	6,883	58,399	658,944	774,833
1982	1,051	71,368	47	0	3,618	6,832	18,383	256,569	34,635	7,523	51,889	481,994	618,046
1983	1,705	16,681	48	0	2,130	1,537	10,021	216,424	42,992	7,024	53,179	372,078	491,334
1984	1,586	19,010	17	0	2,471	884	12,120	168,207	38,555	11,859	30,969	296,601	402,941
1985	1,017	35,822	0	0	4,581	6,977	8,377	72,199	42,274	7,175	39,326	237,743	341,488
1986	1,453	42,302	27	0	4,170	7,603	8,158	75,555	38,139	8,916	39,291	282,605	395,040
1987	1,744	75,322	38	0	3,731	6,474	9,005	80,489	42,073	8,465	47,589	354,013	494,860
1988	1,970	107,581	51	0	3,060	12,439	10,215	93,382	68,779	9,103	55,147	410,852	554,037
1989	2,041	40,754	0	0	2,923	10,605	9,171	60,846	60,772	9,609	62,115	305,100	454,565
1990	1,444	32,217	53	0	2,419	6,964	7,950	36,191	66,877	10,541	70,260	277,217	403,812
1991	1,768	20,127	265	0	2,503	8,624	10,009	24,409	30,391	9,721	73,544	218,266	352,120
1992	1,998	12,843	0	0	1,301	3,459	8,686	36,261	53,863	9,295	65,949	234,895	358,195
1993	1,552	12,092	478	0	1,225	13,802	5,178	42,149	57,861	8,077	51,634	220,773	316,553
1994	1,480	9,625	562	994	717	19,050	5,146	49,693	69,759	7,612	47,599	242,942	355,803
1995	2,035	20,063	540	911	1,035	29,027	6,973	35,260	82,475	9,831	50,388	266,872	396,799
1996	2,215	11,905	694	885	1,253	27,933	6,951	58,125	94,801	10,316	50,050	294,623	419,287
1997	2,734	12,673	291	1,079	1,650	25,970	10,359	50,813	65,033	13,204	43,647	254,745	381,696
1998	2,614	7,085	566	859	1,106	2,022	8,510	49,956	57,407	10,739	14,161	170,111	258,103
1999	2,544	11,845	511	553	1,812	40,845	9,057	40,375	82,211	7,541	21,840	243,084	332,508
2000	1,614	16,684	724	710	1,532	32,400	14,282	39,418	73,782	9,809	24,230	238,843	326,845
2001	1,805	12,362	679	602	1,280	19,710	14,400	36,817	59,951	9,951	20,906	197,050	269,133
2002	2,284	14,949	910	449	1,727	20,973	13,718	25,304	66,442	9,484	17,322	197,861	256,994
2003	2,159	23,512	775	429	743	25,943	9,452	37,778	127,126	8,904	42,041	292,594	358,137
2004	3,410	33,535	591	360	694	21,622	14,074	32,183	109,678	1,887	32,199	261,613	324,498
2005	3,012	25,513	704	382	863	33,417	12,803	24,513	85,933	1,079	32,362	235,118	313,017
2006	2,771	10,487	615	378	865	27,678	12,236	27,492	132,407	10,480	9,779	248,632	331,101
2007	1,834	12,783	671	301	1,179	29,204	15,703	25,155	103,069	9,242	9,265	225,806	309,848
1981-2007 Avg	*1,962*	*28,646*	*365*	*329*	*2,030*	*16,751*	*11,098*	*77,777*	*67,565*	*8,677*	*41,299*	*285,962*	*392,281*
1991-2007 Avg	*2,225*	*15,769*	*563*	*523*	*1,264*	*22,452*	*10,443*	*37,394*	*79,541*	*8,657*	*35,701*	*237,872*	*332,979*
1998-2007 Avg	*2,405*	*16,875*	*675*	*502*	*1,180*	*25,381*	*12,424*	*33,899*	*89,800*	*7,911*	*22,411*	*231,071*	*308,018*

NOTE: Values are adjusted to 2007 terms using the U.S. GDP Deflator (http://www.bea.gov/bea/dn/home/gdp.htm).
For 1981-1990, at-sea whiting catch estimates are from Council 1997.

Groundfish Fishery In Relation to Other West Coast Fisheries

Tables 7-2a through 7-2c also show harvests and revenues from the other, non-groundfish west coast fisheries.

Total west coast harvests dipped below 500,000 mt in 2007 for the first time since 2004. Total harvests in 2007 were valued at $309 million in ex-vessel terms. Of this amount, groundfish fisheries accounted for 50 percent of the harvests and 27 percent of the revenues. Dungeness crab, the most valuable fishery in terms of exvessel revenue, saw a dip in both landings and revenue from all-time highs in 2006. CPS squid and CPS wetfish both saw increases in landings and revenue in 2007 over 2006. Overall west coast non-groundfish revenues were down from 2006 levels, but still above historical averages. Changes in non-groundfish fisheries make communities already facing declining groundfish harvests, more vulnerable and may lead to increased effort in groundfish fisheries. Many of these non-groundfish fisheries are part of the groundfish open access sector, described below.

Bycatch and Fisheries

Table 7-3 shows the various bycatch associated with each commercial fisheries sector. To identify likely distributional affects of reductions in overfished species mortality, NMFS Northwest Region working with members of the GMT constructed a relational database. This database used available data on the interaction of fishery sectors with overfished species and historical management actions that have been taken to achieve management targets of overfished species. Information from the 2005 groundfish stock assessments was used to identify the distributional range of various overfished species, and then analyzed in conjunction with the size of fishing sectors on a regional basis. The resulting combined effect of relative stock size and relative fleet size helps identify the risk that a regional component of a fishing sector poses to a stock of an overfished species. In this case, "risk" is the potential catch that a particular regional sector has the potential to attain relative to the OY and relative to the capability of other sectors operating in the same area. Using this information on the relationship of groundfish stock and fleet sizes, a data set was constructed to identify sectors that have high, medium-high, medium-low, and low or no impact on each overfished species, within a coastwide series of latitude-bounded management areas. The following fishing sectors were analyzed:

1. limited entry bottom trawl – deep (LE B-TRAWL-DEEP)
2. limited entry bottom trawl –shelf (LE B-TRAWL-SHELF)
3. limited entry midwater trawl – Pacific whiting (LE MW-TRAWL-WHITING)
4. limited entry fixed gear – sablefish (LE-FG-SABLEFISH)
5. limited entry fixed gear – nearshore (LE-FG-NEARSHORE)
6. limited entry fixed gear – dogfish (LE-FG-DOGFISH)
7. open access fixed gear – sablefish (OA-FG-SABLEFISH)
8. open access fixed gear – nearshore (OA-FG-NEARSHORE)
9. open access fixed gear – dogfish (OA-FG-DOGFISH)
10. California recreational-bottomfish (CA REC. BOTTOMFISH)
11. Oregon recreational-bottomfish (OR REC. BOTTOMFISH)
12. Washington recreational-bottomfish (WA REC. BOTTOMFISH)
13. Washington recreational-halibut (WA REC. P.HALIBUT)
14. Oregon recreational-halibut (OR REC. P.HALIBUT)

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

Table 7-3. Overfished species ranking by sector and area.

		OVERFISHED SPECIES						
AREA	SECTOR	BCCCIO	CANARY	COWCD	D’BLTCH	POP	WIDOW	Y’EYE
N 40 10	LE FG-DOGFISH		ML					MH
	LE FG-NEARSHORE		ML					MH
	LE FG-SABLEFISH		ML					MH
	LE B-TRAWL-DEEP		ML		HIGH	HIGH		
	LE B-TRAWL-SHELF		HIGH					
	LE MW-TRAWL-WHITING		HIGH		ML	ML	HIGH	
	OA FG-DOGFISH		ML					MH
	OA FG-NEARSHORE		MH					MH
	OA FG-SABLEFISH		ML					MH
	WA REC P.HALIBUT		ML					HIGH
	WA REC BOTTOMFISH		ML					HIGH
	OR REC P. HALIBUT		MH					HIGH
	OR REC BOTTOMFISH		MH					HIGH
	CA REC BOTTOMFISH		ML					ML
38 - 40 10	LE FG-NEARSHORE	ML	ML					
	LE FG-SABLEFISH	ML	ML					
	LE B-TRAWL-DEEP	ML	ML		MH			
	LE B-TRAWL-SHELF	HIGH	MH					
	OA FG-NEARSHORE	ML	ML					
	OA FG-SABLEFISH	ML	ML					
	CA REC. BOTTOMFISH	ML	MH					ML
36 - 38	LE FG-NEARSHORE	ML	ML	ML				
	LE FG-SABLEFISH	ML	ML	ML				
	LE B-TRAWL-DEEP	ML	ML					
	LE B-TRAWL-SHELF	HIGH	ML	MH				
	OA FG-NEARSHORE	ML	ML	ML				
	OA FG-SABLEFISH	ML	ML	ML				
	CA REC. BOTTOMFISH	ML	MH					ML
S 36	LE FG-NEARSHORE	ML		ML				
	LE FG-SABLEFISH	ML		ML				
	LE B-TRAWL-DEEP	ML						
	LE B-TRAWL-SHELF	HIGH		MH				
	OA FG-NEARSHORE	ML		ML				
	OA FG-SABLEFISH	ML		ML				
	CA REC BOTTOMFISH	HIGH		ML				

Bycatch and Communities

Inspection of Tables 7-4a and Tables 7-4b shows that every community is affected in some way by the management of overfished species. Although this table applies to the commercial sectors, recreational fisheries in the communities listed would likely encounter similar bycatch species as encountered in the nearshore areas.

How the Rest of This Chapter Is Organized

The rest of this chapter provides detailed descriptions of the various sectors that are a component of the non-treaty commercial sectors, including discussions of participation, landings, revenues, seasonality, and major fishing communities. Treaty and recreational fisheries are discussed in similar fashion. Seasonality information is presented to address considerations associated with promoting a year round fishery. In addition, the processing sector, non-consumptive users, and fishing communities are also described. After these descriptions, section 7.2 describes the economic impacts of the alternatives. These impacts include direct and indirect impacts and cumulative effects. Several of the tables in this chapter have not been updated from previous EISs because more recent data are not available. It is expected that updated data will not show a significant change from previous years. However, if these data become available before the final EIS is published, the relevant tables will be updated.

Table 7-4a. Port engagement in groundfish sectors in areas north of 40°10' N latitude.

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

Table 7-4b. Port engagement in groundfish sectors in areas south of 40°10' N latitude.

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

7.1.2 Commercial and Treaty Fisheries

7.1.2.1 *Overview: Non-Tribal Shoreside Fisheries*

Participation

Active participation in west coast shore-based commercial fisheries has generally declined since 2000 (Table 7-5). In 2005, 1,292 vessels landed west coast groundfish, 261 landed CPS, 1,084 landed crab, 721 landed highly migratory species, 1,339 landed salmon, and 170 landed shrimp. Groundfish vessels accounted for roughly one-third of the west coast fleet. As evidenced by the state permits purchased in the Groundfish Buyback Program, groundfish fishermen participate in these other fisheries as well, especially the crab and shrimp fisheries. These estimates exclude any participation in treaty or at-sea fisheries.

Table 7-5. Count of vessels making landings by species group (number of vessels).

Species Group	2000	2001	2002	2003	2004	2005
Coastal Pelagic	487	381	355	314	313	261
Crab	1,387	1,239	1,311	1,288	1152	1,084
Groundfish	1,993	1,800	1,619	1,511	1332	1,292
Highly Migratory	958	1,116	875	1,034	919	721
Other	1,624	1,642	1,558	1,404	1328	1,234
Salmon	1,255	1,265	1,271	1,203	1427	1,339
Shellfish	110	95	228	81	123	89
Shrimp	328	301	296	215	187	170
Total Unique Vessels	4,276	4,010	4,020	3,811	3,622	3,369

Source: PacFIN FT and FTL tables. July 2005

Landings and Revenues

Commercial fisheries make up the largest portion of west coast landed catch by weight. CPS, followed by groundfish, crab, and highly migratory species have made up the largest commercial landings by weight (Table 7-6). Crab, followed by groundfish, CPS, and highly migratory species comprise the highest-value groups from 2005–2007 (Table 7-6). The four largest gear groups by weight are net (gill, trammel net, and purse seine), trawl, trap/pot, and troll gear (Table 7-7).

Limited entry trawlers take the vast majority of the groundfish harvest measured by weight but somewhat less if measured by value. In 2003, groundfish trawlers landed 96 percent of total groundfish harvest by weight but only 67 percent by value (Table 7-8). The difference in trawl weight and revenue proportions is mostly due to the catch of Pacific whiting. Since whiting is caught almost exclusively by limited entry trawl vessels, it skews the overall trawl value-per-unit weight calculations.

Distribution of Effort and Major Ports

The discussion that follows describes the distribution of effort and major ports that are associated with the various sub-sectors (limited entry trawl, limited entry fixed gear, and open access). As discussed below, trawl vessels make most of their landings in Oregon. Newport, Astoria, and Charleston (Coos Bay), Oregon are three of the largest four ports for landed weight and exvessel revenue. Westport and

Ilwaco in Washington; Eureka and Crescent City in California; Brookings in Oregon; and Bellingham Bay and Neah Bay in Washington comprise the remaining top 10 largest ports for trawl vessel landings.

Table 7-6. Shoreside landings and exvessel revenue by species category and year.

Group	Data	2005	2006	2007
CPS	Landed wt (lbs)	345,273,605	344,996,378	428,340,207
	Exvessel revenue ($)	43,521,016	38,880,909	44,906,624
Crab	Landed wt (lbs)	54,956,816	80,169,136	47,047,182
	Exvessel revenue ($)	87,617,557	139,022,818	112,096,530
Groundfish	Landed wt (lbs)	295,122,377	331,053,412	242,626,108
	Exvessel revenue ($)	55,335,987	62,113,351	59,229,390
HMS	Landed wt (lbs)	22,213,815	29,703,366	27,537,130
	Exvessel revenue ($)	23,124,919	26,780,557	25,154,703
Other	Landed wt (lbs)	20,291,366	25,449,272	21,783,877
	Exvessel revenue ($)	15,156,338	16,110,312	15,520,856
Salmon	Landed wt (lbs)	9,464,297	2,624,276	3,180,974
	Exvessel revenue ($)	24,098,434	10,215,416	12,782,755
Shellfish	Landed wt (lbs)	358,848	507,791	503,970
	Exvessel revenue ($)	427,339	574,718	563,858
Shrimp	Landed wt (lbs)	24,391,398	19,040,841	24,685,657
	Exvessel revenue ($)	13,555,559	10,612,441	14,780,604
TOTAL Landed wt (lbs)		772,072,522	833,544,472	795,705,105
TOTAL Exvessel revenue ($)		262,837,149	304,310,522	285,035,320

Source: PacFIN monthly vessel summary tables.
Note: Data shown is for catch from PFMC management areas only and does not include catch from inside waters such as Puget Sound and the Columbia River.

Table 7-7. Shoreside landings and revenue by gear type and year.

		Year				
Gear	Data type	2001	2002	2003	2004	2005
Dredge	Landed weight (lbs)		C		C	C
	Exvessel Revenue ($)		C		C	C
Hook and Line	Landed weight (lbs)	11,020,519	12,703,981	10,772,455	10,024,355	9,156,856
	Exvessel Revenue ($)	19,231,233	17,839,558	19,844,158	19,008,966	19,500,558
Misc.	Landed weight (lbs)	33,692,759	43,168,744	40,711,529	43,901,647	43,979,921
	Exvessel Revenue ($)	58,190,196	74,343,110	75,474,308	96,787,328	87,069,866
Non-trawl Net	Landed weight (lbs)	434,945,382	406,344,617	278,973,327	318,813,541	350,683,566
	Exvessel Revenue ($)	36,694,139	36,381,139	38,413,902	35,732,115	47,041,661
Pot	Landed weight (lbs)	29,262,535	39,985,745	79,646,584	66,968,591	59,661,693
	Exvessel Revenue ($)	64,283,421	72,130,216	131,455,587	116,678,161	97,299,820
Troll	Landed weight (lbs)	28,793,540	26,968,998	45,807,868	40,980,942	27,592,753
	Exvessel Revenue ($)	29,259,325	25,526,431	43,894,614	56,817,652	44,424,182
Trawl	Landed weight (lbs)	219,949,824	157,484,545	173,477,263	260,183,431	287,705,054
	Exvessel Revenue ($)	36,469,749	31,435,464	33,200,917	32,713,800	38,766,282
Shrimp Trawl	Landed weight (lbs)	39,810,632	56,863,283	31,471,670	20,146,932	24,197,316
	Exvessel Revenue ($)	14,219,346	19,073,996	9,076,428	8,575,689	11,107,146
Total Landed weight (lbs)		797,475,191	743,519,913*	660,860,696	761,019,439*	802,977,159*
Total Exvessel Revenue ($)		258,347,409	276,729,913*	351,359,914	366,313,709*	345,209,515*

Source: PacFIN ftl table. August 2004

Note: Data shown is for PFMC management areas only and does not include areas such as Puget Sound and Columbia River.

C means data was restricted due to confidentiality.

* totals do not include confidential data

Table 7-8. Shoreside groundfish landings and revenue by trawl and non-trawl vessels.

Gear Group	Data	2000	2001	2002	2003	2004	2005	2006	2007
Non-Trawl	Landed Weight (mt)	4,163	3,561	3,051	3,347	3,456	5,062	4,820	3,907
	Landed Revenue (1000's $)	16,997	14,326	12,039	14,626	14,086	19,150	20,538	18,153
Trawl	Landed Weight (mt)	117,152	98,388	70,513	73,296	109,482	128,803	145,343	111,314
	Landed Revenue (1000's $)	42,402	34,294	28,962	30,204	29,345	36,186	41,575	41,982
Trawl Portion	Landed Weight (mt)	0.97	0.97	0.96	0.96	0.97	0.96	0.97	0.97
	Landed Revenue (1000's $)	0.71	0.71	0.71	0.67	0.68	0.65	0.67	0.70

Source: PacFIN ftl data and monthly vessel summary data

Note: Data shown is for PFMC management areas only and does not include areas such as Puget Sound and the Columbia River.

7.1.2.2 *Limited Entry Groundfish Trawl Sector*

Participation

West coast limited entry trawl vessels use midwater trawl gear, and small and large footrope bottom trawl gear (defined at 50 CFR 660.302 and 660.322(b)). Midwater trawl gear is not designed to touch the ocean bottom and is therefore used to target groundfish species, such as Pacific whiting and yellowtail rockfish, above the ocean floor. Small and large footrope trawl gear are designed to remain in contact with the ocean floor and are used to target species that reside along the bottom such as flatfish on the continental shelf and slope, or DTS species (Dover sole, thornyhead and sablefish complex) in deep water. Fishers generally use small footrope trawl gear in areas that have a regular substrate (few rocks or outcroppings) and more widely on the continental shelf than on the continental slope; this is due in large part to regulatory requirements. Traditionally fishers use large footrope trawl gear most commonly in areas that may have an irregular substrate, and along the continental slope and in deeper water.

The limited entry shore-based trawl vessels primarily deliver their catch to processors and buyers located along the coasts of Washington, Oregon, and California, and tend to have their homeports located in towns within the same general area where they make deliveries. Larger vessels in the shore-based limited entry trawl sector focus more heavily on the DTS complex in deep water, while smaller trawl vessels focus more heavily on the shelf. Large trawl vessels also tend to participate in the trawl fishery for more months of the year than small trawl vessels. The shore-based vessels range in size from less than 40 feet to over 90 feet in length (Table 7-9).

Table 7-9. Count of limited entry trawl vessels making landings by state, year, and vessel length.

		Vessel Length (feet)						
State	YEAR	0–40	41 - 50	51 - 60	61 - 70	71 - 80	81 - 90	> 90
CA	2000	1	13	24	20	18	6	2
	2001	4	10	16	15	12	7	1
	2002	2	5	5	8	12	3	0
	2003	3	8	8	4	5	1	0
OR	2000	1	3	21	35	30	15	7
	2001	2	7	19	34	31	13	3
	2002	2	5	17	32	29	14	3
	2003	2	5	17	33	28	15	3
WA	2000	0	3	5	5	10	4	3
	2001	0	5	5	4	12	3	1
	2002	0	2	6	3	8	4	1
	2003	0	1	2	4	9	3	1

Source: PacFIN ftl and cg tables. July 2004

In late 2003, a fishing capacity reduction program (buyback) was implemented off the west coast which retired 91 vessels from the limited entry trawl sector. These 91 vessels represented less than 40 percent of the number of boats actively engaged in the limited entry trawl sector, but approximately 50 percent of historic catch. The purpose of the program was to reduce the number of vessels and permits endorsed for the operation of groundfish trawl gear in order to increase and stabilize economic revenues for vessels remaining in the groundfish fishery, and to conserve and manage depleted groundfish species. Vessels that participated in the buyback program were sold, scrapped, or converted to non-fishing purposes, and those vessels cannot be used for fishing again.

The impact of the trawl vessel buyback appears to have been positive in terms of exvessel revenue per vessel. Average trawl exvessel revenues generated by non-Pacific whiting groundfish increased from approximately $108,000 to $151,000 between the years 2003 and 2004 even though total exvessel revenues for the fleet decreased from approximately $25,000,000 to $22,000,000 during the same period (Figure 7-1). Declining total bottom trawl revenues in 2005 resulted in a slight decline in average revenue per vessel compared to 2004.

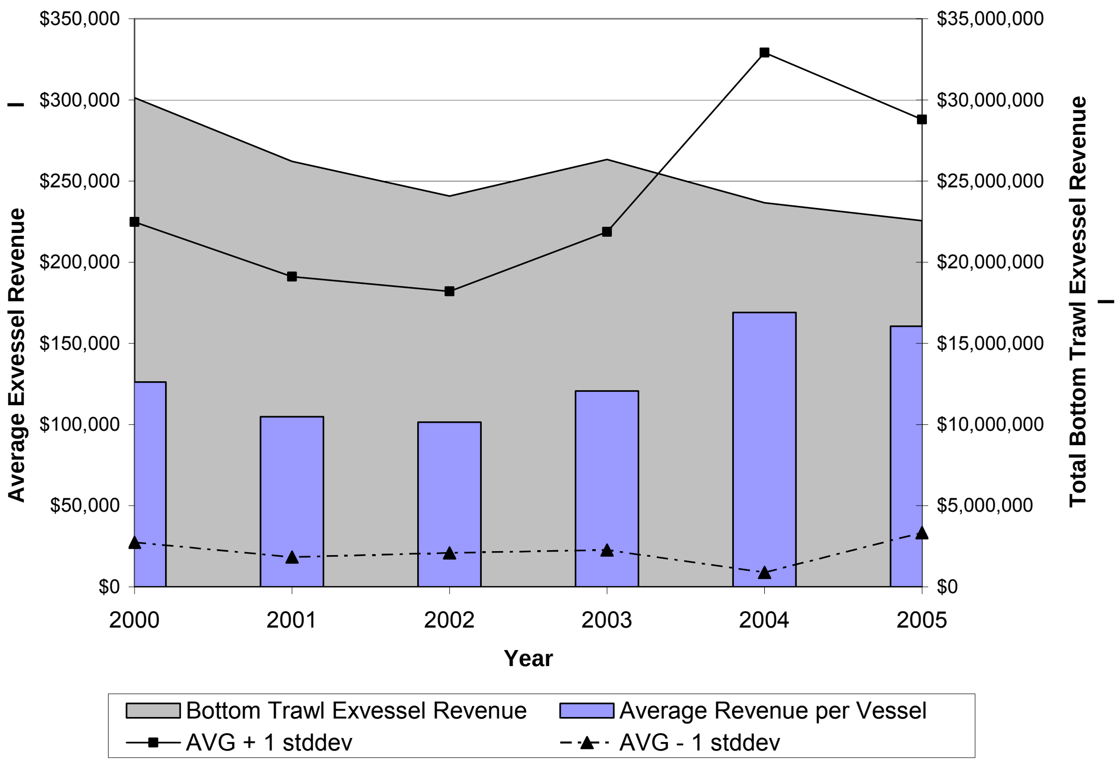


Figure 7-1. Annual limited entry trawl vessel revenues per year (excluding catch of Pacific whiting).

The impact of the trawl vessel buyback differed by region. Some ports lost a disproportionate share of their trawl fleet, while others lost relatively few trawl vessels (Table 7-10). The number of trawl vessels landing in the major trawl ports of Eureka, Crescent City, and Avila declined by 50 percent or more.

Table 7-10. Count of trawl vessels landing non-whiting groundfish by port and year.

PORT	2000	2001	2002	2003	2004	2005	2006	2007
ASTORIA	54	48	41	44	32	29	32	32
AVILA	13	15	16	13	7			w
BELLINGHAM BAY	7	16	6	9	6	6	6	6
BROOKINGS	11	11	11	13	8	7	9	8
CHARLESTON (COOS BAY)	30	30	25	28	21	19	19	23
CRESCENT CITY	26	21	24	19	4	5	7	7
EUREKA	27	32	30	28	15	14	17	18
FIELDS LANDING	15	14						
FORT BRAGG	17	19	29	14	11	10	9	
MONTEREY	5	4	5	5	3	w	w	w
MOSS LANDING	16	15	14	16	16	8	7	w
MORRO BAY	17	10	11	10	10	9	4	4
NEAH BAY	11	11	5	8	5	7	4	w
NEWPORT	41	41	31	33	27	22	23	22
PORT ANGELES	7	8	10		5			
PRINCETON / HALF MOON BAY	14	14	12	11	12	7	9	8
SAN FRANCISCO	26	18	17	12	10	13	11	9
SANTA BARBARA	5	14	14	8	4			
SANTA CRUZ	6	5	6	6	4	w	w	w
VENTURA	5	7	10	8	3			
WESTPORT	19	11	10	9	9	3	w	6

“w” = counts for ports with fewer than three trawl vessels in any year were excluded for confidentiality purposes
Source: PacFIN monthly vessel summary, ft and ftl tables.

Landings and Revenues from Groundfish Trawl Vessels

Trawlers catch a wide range of species. By weight, the following species account for the bulk of non-whiting landings: Dover sole, arrowtooth flounder, petrale sole, sablefish, longspine thornyhead and shortspine thornyhead, and yellowtail rockfish. Management measures intended to reduce the directed and incidental catch of overfished rockfish and other depleted species have significantly reduced rockfish catches in recent years substantially below historical levels. Non-whiting landings and revenues by non-tribal trawlers in Oregon are significantly larger than the other two states (Table 7-11).

By weight, the vast majority of trawl vessel groundfish is caught with midwater trawl gear targeting Pacific whiting. In contrast, the majority of trawl exvessel revenues are attributed to the bottom trawl sector (Table 7-12).

Limited entry trawlers take the vast majority of the groundfish harvest measured by weight but somewhat less if measured by value. In 2003, groundfish trawlers landed over 95 percent of total groundfish harvest by weight but only 64 percent by value (Table 7-13). The difference between the weight and revenue shares is mostly due to the catch of Pacific whiting. Since whiting fetch a relatively low price and are caught almost exclusively by limited entry trawl vessels, they skew the overall value per unit weight for this sector.

Table 7-11. Non-tribal trawl shoreside landings and exvessel revenue by state and year.

State	Species Aggregation	Data Type	2000	2001	2002	2003	2004	2005	2006	2007
CA	Non-whiting	Landed weight (mt)	9,764	7,929	8,026	7,330	6,101	5,586	4,963	6,062
		Exvessel Rev (1000's $)	11,859	9,546	10,068	8,618	7,090	6,857	7,033	8,560
	Pacific Whiting	Landed weight (mt)	4,986	2,306	2,773	1,695	4,742	3,095	5,464	3,008
		Exvessel Rev (1000's $)	765	171	274	166	641	364	663	401
OR	Non-whiting	Landed weight (mt)	15,952	12,152	8,410	10,499	10,245	10,033	10,235	12,028
		Exvessel Rev (1000's $)	17,974	14,687	10,150	12,897	11,833	12,017	13,758	14,918
	Pacific Whiting	Landed weight (mt)	68,702	53,376	32,305	36,581	59,075	61,635	61,413	42,914
		Exvessel Rev (1000's $)	6,081	4,132	3,219	3,642	4,641	7,298	8,884	7,657
WA	Non-whiting	Landed weight (mt)	5,593	4,896	8,370	4,258	3,481	2,910	1,706	1,514
		Exvessel Rev (1000's $)	4,601	4,319	4,189	3,598	3,148	3,018	2,103	1,677
	Pacific Whiting	Landed weight (mt)	12,156	17,730	10,630	12,934	25,838	32,445	30,687	27,768
		Exvessel Rev (1000's $)	1,122	1,439	1,061	1,283	1,993	3,964	4,429	4,886

Source: PacFIN monthly vessel summary and ftl data.
Note: Landings are from catch in PFMC management areas and does not include catch from areas such as Puget Sound and Columbia River.

Table 7-12. Shoreside non-tribal trawl groundfish landings and exvessel revenue by state, year, and trawl type.

Trawl Type	State	Data	2000	2001	2002	2003	2004	2005	2006	2007
Bottom Trawl	CA	Landed wt (mt)	8,910	7,442	7,928	7,320	6,062	5,586	4,963	6,062
		Exvessel Rev (1000's $)	10,954	9,034	9,960	8,611	7,054	6,857	7,033	8,560
	OR	Landed wt (mt)	11,341	10,012	7,942	10,459	10,081	10,033	10,235	12,028
		Exvessel Rev (1000's $)	13,503	12,545	9,661	12,811	11,585	12,017	13,758	14,918
	WA	Landed wt (mt)	4,497	3,777	4,330	4,121	3,347	2,910	1,706	1,514
		Exvessel Rev (1000's $)	3,552	3,402	3,422	3,561	3,062	3,018	2,103	1,677
Midwater Trawl	CA	Landed wt (mt)	5,839	2,792	2,870	1,705	4,781	3,095	5,464	3,008
		Exvessel Rev (1000's $)	1,670	683	381	173	676	364	663	401
	OR	Landed wt (mt)	73,313	55,516	32,772	36,621	59,239	61,635	61,413	42,914
		Exvessel Rev (1000's $)	10,552	6,274	3,709	3,728	4,889	7,298	8,884	7,657
	WA	Landed wt (mt)	13,252	18,848	14,670	13,071	25,972	32,445	30,687	27,768
		Exvessel Rev (1000's $)	2,171	2,355	1,828	1,321	2,078	3,964	4,429	4,886
Total Landed wt (mt)			117,152	98,388	70,513	73,296	109,482	115,705	114,468	93,295
Total Exvessel Rev (1000's $)			42,402	34,294	28,962	30,204	29,345	33,946	36,870	38,099

Source: PacFIN monthly vessel summary and ftl data.
Note: Landings are from catch in PFMC management areas and does not include catch from areas such as Puget Sound and Columbia River.

Distribution of Effort by Limited Entry Groundfish Trawl Vessels

Limited entry trawl vessels focus much of their effort on DTS species along the slope, flatfish species along the shelf, and Pacific whiting above the seafloor. Historically, much effort was focused on rockfish species, but recent regulatory requirements–such as RCAs and various cumulative limits - have curtailed rockfish opportunities to protect overfished stocks. In 2005, a specific small footrope trawl designed to avoid rockfish (the selective flatfish trawl) was adopted to further avoid the catch of rockfish along the shelf while increasing opportunities for flatfish north of 40º10' N latitude. Opportunities to harvest DTS and flatfish species, largely in the form of differential cumulative limits and RCAs, dictate the location of much of the trawl effort, although not all effort is dictated by regulation. Vessels differ in size and technical capacity. For example, small vessels may find it more difficult to fish during the winter months because of weather and other vessels may not have the capacity to fish in deep water where DTS species primarily reside. In other cases, some vessel captains may be more knowledgeable and more successful in certain areas. This knowledge would also influence the location and timing of effort by certain vessels. Furthermore, some species are known to migrate and aggregate during certain months of the year. For example, petrale sole and Dover sole are known to aggregate for spawning during the winter months, and several types of flatfish are known to migrate onto the shelf during the summer months. Fishers may target the location of their efforts according to species aggregations and the tendencies of certain fish species to migrate. Differences in knowledge, capital constraints, fish migration, and the regulatory environment can, in large part, affect the location and timing of effort by commercial fishing vessels.

Table 7-13 shows the distribution of catch made by non-shrimp trawl vessels by depth fished, and year in 2001-03.

Table 7-14 shows the monthly distribution of catch as recorded in trawl logbook data, including bottom trawl and midwater trawl gear.

Table 7-13. Depth-based distribution of landed groundfish catch by limited entry trawl vessels using midwater or bottom trawl gear (pounds).

Depth Range (fm)	2001	2002	2003
0-50	22,930,260	40,048,627	15,919,762
51-100	215,155,125	158,543,798	135,411,711
101-150	62,788,477	45,254,962	61,445,691
151-200	13,325,986	7,713,513	18,157,965
201-250	8,322,800	6,198,206	12,817,069
>250	20,664,041	23,096,810	30,265,559

Source: PacFIN logbook data. July 2005

Note: Not all logbook records have an associated depth and depth is recorded as the average or start tow depth.

Table 7-14. Monthly distribution of groundfish landed catch by limited entry trawl vessels using midwater or bottom trawl gear (pounds).

	Year		
Month	2001	2002	2003
January	5,280,981	4,051,019	4,589,094
February	6,560,832	5,870,089	5,062,798
March	7,103,004	6,090,047	3,726,461
April	11,361,478	9,881,215	9,423,497
May	13,248,925	11,022,904	10,856,262
June	56,177,784	97,157,431	114,340,896
July	115,519,050	113,615,466	103,952,685
August	89,458,920	20,530,848	13,742,628
September	32,274,454	3,193,638	8,614,816
October	2,661,432	6,597,853	4,965,831
November	3,091,795	4,987,239	4,241,793
December	2,001,895	2,465,965	1,990,757

Source: PacFIN logbook data. July 2005

Major Ports

Trawl vessels make most of their landings in Oregon. Newport, Astoria, and Charleston (Coos Bay), Oregon make up three of the largest four ports for landed weight and exvessel revenue during the 2002–2007 period (Table 7-15, 7-16 and 7-17). Westport and Ilwaco in Washington, Eureka and Crescent City in California, Brookings in Oregon, and Bellingham Bay and Neah Bay in Washington comprise the remaining top 10 largest ports for trawl vessel landings. Because of the buyback program, some ports appear to have lost relatively more groundfish vessels and catch than other ports.

Table 7-15. Landed weight (in pounds) of groundfish landings by trawl vessels by port and year.

PORT	2002	2003	2004	2005	2006	2007
ASTORIA	8,265,559	9,742,986	11,691,379	12,298,767	12,439,743	13,323,238
AVILA	1,563,590	1,542,126	982,240			
BELLINGHAM BAY	5,239,046	4,971,017	3,356,161	3,244,069	1,935,626	1,822,193
BROOKINGS	1,263,150	1,973,492	1,070,491	1,498,436	1,586,662	2,267,412
CHARLESTON (COOS BAY)	4,692,898	6,261,152	5,307,643	4,881,930	5,271,251	6,258,363
CRESCENT CITY	2,789,286	1,903,833	1,089,460	1,370,475	1,066,715	1,433,406
EUREKA	3,905,964	4,373,074	3,696,474	4,029,128	4,341,672	6,168,857
FIELDS LANDING						
FORT BRAGG	4,506,717	3,028,961	2,902,846	3,406,927	2,630,705	2,768,896
MONTEREY	573,330	547,952	409,290	277,861	234,660	202,336
MORRO BAY	167,050	248,413	777,682	903,803	87,906	57,391
MOSS LANDING	1,447,451	2,039,384	1,138,278	1,030,277	1,132,846	283,636
NEAH BAY	36,017	1,906,337	616,595	1,218,722	752,675	119,397
NEWPORT	4,023,203	4,997,183	4,414,402	3,424,334	3,205,283	4,651,957
PORT ANGELES	2,550,679		396,169			
PRINCETON / HALF MOON BAY	927,221	651,677	561,930	363,193	472,244	637,807
SAN FRANCISCO	1,294,075	1,311,881	1,820,147	913,671	857,491	1,628,444
SANTA BARBARA	12,914	965	8,356			
SANTA CRUZ	25,959	10,172	4,524	19,323		
VENTURA	3,131	683	344			
WESTPORT	9,075,180	1,032,300	1,006,859	610,571	381,803	1,347,079

Source: PacFIN monthly vessel summary and ftl data.

Note: Landings are from catch in PFMC management areas and does not include catch from areas such as Puget Sound and Columbia River.

Table 7-16. Exvessel revenue ($) of groundfish landings by trawl vessels by port and year.

PORT	2005	2006	2007
ASTORIA	6,440,451	6,996,439	6,717,010
AVILA			
BELLINGHAM BAY	1,487,329	1,175,499	963,853
BROOKINGS	831,264	1,030,473	1,409,748
CHARLESTON (COOS BAY)	2,617,128	3,380,084	3,649,470
CRESCENT CITY	761,884	676,377	869,839
EUREKA	2,190,035	2,792,961	3,573,492
FIELDS LANDING			
FORT BRAGG	1,744,517	1,562,455	1,872,910
MONTEREY	209,588	168,745	182,648
MORRO BAY	486,578	58,350	56,323
MOSS LANDING	600,767	676,786	238,918
NEAH BAY	524,520	342,738	58,405
NEWPORT	2,117,349	2,307,130	3,129,806
PORT ANGELES			
PRINCETON / HALF MOON BAY	293,324	329,653	465,356
SAN FRANCISCO	547,396	689,176	1,130,020
SANTA BARBARA			
SANTA CRUZ	21,933		
VENTURA			
WESTPORT	362,063	243,728	621,951

Source: PacFIN monthly vessel summary and ftl data.

Note: Landings are from catch in PFMC management areas and do not include catch from areas such as Puget Sound and Columbia River.

Table 7-17. Largest ports for limited entry trawl vessel groundfish landings and exvessel revenue (2005–2007).

Rank	Rank by Weight	Rank by Exvessel Revenue
1	ASTORIA	ASTORIA
2	CHARLESTON (COOS BAY)	CHARLESTON (COOS BAY)
3	EUREKA	EUREKA
4	NEWPORT	NEWPORT
5	FORT BRAGG	FORT BRAGG
6	BELLINGHAM BAY	BELLINGHAM BAY
7	BROOKINGS	BROOKINGS
8	CRESCENT CITY	SAN FRANCISCO
9	SAN FRANCISCO	CRESCENT CITY
10	MOSS LANDING	MOSS LANDING
11	WESTPORT	WESTPORT
12	NEAH BAY	PRINCETON / HALF MOON BAY
13	PRINCETON / HALF MOON BAY	NEAH BAY
14	MORRO BAY	MORRO BAY
15	MONTEREY	MONTEREY

Source: PacFIN monthly vessel summary and ftl data.
Note: Landings are from catch in PFMC management areas and does not include catch from areas such as Puget Sound and Columbia River.

7.1.2.3 *At-Sea Limited Entry Sector*

Participation

In addition to the shore-based limited entry trawl fishery, an at-sea limited entry trawl fishery exists off the coasts of Washington, Oregon, and California. The high volume at-sea fishery targets Pacific whiting with the use of midwater trawls. Pacific whiting commands a relatively low price per pound in the marketplace. The limited entry at-sea sector is made up of a catcher-processor fleet and a mothership/catcher vessel fleet. A catcher-processor participates in both catching and processing; a mothership engages only in the processing of a particular catch, and relies on catch made by catcher vessels. Many of the catcher vessels that deliver to the west coast mothership sector may also fish as west coast shore-based trawl vessels outside the Pacific whiting season; other catcher vessels fish in west coast waters only during Pacific whiting fishery and return to North Pacific fisheries when the Pacific whiting season closes.

The catcher/processor sector is composed of vessels that harvest and process whiting (the fleet has typically been 6-7 vessels since the formation of the Pacific Whiting Conservation Cooperative in 1997). The mothership sector is composed of a number of catcher vessels that harvest whiting for delivery to motherships. Typically 3-5 motherships operate in the fishery, with one mothership also servicing the tribal fleet; ach vessel is typically serviced by 3-4 catcher vessels. Motherships are vessels that process, but do not harvest, whiting.

The at-sea sector annually catches over 100 million pounds of Pacific whiting, as well as several hundred thousand pounds of other types of west coast groundfish.

The at-sea sector annually catches over 100 million pounds of Pacific whiting, as well as tens of thousands of pounds of other west coast groundfish. Catch of non-whiting groundfish is largely composed of yellowtail rockfish, widow rockfish and species within the Minor Rockfish North complex.

Harvests and Revenue

Depending on the OY, at-sea harvests by non-tribal motherships and catcher-processors since 1998 have ranged from 63,000-134,000 mt; the latter harvest level being attained in 2006 (Table 7-18a). This harvest was worth an estimated $18 million (Table 7-19). Note that relatively higher prices for Pacific whiting in 2007 caused the estimated value of at sea catch to exceed $21 million even though harvest was lower than in 2006. The amount of non-whiting groundfish harvested by this fleet is quite small, often in the range of less than half of one percent of total catch.

Table 7-18. Total groundfish catch 1998-2007 reported by non-tribal at-sea processors: Motherships and Catcher-processors (mt).

Species Category	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Pacific whiting	120,452	115,259	114,655	94,451	62,935	67,236	97,277	127,461	134,219	121,072
Pacific cod	0	0.04	0.19	0	0	0.25	0.02	0.01		0.00
Lingcod	0.11	0.06	0.41	0.66	0.27	0.49	1.18	2.42	3.11	5.21
Sablefish	27.83	2.1	47.13	21.5	21.02	16.95	28.71	15.13		3.14
Arrowtooth	1.04	3.21	8.61	3.76	2.17	2.86	1.12	1.26		2.52
Dover sole	0.01	0	0.27	1.53	0.65	0.85	0.14	0.38		0.06
English sole	0	0.02	0.22	0.1	0.11	0.02	0.02	0.06		0.00
Petrale sole	0	0	0	0	0	0	0	0		0.01
Rex sole	0.36	0.02	5.54	18.32	11.51	6.71	1.89	3.18		
Rock sole	0	0	0	0	0	0	0	0		
Starry flounder	0	0	0	0	0	0	0	0		0.00
All other flatfish spp. (except halibut)	0.01	0.01	1.32	7.05	0.15	0.18	0.02	0.01		0.26
Bocaccio	1.21	0.32	2.65	0.29	0.19	0.06	0.16	0.28		
Canary	2.72	1.22	1.42	1.61	2.41	0.26	4.6	1.04	0.95	1.97
Chilipepper	0.01	0.54	4.83	3.57	4.9	1.26	1.97	1.15		0.32
Darkblotched		12.07	3.13	4.31	7.38	11.02			10.97	12.01
POP	21.28	14.15	9.61	19.74	3.62	5.16	1.05	1.64	2.63	3.65
Shortbelly	0.02	0	0.86	27.33	0.6	0.51	0.02	2.69		0.01
Thornyhead	2.51	0.02	19.07	15.21	11.91	15.65	5.64	7.09		2.73
Widow rockfish	292.76	148.95	220.62	168.91	135.6	12.25	19.8	78.65	138.8	145.76
Yellowtail	376.98	684.13	555.56	124.99	14.28	2.32	18.49	72.96	62.69	69.33
Yelloweye		0	0	0	0				0.03	0.01
Other rockfish spp.	62.36	33.15	120.34	66.15	20.54	24.74	25.83	59.22		34.00
Spiny dogfish										86.18
Other groundfish	218.07	254.05	92.46	89.18	38.82	14.33	349.89	94.81		1.78
TOTAL GROUNDFISH	121,689	116,401	115,746	95,033	63,207	67,345	97,738	127,813	134,438	121,441

Source: NMFS whiting reports.

Table 7-19. Non-tribal, at-sea Pacific whiting harvests and revenues.

Sector		2005	2006	2007
Catcher-Processors	Mt	78,890	78,894	73,263
	$,000	9,146	10,564	12,886
Motherships	Mt	48,571	55,355	47,809
	$,000	5,631	7,412	8,409
Total	Mt	127,461	134,249	121,072
	$,000	14,778	17,977	21,294
Estimated price ($,000/mt)		0.116	0.134	0.176
Source: NMFS whiting reports and PacFIN monthly vessel summaries.				

Table 7-20. Monthly at-sea harvests by at-sea sectors (in kilograms).

Sum of Weight (kg)				
YEAR	Calendar month	Catcher/proc.	Mothership	Tribal Mothership
2001	May	10,593,363	23,743,292	
	June	12,585,083	7,463,645	
	July	5,258,001	1,809,551	
	August	6,319,107		
	September	6,493,754		1,654,963
	October	12,431,475		4,427,861
	November	4,949,718		
2001 Total		58,630,502	33,016,488	6,082,823
2002	May	15,707,176	21,432,124	
	June		5,131,053	3,901,774
	July	3,892,390		10,354,934
	August	8,420,572		7,253,635
	September	5,520,573		
	October	2,714,559		
2002 Total		36,255,268	26,563,177	21,510,342
2003	May	9,933,710	21,606,979	
	June	4,539,275	3,748,690	6,218,430
	July	5,528,418		8,329,453
	August	7,621,855		4,719,978
	September	10,365,322		
	October	3,202,512		
2003 Total		41,191,091	25,355,669	19,267,862
2004	May	16,553,683	19,932,828	
	June	8,706,707	4,117,461	6,299,350
	July	5,922,489		10,991,465
	August	8,147,306		6,030,633
	September	17,863,890		
	October	12,336,267		
	November	3,463,771		
2004 Total		72,994,113	24,050,290	23,321,448
2005	May	22,984,025	25,222,321	
	June	15,305,174	12,422,829	9,156,457
	July	7,991,038		10,529,339
	August	9,938,277		3,730,258
	September	14,100,781		
	October	8,554,089	5,849,297	
	November		5,063,628	
2005 Total		78,873,383	48,558,075	23,416,054

Distribution of Effort

The catcher-processor fleet and mothership fleet in recent years have typically harvested a major portion of their allocations during May and June. After June, most of the vessels leave to fish off Alaska. The vessels then often return in late August or September to fish the remainder of their allocations. During the summer months, a few catcher-processors may remain to fish for whiting.

Major Ports

The majority of whiting harvested by the non-tribal at-sea fleet is processed into finished product and then transported at sea to foreign markets. As such, there are no key "at-sea" ports, other than Seattle and Anacortes where the corporate headquarters for these companies are located, and where the hiring of crew and purchasing inputs most likely occurs.

7.1.2.4 *Limited Entry Groundfish Fixed Gear Sector*

Participation

Vessels deploying longlines and traps (pots) comprise the limited entry fixed gear sector. These gear types also may be used by vessels in the open access sector, but preferential harvest limits favor license holders. West coast limited entry fixed gear vessels typically use longline and fish pots (traps) for catching groundfish, particularly sablefish. Groundfish longline activities involve anchoring to the ocean floor a stationary line (groundline) with multiple baited hooks attached to it. A buoy line attaches the groundline to a surface float, usually a buoy and pole. Fishermen leave the longline in the water for several hours to a day. The vessel returns to the gear, retrieves the buoy, and hauls the line to the surface to retrieve the gear and fish. Fish pots or traps used to harvest groundfish are generally square and have mesh or twine encompassing the exterior. Baited traps connected to a surface pole or buoy by a vertical line are dropped to the ocean floor. The fish enter the trap through a door but cannot exit the trap unless they are small enough to escape through the mesh or back out the door. These pots are retrieved by the vessel several hours after being set. Both longlines and fish pots can be set across diverse ocean bottom types, though longlines can get hooked on rocky areas or reefs, causing some gear loss. Limited entry fixed gear fishers typically use shore-based vessels that range in size from 30-65 feet in length, with some vessels exceeding 100 feet, and some as small as 23 feet (Table 7-21). Limited entry fixed gear vessels may also participate in open access fisheries or in the limited entry trawl fishery. Like the limited entry trawl fleet, limited entry fixed gear vessels deliver their catch to ports along the Washington, Oregon, and California coast.

Table 7-21. Count of limited entry vessels making landings with hook and line or pot gear by state, year, and vessel length.

		Vessel Length (feet)						
State	Year	< 40	40 - 49	50 - 59	60 - 69	70–79	80 - 89	> 89
CA	2000	23	25	14	2			
	2001	13	28	9	2			
	2002	14	23	10		2		
	2003	14	18	8				
OR	2000	24	46	18	14		1	
	2001	17	31	16	13	1	1	1
	2002	15	19	14	11		1	
	2003	15	21	10	9	1	2	1
WA	2000	11	21	16	5	2	1	
	2001	6	18	13	3	2	1	
	2002	7	14	10	6	2	1	
	2003	7	16	13	5	2	1	

Source: PacFIN FTL table July 2004

The limited entry fixed gear sector has exhibited overcapacity, although a series of management initiatives have largely addressed the problem. In the early to mid 1990s the fishery was a "derby" managed by very short seasons of two weeks or less. Two Groundfish FMP amendments have helped to alleviate the symptoms of over capacity in the fixed gear sablefish fishery, effectively eliminating the short, derby season. Amendment 9 required a permit endorsement to participate in the primary sablefish fishery, and Amendment 14 introduced permit stacking. Permit stacking allows up to three sablefish-endorsed permits to be used per vessel. Through a tier system, landing limits vary with the number and type of permits held.

Landings and Revenue from Limited Entry Fixed Gear Vessels

Fixed gear vessels primarily target the high-value sablefish; this species accounts for a large share of landings, especially when measured by exvessel value. According to PacFIN data, the majority of limited entry fixed gear landings occur in Oregon and Washington. Oregon and Washington also have a higher price per pound for sablefish, while California has a higher price per pound for other types of groundfish. This is most likely representative of the higher amount of high valued live fish landings that occur in California (Table 7-22).

Table 7-22. Landings and exvessel revenue made by limited entry vessels with fixed gear by state and year (hook and line and pot gear).

State	Species Aggregation	Data Type	2000	2001	2002	2003	2004	2005	2006	2007
CA	Non-Sablefish Groundfish	Landed Weight (mt)	253	247	239	276	260	289	272	250
		Exvessel $ (1000's)	1,089	974	938	1,264	1,362	1,322	1,496	1,594
	Sablefish	Landed Weight (mt)	549	436	352	390	396	418	493	434
		Exvessel $ (1000's)	1,867	1,448	1,146	1,509	1,325	1,396	1,712	1,683
OR	Non-Sablefish Groundfish	Landed Weight (mt)	74	103	51	38	33	30	32	39
		Exvessel $ (1000's)	243	367	200	117	90	77	82	114
	Sablefish	Landed Weight (mt)	984	703	435	603	849	972	846	740
		Exvessel $ (1000's)	4,875	3,426	2,279	3,339	3,430	4,102	4,155	3,734
WA	Non-Sablefish Groundfish	Landed Weight (mt)	384	260	450	228	183	292	195	251
		Exvessel $ (1000's)	240	162	221	120	109	175	141	170
	Sablefish	Landed Weight (mt)	382	346	285	481	496	841	891	625
		Exvessel $ (1000's)	2,477	2,139	1,874	3,195	2,753	3,583	4,204	3,162

Source: PacFIN monthly vessel summary and ftl data.

Note: Landings are from catch in PFMC management areas and does not include catch from areas such as Puget Sound and Columbia River.

Distribution of Effort by Limited Entry Fixed Gear Vessels

Limited entry fixed gear vessels principally target sablefish, a species that tends to reside in relatively deep water (Table 7-23). The limited entry fixed gear sector cannot fish within the boundaries of RCAs; however, the boundaries are somewhat different than those of the limited entry trawl sector. Fixed gear vessels are more prone than trawl vessels to catching some overfished rockfish species, such as yelloweye rockfish, and are therefore restricted from fishing on the continental shelf. Limited entry fixed gear vessels exert most of their effort during the late spring, summer, and early fall. The monthly distribution of effort has become more spread out over the year, and the number of vessels participating has declined after the tier system and permit stacking provisions were put in place in 1998 and 2001 respectively.

Table 7-23. Limited entry vessel groundfish landings made with fixed gear by month and year.

	2000		2001		2002		2003	
Mth.	Landed wt (lbs)	Revenue ($)	Landed wt (lbs)	Revenue ($)	Landed wt (lbs)	Revenue ($)	Landed wt (lbs)	Revenue ($)
1	67,326	132,487	90,463	119,114	132,364	163,145	112,472	215,344
2	108,890	71,447	152,470	154,001	222,151	169,911	139,408	170,878
3	151,900	141,260	136,058	201,181	317,009	243,697	171,134	214,311
4	256,103	190,067	195,109	198,431	445,992	399,176	357,136	396,859
5	361,945	246,369	310,071	269,816	578,767	763,776	489,877	976,868
6	172,531	211,962	141,985	233,775	373,550	716,493	573,040	1,403,875
7	144,956	265,388	208,843	315,779	336,405	754,497	678,224	1,592,493
8	3,616,594	7,790,820	1,147,999	2,404,248	442,965	968,219	546,730	1,313,028
9	387,210	778,563	1,322,139	2,734,656	576,482	1,246,036	817,926	1,965,899
10	205,454	374,881	764,189	1,622,828	387,172	883,103	405,198	942,079
11	180,519	335,921	94,793	162,831	118,599	222,777	111,521	249,621
12	137,895	252,048	54,052	98,561	62,708	127,611	44,003	102,500

Source: PacFIN VSMRFD files. July 2004

Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River.

Major Ports

Table 7-24 shows the top 15 ports (of the 62 receiving landings) for limited entry fixed gear landings and exvessel revenue from 2005–07. The rankings of limited entry fixed gear ports differ only slightly in terms of landings (weight) and of exvessel revenue. The top five ports for landings make up approximately 56 percent of total landings, while the top five ports for revenue make up approximately 58 percent of total exvessel revenues for limited entry fixed gear vessels.

Table 7-24. Largest ports for limited entry fixed gear landings and exvessel revenue (2005-2007).

Rank	Top Ports for Exvessel Revenue	Top Ports for Landings
1	BELLINGHAM BAY	BELLINGHAM BAY
2	NEWPORT	NEWPORT
3	CHARLESTON (COOS BAY)	CHARLESTON (COOS BAY)
4	ASTORIA	ASTORIA
5	PORT ORFORD	MOSS LANDING
6	ILWACO	PORT ORFORD
7	MOSS LANDING	WESTPORT
8	WESTPORT	EUREKA
9	NEAH BAY	ILWACO
10	OCEANSIDE	NEAH BAY
11	EUREKA	CRESCENT CITY
12	LOS ANGELES	FORT BRAGG
13	CRESCENT CITY	LA PUSH
14	FORT BRAGG	OXNARD
15	LA PUSH	OCEANSIDE

Source: PacFIN monthly vessel summary and ftl data.
Note: Landings are from catch in PFMC management areas and does not include catch from areas such as Puget Sound and Columbia River.

7.1.2.5 *Open Access Groundfish*

The open access sector consists of vessels that do not hold a Federal groundfish limited entry permit and target (Open Access Directed Fisheries) or incidentally catch (Open Access Incidental Fisheries) groundfish using a variety of gears. The open access appellation can be confusing because vessels in this sector may hold limited entry permits for other, non-groundfish fisheries issued by the Federal or state governments. However, groundfish catch by these vessels is regulated under the Groundfish FMP. For example, open access vessels must comply with cumulative trip limits established for the open access sector and are subject to the other operational restrictions imposed in the regulations, including general compliance with the RCA restrictions.

Open Access Fisheries: Directed and Incidental

Participation in the directed open access fishery segment varies between years. Participants may move into other, more profitable fisheries, or they may take time off from fishing or quit fishing altogether. Fishers use various non-trawl gears to target particular groundfish species or species groups. Longline and hook and line gear are the most common open access gear types used by vessels directly targeting groundfish and are generally used to target sablefish, rockfish, and lingcod. Pot gear is used for targeting sablefish, thornyheads and rockfish. Though largely proscribed from use under current regulations, in the past off southern and central California, setnet gear was used to target rockfish, including chilipepper rockfish, widow rockfish, bocaccio, yellowtail rockfish, and olive rockfish, and to a lesser extent vermilion rockfish.

The directed open access fishery is further grouped into the “dead” and/or “live” fish fisheries. The terms dead and live fish fisheries refer to the state of the fish when it is landed. The dead fish fishery has historically been the most common way to land fish. However, more recently, the higher market value for live fish has resulted in increased landings in the live fish fishery. In 2001, 20 percent of fish landed (by weight, coastwide) by directed open access fishers was landed live as compared to only 6 percent in 1996 (PFMC 2004d).

In the live-fish fishery, groundfish are primarily caught with hook and line gear (rod-n-reel), limited entry longline gear, and a variety of other hook gears (e.g. stick gear). The fish are kept alive in a seawater tank on board the vessel. California halibut and rockfish taken in gill and trammel nets have increasingly appeared in the live fish fishery (CDFG 2001). Live fish are sold at a premium price to food fish markets and restaurants, primarily in Asian communities in California. Only limited information exists on the distribution of effort by open access vessels. Because the open access sector has an increasingly large live fish fishery component with nearshore species making up most of the live fish landings, it is likely that effort located near shore accounts for most live fish landings.

In California, hook and line gear for the live fish fishery has been limited, since 1995, to a maximum of 150 hooks per vessel and 15 hooks per line within one mile of the mainland shore (CDFG 2001). Traps are limited to 50 per fisherman. In Washington, it is illegal to possess live bottom fish taken under a commercial fishing license. In Oregon, nearshore rockfish and species such as cabezon and greenling are the primary target of the live fish fishery. Sablefish and rockfish are also landed live in Oregon and are managed under limits that count against the Federally established limited entry allocations. The Oregon live fish fishery occurs in waters of ten fm (18 meters) or less. Only legal gears are allowed to be used to catch nearshore live fish. In early 2002, an Oregon Development Fisheries Permit was required for fishermen landing live fish species (e.g. cabezon, greenling (except kelp greenling), brown, gopher, copper, black and yellow, kelp, vermilion, and grass rockfish (among others), buffalo sculpin, Irish lords, and many surfperch species). Commercial fishing for food fish is also prohibited in Oregon bays and estuaries and within 600 feet (183 meters) seaward of any jetty.

Participation

Many fishers catch groundfish incidentally when targeting other species due to the kind of gear they use and the co-occurrence of target and groundfish species in a given area. Managers classify vessels as within the open access incidental fishery if groundfish comprises 50 percent or less of their landings, measured by dollar value. These incidental open access fisheries may also at times account for a significant amount of bycatch, especially for overfished groundfish species. Fisheries targeting pink shrimp, spot prawn, ridgeback prawn, California and Pacific halibut, Dungeness crab, salmon, sea cucumber, CPS, California sheephead (California nearshore fishery), highly migratory species, and the mix of species caught in net fisheries comprise this incidental segment of the open access sector. These fisheries and associated target species are described below.

Given that vessels within the incidental open access fishery do not necessarily depend on revenue from the groundfish fishery as a major source of income, understanding the level of dependency that such participants have on the groundfish fishery must be considered in light of their overall fisheries revenues. Table 7-25 shows the number of open access vessels by vessel length and level of dependency on the groundfish fishery (proportion of annual revenue derived from groundfish). Between November 2000 and October 2001, 1,287 vessels landed groundfish in the open access sector of the groundfish fishery. Of these vessels, 771 vessels (60 percent) had a greater than 5 percent dependency on the groundfish fishery with 345 of these vessels having a 95-100 percent level of dependency of groundfish. The open access fishery is dominated by vessels under 40 feet in length. About 78 percent of the vessels that landed open access groundfish between November 2000 and October 2001 were less than 40 feet in length. It is assumed that a portion of these smaller vessels fish exclusively in state waters, and thus would be excluded from VMS requirements. However, the data is not available to identify the proportion of vessels that fish only in state waters. About one-third (36 percent) of the open access vessels had a greater than 65 percent dependency on groundfish, with just over half (56 percent) of the most dependent vessels having less than $5,000 in total exvessel revenue. A greater proportion of vessels with lower levels of dependency on groundfish had greater than $5,000 total exvessel revenue.

Table 7-25. Number of open access vessels by level of dependency[a/] and vessel length.

Dependency	<40’	40’-50’	50’-60’	60’-70’	70’-150’	Unspecified	Total
<5%	324	109	29	28	25	1	516
>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

Extracted from Table 6-18a DEIS, Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2005-2006 Pacific Coast Groundfish fishery
a/ The share of total revenues derived from groundfish landings. Open access vessels with more than half of their total landings value coming from groundfish are considered to be in the directed fishery.

Though fishery managers divide the open access sector into directed and incidental categories, as discussed above, it should be noted that such segregation is difficult to do because the choice depends on the intention of the fisher. Over the course of a year or during a single trip, a fisher may engage in different strategies and they may switch between directed and incidental fishing categories. Such changes in strategy are likely the result of a variety of factors, including the potential economic return from landing a particular mix of species. Table 7-26 provides information on open access participants for the 2000- 03 period taken from the VMS EA.

Table 7-26. Open access groundfish landings by gear group, 2000-2003.

Open Access Gear Group	Number of Vessels Landing Groundfish	Landed Groundfish Weight (mt)	Exvessel Revenue Groundfish ($)	Exvessel Revenue per Vessel ($)
Longline - all groundfish a				
2000	399	435	1,847,800	4,627
2001	392	408	1,656,395	4,221
2002	287	349	1,268,537	4,422
2003	307	507	1,728,038	5,625
Average	346	425	1,625,193	4,724
Longline - groundfish directed b				
2000	133	399	1,679,851	12,619
2001	115	367	1,466,101	12,765
2002	96	318	1,129,437	11,733
2003	113	469	1,541,727	13,610
Average	114	388	1,454,279	12,682
Longline - CA Halibut				
2000	4	3	24,226	6,057
2001	2	3	29,774	14,887
2002	2	1	5,352	2,676
2003	0	0	0	0
Average	2	2	19,784	7,873
Pot - groundfish directed c				
2000	28	164	834,087	29,789
2001	34	145	720,680	21,196
2002	35	124	573,289	16,380
2003	41	194	763,732	18,628
Average	35	157	722,947	21,498
Pot - Dungeness crab				
2000	71	45	165,638	2,333
2001	63	29	124,674	1,979
2002	63	34	149,311	2,370
2003	61	39	173,518	2,845
Average	65	37	153,285	2,382
Pot - prawn/shrimp				
2000	12	1	3,973	331
2001	10	5	21,569	2,157
2002	8	1	9,869	1,234
2003	7	6	25,635	3,662
Average	9	3	15,262	1,846
Pot - sheephead				
2000	49	4	43,446	887
2001	40	3	30,770	769
2002	36	9	58,951	1,638
2003	22	1	14,542	661
Average	37	5	36,927	989
Trawl - sea cucumber				
2000	3	0.1	189	63
2001	10	0.8	1,649	165
2002	8	0.8	2,962	370
2003	6	0.3	650	108
Average	7	1	1,363	177

Table 7-26. Open access groundfish landings by gear group, 2000-2003 (based on 8/24/04 PacFIN data) (continued).

Open Access Gear Group	Number of Vessels Landing Groundfish	Landed Groundfish Weight (mt)	Exvessel Revenue Groundfish ($)	Exvessel Revenue per Vessel ($)
Trawl - CA halibut				
2000	24	22	38,697	1,612
2001	30	7	12,324	411
2002	21	6	12,961	617
2003	15	2	5,513	368
Average	23	9	17,374	752
Trawl -Ridgeback Prawn				
2000	28	11	28,468	1,017
2001	0	0	0	0
2002	0	0	0	0
2003	0	0	0	0
Average	--	--	--	--
Line gear - all groundfish a/				
2000	1,180	391	2,029,516	1,720
2001	1,175	418	2,136,846	1,818
2002	881	406	2,178,544	2,474
2003	641	326	1,614,643	2,521
Average	969	385	1,989,887	2,133
Line gear - CA halibut				
2000	< 285	10	32,419	114
2001	< 270	7	31,471	117
2002	< 250	5	31,333	125
2003	< 245	6	40,284	164
Average	< 263	7	33,877	129
Line gear - Salmon troll (coastwide)				
2000	304	17	37,806	124
2001	229	14	27,860	122
2002	212	10	25,336	120
2003	220	9	19,604	89
Average	241	12	27,651	115
Line gear - Salmon troll (north only)				
2000	163	11	24,280	149
2001	177	11	19,014	107
2002	152	6	13,742	90
2003	154	6	11,304	73
Average	162	9	17,085	106
Net gear - CPS				
2000	3	2	738	369
2001	1	0	2	1
2002	1	0	14	14
2003	3	0	52	17
Average	2	1	213	100

Note: (based on 8/24/04 PacFIN data)
a/ Multiple records exist for landings with HKL gear that do not have an associated vessel ID. The vessel count in this case is an estimate.
b/ Annual revenue of $2,500 is used as a proxy for vessels that had efforts directed at groundfish.
c/ If ≥20% of revenue was from groundfish, a vessel was assumed to have targeted groundfish at some point during the year.

Landings and Revenue from Groundfish Open Access Vessels

Rockfish, thornyheads, and sablefish account for most of the open access landings and revenue and hook and line is the major gear type used for open access landings (Table 7-27). Fixed gear are used to catch most open access groundfish, although non-shrimp trawl gear and net gear also make substantial landings (Table 7-28). Open access landings in the state of California have a large live fish component, which is made evident by the relatively high unit value of rockfish in that state compared to the unit value of rockfish landed in Oregon and Washington.

Table 7-27. Directed open access groundfish landings and exvessel revenue by year, state, and species.

State	Species Aggregation	Data Type	2005	2006	2007
CA	Lingcod	Landed wt (lbs)	82,417	71,089	69,496
		Exvessel Revenue ($)	152,405	137,544	145,539
	Flatfish	Landed wt (lbs)	4,760	7,244	10,031
		Exvessel Revenue ($)	7,333	17,929	24,047
	Sablefish	Landed wt (lbs)	1,041,217	842,947	655,218
		Exvessel Revenue ($)	1,357,476	1,231,748	1,008,352
	Rockfish a/	Landed wt (lbs)	489,493	497,203	521,579
		Exvessel Revenue ($)	1,661,060	1,784,623	2,019,626
	Other Groundfish	Landed wt (lbs)	242,940	182,673	143,834
		Exvessel Revenue ($)	437,350	442,532	395,562
OR	Lingcod	Landed wt (lbs)	74,209	81,409	96,430
		Exvessel Revenue ($)	111,807	142,614	177,677
	Flatfish	Landed wt (lbs)	1,727	2,389	2,926
		Exvessel Revenue ($)	325	413	441
	Sablefish	Landed wt (lbs)	575,983	537,529	275,850
		Exvessel Revenue ($)	928,756	967,814	534,028
	Rockfish a/	Landed wt (lbs)	266,732	246,718	252,133
		Exvessel Revenue ($)	389,034	438,000	479,915
	Other Groundfish	Landed wt (lbs)	103,175	74,260	77,209
		Exvessel Revenue ($)	400,360	288,772	301,343
WA	Lingcod	Landed wt (lbs)	5,944	6,518	9,398
		Exvessel Revenue ($)	4,232	5,122	7,271
	Flatfish	Landed wt (lbs)	512	117	200
		Exvessel Revenue ($)	135	54	60
	Sablefish	Landed wt (lbs)	427,181	415,277	136,242
		Exvessel Revenue ($)	720,751	733,178	287,949
	Rockfish a/	Landed wt (lbs)	20,929	5,115	6,955
		Exvessel Revenue ($)	10,863	2,243	7,454
	Other Groundfish	Landed wt (lbs)	8,231	132,097	454
		Exvessel Revenue ($)	2,155	31,052	109
Total Landed wt (lbs)			3,345,450	3,102,585	2,257,955
Total Exvessel Revenue ($)			6,184,042	6,223,638	5,389,373

a/ the “Rockfish” aggregation includes thornyheads and scorpionfish.
Source: PacFIN monthly vessel summary data.
Note: Landings are from catch in PFMC management areas and does not include catch from areas such as Puget Sound and Columbia River.

Table 7-28. Incidental open access groundfish landings and exvessel revenue by year, state, and species.

State	Species Aggregation	Data Type	2005	2006	2007
CA	Lingcod	Landed wt (lbs)	962	162	40
		Exvessel Revenue ($)	795	137	37
	Flatfish	Landed wt (lbs)	76,949	63,734	36,772
		Exvessel Revenue ($)	95,334	79,887	33,941
	Sablefish	Landed wt (lbs)	6,160	10,757	17
		Exvessel Revenue ($)	8,218	16,175	51
	Rockfish a/	Landed wt (lbs)	12,503	4,456	3,326
		Exvessel Revenue ($)	23,127	10,525	10,511
	Other Groundfish	Landed wt (lbs)	6,074	6,964	71
		Exvessel Revenue ($)	1,912	2,464	60
OR	Lingcod	Landed wt (lbs)	7		
		Exvessel Revenue ($)	4		
	Flatfish	Landed wt (lbs)	133		
		Exvessel Revenue ($)	55		
	Sablefish	Landed wt (lbs)			
		Exvessel Revenue ($)			
	Rockfish a/	Landed wt (lbs)			
		Exvessel Revenue ($)			
	Other Groundfish	Landed wt (lbs)			
		Exvessel Revenue ($)			
WA	Lingcod	Landed wt (lbs)		7	
		Exvessel Revenue ($)		10	
	Flatfish	Landed wt (lbs)	116		46,649
		Exvessel Revenue ($)	44		15,116
	Sablefish	Landed wt (lbs)			6,837
		Exvessel Revenue ($)			11,187
	Rockfish a/	Landed wt (lbs)	45	4	2,293
		Exvessel Revenue ($)	18	2	1,290
	Other Groundfish	Landed wt (lbs)	117		
		Exvessel Revenue ($)	20		
Total Landed wt (lbs)			103,066	86,084	96,005
Total Exvessel Revenue ($)			129,527	109,200	72,193

a/ the "Rockfish" aggregation includes thornyheads and scorpionfish.
Source: PacFIN monthly vessel summary data.
Note: Landings are from catch in PFMC management areas and does not include catch from areas such as Puget Sound and Columbia River.

Distribution of Effort by Groundfish Open Access Vessels

Limited information exists on the distribution of effort by open access vessels. The open access sector is made up of many different gear types involved in directed and incidental catch, which makes it difficult to discern the location of effort. However, based on the diversity of this sector, it is reasonable to assume that effort is widespread across the west coast. The open access sector has an increasingly large live fish fishery component; because nearshore species make up most of the live fish landings, effort located near shore likely accounts for most live fish landings. The live fish fishery is a quickly growing component of the open access sector and likely will continue to grow in the nearshore areas.

As shown in Table 7-29, open access landings and revenue have tended to occur primarily during the spring, summer, and fall months. Assuming that landed catch represents directed open access, and that landed catch is a function of effort, then more open access-related fishing activity occurs during the spring, summer, and fall months than during winter months.

Table7-29. Open access groundfish landings and exvessel revenue by year and month.

		Year			
Month	Data Type	2000	2001	2002	2003
Jan	Landed Weight (lbs)	93,701	112,254	181,903	110,711
	Exvessel Revenue ($)	145,656	223,168	306,917	205,300
Feb	Landed Weight (lbs)	41,385	165,665	182,796	163,689
	Exvessel Revenue ($)	65,017	302,154	414,606	340,653
Mar	Landed Weight (lbs)	73,791	143,817	252,550	160,549
	Exvessel Revenue ($)	146,782	233,427	336,792	185,578
Apr	Landed Weight (lbs)	159,222	167,204	179,382	245,277
	Exvessel Revenue ($)	288,795	289,676	302,902	254,953
May	Landed Weight (lbs)	183,220	258,256	262,229	292,340
	Exvessel Revenue ($)	375,394	548,591	533,438	579,894
Jun	Landed Weight (lbs)	254,531	261,425	312,602	270,832
	Exvessel Revenue ($)	536,131	500,489	548,528	532,533
Jul	Landed Weight (lbs)	317,609	515,377	273,616	291,337
	Exvessel Revenue ($)	577,348	757,606	476,710	573,222
Aug	Landed Weight (lbs)	293,626	360,067	303,725	344,512
	Exvessel Revenue ($)	683,134	638,477	504,046	549,447
Sep	Landed Weight (lbs)	256,663	306,550	305,507	536,720
	Exvessel Revenue ($)	548,398	538,645	357,348	627,820
Oct	Landed Weight (lbs)	250,241	191,702	184,380	392,800
	Exvessel Revenue ($)	477,569	418,312	315,544	401,556
Nov	Landed Weight (lbs)	271,041	193,812	196,511	359,501
	Exvessel Revenue ($)	522,012	302,037	292,301	344,660
Dec	Landed Weight (lbs)	295,861	81,443	79,445	82,812
	Exvessel Revenue ($)	603,194	155,837	106,519	84,050

Source: PacFIN VSMRFD files. July 2004

Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

Major Ports

Table 7-30 shows that the top open access ports are Moss Landing, Port Orford, Morro Bay, Fort Bragg and Gold Beach. The top five ports accounted for 49 percent of open access groundfish landings by weight and exvessel revenue.

Table 7-30. Top ports for open access groundfish landings and revenue (2005-07).

Rank	Top 15 Ports for Landed Revenue	Top 15 Ports for Landed Weight
1	PORT ORFORD	FORT BRAG
2	MORRO BAY	PORT ORFORD
3	FORT BRAG	MORRO BAY
4	AVILA	ILWACO
5	CRESCENT CITY	CRESCENT CITY
6	ILWACO	MOSS LANDING
7	COOS BAY	COOS BAY
8	GOLD BEACH	EUREKA
9	MOSS LANDING	AVILA
10	SANTA BARBARA	GOLD BEACH
11	EUREKA	ASTORIA
12	SAN FRANCISCO	NEWPORT
13	ASTORIA	BELLINGHAM
14	BROOKINGS	SAN FRANCISCO
15	MONTEREY	TILLAMOOK

Source: PacFIN monthly vessel summary data.
Note: Landings are from catch in PFMC management areas and does not include catch from areas such as Puget Sound and Columbia River.

7.1.2.6 *Tribal Fisheries*

West coast treaty tribes in Washington have formal groundfish allocations for sablefish, black rockfish, and Pacific whiting. Members of four coastal treaty tribes participate in commercial, ceremonial, and subsistence fisheries off the Washington coast. Participants in the tribal commercial fisheries use similar gear to non-tribal fishers. Fish caught in the tribal commercial fishery are distributed through the same markets as non-tribal commercial catch.

Participation

Tribal treaty fisheries are place-oriented—limited to the adjudicated usual and accustomed (U&A) areas. This results in fisheries that cannot move to a new location if the resources or habitat are depleted. In addition, the tribes and their fishermen have a view of ownership of their fishing grounds rooted in centuries of use and control of these grounds. This sense of ownership influences fishing practices and these practices are used by the tribes to develop tribal rules and regulations to stay within the harvest limits established by the Council for overfished and abundant stocks. Tribal fisheries take several species for which they have no formal allocations, and some species for which no specific allocation has been determined (Table 7-31). Rather than try to reserve specific allocations of these species, the tribes biennially recommend trip limits for some species to the Council, which in turn tries to accommodate these fisheries.

Table 7-31. Tribal shoreside landings and exvessel revenue by species group and year.

		Year				
Species Group	Data Type	2000	2001	2002	2003	2004
CPS	Landed weight (lbs)				C	
	Exvessel revenue ($)				C	
Crab	Landed weight (lbs)	922,909	665,443	1,804,399	1,420,102	2,672,525
	Exvessel revenue ($)	1,957,757	1,292,271	3,240,886	2,660,939	5,704,007
Groundfish	Landed weight (lbs)	1,152,546	1,274,750	1,675,078	11,808,437	18,689,384
	Exvessel revenue ($)	2,625,809	2,589,479	2,034,776	3,639,098	4,082,579
HMS	Landed weight (lbs)		15,110	21,664	37,950	15,301
	Exvessel revenue ($)		11,876	11,645	33,456	11,162
Other	Landed weight (lbs)	281,820	418,480	480,185	485,509	537,583
	Exvessel revenue ($)	747,950	840,983	949,711	1,271,393	1,506,766
Salmon	Landed weight (lbs)	236,966	735,977	573,684	513,772	1,090,256
	Exvessel revenue ($)	282,162	631,997	444,341	512,614	1,648,124
Shellfish	Landed weight (lbs)	C			C	C
	Exvessel revenue ($)	C			C	C
Sum of weight (lbs)		2,594,241	3,109,760	4,555,010	14,265,770	23,005,049
Sum of revenue (lbs)		5,613,678	5,366,607	6,681,358	8,117,501	12,952,638

Source: PacFIN FTL table. September 2005
Note: Totals do not include confidential data.

Groundfish fishing by the tribes occurs primarily with hook and line and trawl gear (Table 7-32). All tribes participating in groundfish fisheries have longline vessels in their fleets, but only the Makah tribe has trawlers, and only the Makah tribe has participated in the Pacific whiting fishery. The Makah tribe also has the majority of longline vessels, followed by Quinault, Quileute, and Hoh tribes. Since 1996, a portion of the U.S. Pacific whiting OY has been allocated to the west coast treaty tribes. The tribal allocation is subtracted from the whiting OY before allocation to the non-tribal 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 fishing with mid-water trawl gear have also been targeting yellowtail rockfish in recent years.

Table 7-32. Tribal shoreside landings by gear type and year.

		Year				
Gear Type	Data	2000	2001	2002	2003	2004
Hook and Line	Landed weight (lbs)	1,317,524	1,406,585	1,125,842	1,362,733	1,623,791
	Exvessel revenue ($)	3,264,578	3,296,352	2,470,980	3,423,539	3,942,738
Misc.	Landed weight (lbs)	C			C	C
	Exvessel revenue ($)	C			C	C
Net	Landed weight (lbs)	55,731	119,043	11,810	5,412	4,597
	Exvessel revenue ($)	66,020	84,960	8,185	4,950	4,720
Pot	Landed weight (lbs)	943,559	665,443	1,804,399	1,420,102	2,672,525
	Exvessel revenue ($)	2,022,219	1,292,271	3,240,886	2,660,939	5,704,007
Troll	Landed weight (lbs)	198,984	656,317	600,689	567,302	1,143,716
	Exvessel revenue ($)	226,440	569,236	457,477	553,069	1,696,708
Trawl	Landed weight (lbs)	78,443	262,372	1,012,270	10,910,311	17,560,420
	Exvessel revenue ($)	34,420	123,789	503,830	1,475,040	1,604,465
Total Sum of weight (lbs)		2,594,241	3,109,760	4,555,010	14,265,860	23,005,049
Total Sum of revenue ($)		5,613,678	5,366,607	6,681,358	8,117,538	12,952,638

Source: PacFIN FTL table. July 2004
Note: Totals do not include confidential data.
* for crab only

Table 7-33. West coast groundfish catch (at-sea and shoreside) in ocean areas by tribal fleet (mt).

Group	Species	2000	2004	2005	2006	2007
Flatfish	ARROWTOOTH FLOUNDER	0.2	81.9	158.3	198.8	224.8
	DOVER SOLE	0.9	83.6	145.0	223.4	303.4
	ENGLISH SOLE	0.5	81.1	65.9	42.0	66.5
	PETRALE SOLE	0.0	84.1	29.7	26.4	45.0
	REX SOLE	0.1	6.8	13.7	20.6	22.3
	ROCK SOLE		2.4	2.3	1.1	3.2
	UNSP. FLATFISH		6.7	29.2	30.0	8.8
	UNSPECIFIED SANDDAB		0.4	1.2	7.9	13.9
	SAND SOLE		0.9	0.5	0.0	0.2
	STARRY FLOUNDER		2.3	1.3	0.0	0.5
	BUTTER SOLE				0.0	
Flatfish Total		1.6	350.1	446.9	550.4	688.5
Rockfish	BOCACCIO	0.1				
	NOM. BLACK ROCKFISH				0.0	
	NOM. CANARY ROCKFISH	0.2	3.1	4.3	2.9	1.5
	CANARY ROCKFISH	0.1				
	NOM. DARKBLOTCHED ROCKFISH		0.1	0.1	0.1	0.1
	DARKBLOTCHED ROCKFISH	0.0				
	GREENSTRIPED ROCKFISH	0.0				
	PACIFIC OCEAN PERCH	0.0				
	REDBANDED ROCKFISH	0.2				
	REDSTRIPE ROCKFISH	0.1				
	ROUGHEYE ROCKFISH	0.0				
	ROSETHORN ROCKFISH					
	SHARPCHIN ROCKFISH	0.0				
	SILVERGREY ROCKFISH	0.0				
	UNSP. POP GROUP		3.9	3.4	2.9	2.0
	UNSP. ROCKFISH	20.8				
	WIDOW ROCKFISH	0.9				
	NOM. WIDOW ROCKFISH	0.0	21.5	28.6	9.9	1.2
	NOM. YELLOWEYE ROCKFISH		0.8	0.8	0.5	0.5
	YELLOWEYE ROCKFISH	0.0				
	NOM. YELLOWTAIL ROCKFISH	4.3	351.7	542.1	171.8	74.0
	YELLOWTAIL ROCKFISH	31.1				
	Unsp. Shelf Rockfish	1.4	4.5	9.3	6.8	2.5
	Unsp. Near-Shore Rockfish	0.0	0.1	0.2	0.3	0.1
	Unsp. Slope Rockfish	9.0	22.8	28.7	28.6	31.8
	BLACKGILL ROCKFISH					
	SHORTRAKER ROCKFISH					
Rockfish Total		68.4	408.4	617.6	223.8	113.7
Other Groundfish	SPINY DOGFISH	2.8	40.1	5.9	76.8	113.1
	LINGCOD	3.1	23.8	29.9	44.9	47.6
	PACIFIC COD	2.1	307.7	123.7	35.6	45.4
	SABLEFISH	705.7	709.2	699.8	669.5	516.1
	UNSPECIFIED SKATE	0.9	8.8	23.4	38.9	56.1
	NOMINAL SHORTSPINE THORNYHEAD	4.1	6.4	10.8	21.5	38.5
	SHORTSPINE THORNYHEAD					
	NOMINAL LONGSPINE THORNYHEAD			0.2		
	WALLEYE POLLOCK		45.9	19.6	0.9	1.1
Other Groundfish Total		718.7	1,141.9	913.4	888.0	817.9
PACIFIC WHITING (including at sea)		6,251.1	28,647.7	34,356.7	35,440.7	30,176.7
	All Groundfish Species	7,039.8	30,548.1	36,334.6	37,102.9	31,796.7

Table 7-34. West coast groundfish exvessel revenue (at-sea and shoreside) in ocean areas by tribal fleet: ($,000).

Group	Species	2000	2004	2005	2006	2007
Flatfish	ARROWTOOTH FLOUNDER	0.0	17.7	36.4	40.1	48.6
	DOVER SOLE	0.7	60.3	112.7	180.2	244.3
	ENGLISH SOLE	0.3	59.4	47.0	30.7	48.5
	PETRALE SOLE	0.1	192.0	66.3	61.4	105.9
	REX SOLE	0.1	5.3	12.6	15.9	17.2
	ROCK SOLE		1.8	1.7	0.8	2.5
	UNSP. FLATFISH		4.9	21.3	20.1	5.8
	UNSPECIFIED SANDDAB		0.3	0.7	6.2	11.0
	SAND SOLE		1.5	0.6	0.0	0.2
	STARRY FLOUNDER		1.6	0.9	0.0	0.4
	BUTTER SOLE				0.0	
Flatfish Total		1.1	344.7	300.1	355.4	484.4
Rockfish	BOCACCIO	0.1				
	NOM. BLACK ROCKFISH					
	NOM. CANARY ROCKFISH	0.2	3.2	4.2	2.9	1.6
	CANARY ROCKFISH	0.1				
	NOM. DARKBLOTCHED ROCKFISH		0.1	0.1	0.1	0.1
	DARKBLOTCHED ROCKFISH	0.0				
	GREENSTRIPED ROCKFISH	0.0				
	PACIFIC OCEAN PERCH	0.0				
	REDBANDED ROCKFISH	0.2				
	REDSTRIPE ROCKFISH	0.1				
	ROUGHEYE ROCKFISH	0.0				
	ROSETHORN ROCKFISH					
	SHARPCHIN ROCKFISH	0.0				
	SILVERGREY ROCKFISH	0.0				
	UNSP. POP GROUP		3.9	3.4	3.9	1.9
	UNSP. ROCKFISH	20.7				
	WIDOW ROCKFISH	0.9				
	NOM. WIDOW ROCKFISH	0.0	22.6	29.9	10.8	1.1
	NOM. YELLOWEYE ROCKFISH	0.0	1.8	1.9	1.0	1.1
	YELLOWEYE ROCKFISH					
	NOM. YELLOWTAIL ROCKFISH	3.4	368.9	569.8	179.0	77.4
	YELLOWTAIL ROCKFISH	30.1				
	Unsp. Shelf Rockfish	1.8	3.9	8.3	6.5	2.5
	Unsp. Near-Shore Rockfish	0.0	0.1	0.2	0.3	0.2
	Unsp. Slope Rockfish	8.2	22.5	27.8	28.9	35.3
	BLACKGILL ROCKFISH					
	SHORTRAKER ROCKFISH					
Rockfish Total		65.9	427.0	645.8	233.5	121.2
Other Groundfish	SPINY DOGFISH	0.8	15.0	2.1	29.7	37.9
	LINGCOD	4.1	34.3	44.5	75.3	84.1
	PACIFIC COD	2.0	307.5	123.5	42.2	54.8
	SABLEFISH	2,544.5	2,476.9	2,440.9	2,639.0	2,435.1
	UNSPECIFIED SKATE	0.1	2.0	6.9	12.3	20.1
	NOMINAL SHORTSPINE THORNYHEAD	7.2	11.4	15.6	32.0	64.6
	SHORTSPINE THORNYHEAD					
	NOMINAL LONGSPINE THORNYHEAD			0.3		
	WALLEYE POLLOCK		14.0	6.3	0.4	0.4
Other Groundfish Total		2,558.8	2,861.2	2,640.1	2,831.0	2,697.0
PACIFIC WHITING (including at sea)		551.3	1,894.7	3,787.2	4,688.0	4,657.0
All Groundfish Species		3,177.1	5,527.7	7,373.2	8,107.8	7,959.6

As the Makah tribe has the largest tribal fleet involved in groundfish fisheries, what follows is a detailed description of Makah groundfish fisheries and management practices. In 2006, the Makah fleet consisted of 43 boats, an increase of two vessels from 2004 (Table 7-35). Twenty-nine of the boats fish for salmon, sablefish, and halibut. These boats primarily fish from March to October. Ten of the boats are small bottom trawlers. The trawl fishery is open from January to December, but primarily the fishing is done from June to October. The mid-water whiting fleet is composed of four mid-water trawlers that deliver to shoreside plants and to two at-sea motherships (one of which also participates in the non-tribal mothership whiting fishery). Their season extends from May to September. Full retention of rockfish bycatch is required (as is the case in all Makah groundfish fisheries). The bycatch is processed for human consumption and forfeited to the tribe for distribution to food banks and similar programs. This program provides full accounting of bycatch in the fishery, avoids wastage and discards of bycatch species, and creates incentives for both the catcher vessels and processors to avoid bycatch. This in turn has reduced bycatch levels of nearly all species.

Table 7-35. Distribution of Vessels Engaged in Tribal Groundfish Fisheries.

Treaty Tribe	Number of Vessels in Groundfish Fishery				Port
	Longline (length in ft)	Whiting (length in ft)	Trawl (length in ft)	Total	
Makah	31 (33'-62')	4 (95'-124')	10 (49'-62')	45	Neah Bay/West Port
Hoh	1	-	-	1	West Port
Quileute	8 (45’-68’)	-	-	8	La Push
Quinault	12 (38'-62')	-	-	12	West Port

Source: NWIFC. 2006. Personal Communication

In the Makah bottom trawl fishery, the tribe adopted small foot rope restrictions as a means to reduce rockfish bycatch and avoid areas where higher incidences of rockfish occur. In addition, the bottom trawl fishery is limited by overall foot rope length as a means to conduct a more controlled fishery. Harvest is restricted by time and area to focus on harvestable species while avoiding bycatch of other species. If bycatch of rockfish is above a set amount, the fishery is modified to stay within the bycatch limit. The midwater trawl fishery has similar control measures. A trawl area must first be tested to determine the incidence of overfished rockfish species prior to opening the area to harvest. Vessels are provided guidelines for fishing techniques and operation of their net. Fishing effort is closely monitored by the on-board observer and harvest manager, and changes or restrictions are implemented as needed to stay within the bycatch limits. In developing these trawl fisheries, the Makah management practices include testing of gear, area, vessels, and catch composition before the fishery can proceed from one level to the next. In addition, a new or developing fishery must show that it can be conducted in a manner that protects existing fisheries.

Tribal Harvests and Revenues

Tables 7-33 and 7-34 shows recorded landings of groundfish species by treaty tribes in 2000 and from 2004 to 2007. Pacific whiting have been the vast majority of tribal landings by weight. As shown in Table 7-34, in addition to increases in Pacific whiting harvests, there has been a growth in tribal landings of flatfish and spiny dogfish. Revenues from landings of tribal groundfish reached $8.1 million in 2006, and nearly $8 million in 2007. Almost 60 percent of this revenue in both years was attributed to Pacific whiting harvests, both shoreside and at sea.

Distribution of Effort

The majority of tribal groundfish landings occur during the March and April Pacific 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 four tribes on the Washington coast 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 are split between the tribes according to a mutually agreed-upon allocation scheme. Specific sablefish allocations are managed by the individual tribes. The fishery begins in March and continues sometime in the autumn, depending on the number of vessels participating in the fishery. Participants in the halibut and sablefish fisheries tend to use hook and line gear, as required by the IPHC. For equity reasons, the tribes have agreed to also use snap-line gear in the fully competitive sablefish fishery. So a vessel that participated in a fully competitive sablefish fishery, but that did not land any halibut (and therefore was not subject to IPHC requirements), would still be required by tribal regulations to use snap-line gear.

Major Ports

Table 7-35 shows the distribution of vessels engaged in tribal groundfish fisheries by major port. These ports are Westport, Neah Bay, and La Push.

7.1.3 Recreational Fisheries

A major change in the collection of California recreational statistics occurred in 2004 when the methodologies employed under MRFSS were replaced by those of a California Recreational Fisheries Survey. The CRFS is a coordinated sampling survey designed to gather catch and effort data from anglers in all modes of marine recreational finfish fishing. This program incorporates and updates the comprehensive sampling methodologies of the former MRFSS and the CDFG Ocean Salmon Project. This program was fully implemented state-wide in January 2004. The comparability of pre-2004 data with data collected under the new system is still being evaluated. The following discussion incorporates the discussion of recreational fisheries and 1996-2003 trends found in the 2007-2008 Groundfish Specifications EIS (PFMC 2004d), as this is still the best available overview of west coast recreational fisheries. This discussion is then followed by presentation of 2005-2007 recreational effort provided by the states through RecFIN and the Council's Groundfish Management Team process.

7.1.3.1 *Participation*

Demand for recreational trips and estimates of the economic impacts resulting from recreational fishing are related to numbers of anglers. In the U.S., over nine million anglers took part in 76 million marine recreational fishing trips in 2000. The west coast accounted for about 22 percent of these participants and 12 percent of trips. 70 percent of west coast trips were made off California, 19 percent off Washington, and 11 percent from Oregon (Gentner 2001).

Recreational fishing is an important economic contributor to the west coast in general, and to some communities specifically. The recreational fishing sector can be divided into the charter fleet and the private fleet. The private fleet is typically made up of vessels owned by residents living in or near areas where they fish. The charter fleet is a for-hire fleet that plays a large role in the tourism sector of many west coast communities, and opportunities to fish on a charter vessel can be a substantial draw for tourists considering a visit to the coast.

The distribution of resident and non-resident ocean anglers among the west coast states in 2000, 2001, and 2002 demonstrates the importance of recreational fishing, especially in Southern California (Table 7-36). Southern California has more than twice the number of resident recreational marine anglers than the next most numerous region, Washington state. While most of the recreational anglers were residents of those states where they fished, a significant share was also non-residents. Oregon had the largest share of non-resident ocean anglers in all three years.

In terms of vessels, about 525 charter boats made up the charter boat fleet in 2005 (Table 7-37). This is a decrease of almost 30 percent from the 753 charter vessels estimated in the Council's 2005-2006 Groundfish Specifications EIS. Estimates of numbers of private boats are unavailable. Table 7-38 shows the distribution of trips by season, boat mode and region in 2003. The table illustrates the concentration of angler effort during the late spring through early fall months.

Recreational fishing in the open ocean generally declined slightly between 1996 and 2003 (Table 7-39); however, charter effort decreased while private effort increased during that period. Part of this increase likely resulted from longer salmon seasons associated with increased abundance during the period.

Table 7-36. Estimated number (in thousands) of west coast marine anglers: 2000 to 2002.

Year/State	Total	State Residents	Non-Residents	% Non-Residents
2000				
Washington	497	450	47	9.50%
Oregon	365	285	80	21.90%
Northern California	-	388	-	
Southern California	-	1,097	-	
Total California	1,705	1,485	220	12.90%
2001				
Washington	915	861	54	5.90%
Oregon	601	505	97	16.10%
Northern California	-	961	-	
Southern California	-	1,838	-	
Total California	3,084	2,799	285	9.20%
2002				
Washington	1,493	1,399	94	6.30%
Oregon	1,056	845	211	20.00%
Northern California	-	2,022	-	
Southern California	-	3,709	-	
Total California	6,406	5,731	675	10.50%

Source: 2005-06 Specifications EIS (PFMC 2004d). Data taken from Gentner (2001).

Table 7-37. Charter vessels engaged in saltwater fishing outside of Puget Sound in 2005 by port area.

State	Port Area	Charter Boats
Washington	Neah Bay (Including 4 that also fish Westport)	13
	La Push (including 2 that also fish Westport)	5
	Westport (including 6 that also fish Neah Bay or La Push)	39
	Ilwaco	29
	TOTAL	86
Oregon	Astoria	20
	Garibaldi	12
	Pacific City	4
	Depoe Bay	16
	Newport	19
	Winchester Bay	6
	Charleston	6
	Bandon	3
	Port Orford	3
	Gold Beach	4
	Brookings	6
	TOTAL	99
California	Fort Bragg/Eureka/Crescent City	14
	San Francisco/SF Bay/SF Delta	47
	Princeton/Bodega Bay	27
	Monterrey//Moss Landing/ Santa Cruz	19
	Avila Beach/Morro Bay	6
	Port Hueneme Oxnard/Ventura Santa Barbara	32
	Redondo/Marina del Rey/Malibu	13
	Seal Beach/Long Beach/San Pedro	45
	Newport Beach	18
	Oceanside/Dana Harbor	21
	San Diego/Mission Bay including boats going to Mexico	97
	TOTAL	339
	GRAND TOTAL	524

Source: State contacts through GMT representatives.

Table 7-38. Seasonal distribution of west coast recreational marine angler boat trips for all fisheries including groundfish in 2003 by mode and region (thousands of angler trips).

State / Region	Boat Mode	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	Annual Total
WA	Charter	0.0	1.2	16.0	37.8	6.1	0.0	61.1
	Private	22.0	19.5	57.2	32.9	5.0	0.0	136.5
	Total	22.0	20.6	73.2	70.7	11.1	0.0	197.6
OR	Charter	0.8	4.4	27.0	34.2	7.7	0.7	74.8
	Private	31.4	31.2	123.6	108.4	19.4	1.3	315.3
	Total	32.2	35.7	150.6	142.5	27.1	2.0	390.1
N. CA	Charter	3.4	11.3	24.1	73.3	33.0	3.3	148.4
	Private	75.9	83.9	332.5	502.8	211.5	278.2	1,485.0
	Total	79.4	95.2	356.7	576.1	244.6	281.5	1,633.4
S. CA	Charter	32.7	42.0	113.0	256.2	87.3	42.4	573.6
	Private	136.9	192.8	348.2	400.8	331.3	222.5	1,632.5
	Total	169.5	234.8	461.1	657.0	418.6	264.9	2,206.1
Total All States	Charter	36.9	58.9	180.1	401.5	134.1	46.4	857.9
	Private	266.2	327.4	861.5	1,044.9	567.2	502.0	3,569.3
	Total	303.1	386.2	1,041.6	1,446.4	701.3	548.4	4,427.2

Source: 2005-2006 Specifications EIS (PFMC 2004d)

Table 7-39. Trends in effort for recreational ocean fisheries in thousands of angler trips made on charter vessels.

Area	1996	1997	1998	1999	2000	2001a/	2002a/	2003
<u>Total Angler Trips</u>								
Washington	51	50	44	49	40	61	56	61
Oregon	54	65	57	60	87	70	62	75
North and Central CA	90	139	158	162	206	221	142	148
Southern CA	982	812	674	609	876	577	438	574
Total	1,177	1,066	933	880	1,218	927	843	858

Source: 2005-2006 Specifications EIS (PFMC 2004d)

a/ The 2001 and 2002 estimates are not directly comparable to previous years due to differences in estimation methodology.

7.1.3.2 *Distribution of Effort*

Fishing effort is related to weather, with relatively more effort occurring in the milder months of summer, and relatively less in winter (Table 7-38). 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.

7.1.3.3 *State Recreational Effort Estimates*

Through the Council's GMT process, total angler trips by mode and by target were developed by each of the states for years 2005-07. In terms of total trips, there was a decline in angler trips coastwide from 1.45 million trips to 1.32 million trips (Table 7-40a). However results were mixed along the coast with increases in the number of angler trips observed in Washington and Oregon in 2007. The overall decline was driven by the California private boat mode.

Table 7-40b shows the estimated share of angler trips targeting groundfish by region. The percentage of marine area trips targeting groundfish ranges from 15.5 percent in Washington in 2005 to 52.6 percent in southern California in 2007. Overall, about 40 percent to 44 percent of total boat-based marine area angler trips targeted groundfish between 2005 and 2007.

Table 7-41 itemizes angler trips during 2005-07 by state, region, boat type and trip target. It should be noted that groundfish are 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 the overall enjoyment and perceived value of the trip.

Table 7-40a. Total boat-based angler trips in marine areas by state for recent years.

State	Mode	2004	2005	2006	2007
WASHINGTON	Charter	63,000	50,947	46,863	47,862
	Private	134,000	80,581	58,499	66,820
	TOTAL	197,000	131,528	105,362	114,682
OREGON	Charter	58,000	51,933	49,920	54,821
	Private	160,000	121,699	111,874	135,409
	TOTAL	218,000	173,632	161,794	190,230
CALIFORNIA	Charter	689,000	363,442	263,725	311,295
	Private	536,000	786,445	838,221	709,792
	TOTAL	874,000	1,149,887	1,101,946	1,021,087
W-O-C TOTAL	Charter	810,000	466,322	360,508	413,978
	Private	830,000	988,725	1,008,594	912,021
	TOTAL	1,640,000	1,455,047	1,369,102	1,325,999

Table 7-40b. Share of boat-based angler trips targeting groundfish.

Region	Trip target	2005	2006	2007
WA	Groundfish	20,407	22,727	21,635
	Total	131,528	105,362	114,682
	% groundfish trips	15.5%	21.6%	18.9%
OR	Groundfish	71,427	71,674	66,665
	Total	173,632	161,794	190,230
	% groundfish trips	41.1%	44.3%	35.0%
Northern CA	Groundfish	64,340	110,774	76,340
	Total	260,142	289,216	215,641
	% groundfish trips	24.7%	38.3%	35.4%
Southern CA	Groundfish	427,508	333,045	423,788
	Total	889,745	812,730	805,446
	% groundfish trips	48.0%	41.0%	52.6%
W-O-C	Groundfish	583,681	538,220	588,428
	Total	1,455,047	1,369,102	1,325,999
	% groundfish trips	40.1%	39.3%	44.4%

Table 7-41a. Estimates of marine angler trips by type, target and region: Washington (number of trips).

State	Region	Boat Type / Trip Target	2005	2006	2007
WASHINGTON					
	North Washington Coast				
		Charter			
		Halibut	1,067	763	895
		Salmon	1,688	1,000	939
		Bottomfish	566	384	589
		Salm/Hlbt	2	0	21
		Tuna	36	44	63
		TOTAL	3,359	2,191	2,507
		Private			
		Halibut	4,156	4,379	4,200
		Salmon	10,821	8,616	8,636
		Bottomfish	4,520	3,975	4,298
		Salm/Hlbt	0	0	139
		Tuna	68	102	305
		TOTAL	19,565	17,072	17,578
	South & Central WA Coast				
		Charter			
		Halibut	3,435	2,750	2,700
		Salmon	29,970	23,930	26,544
		Bottomfish	13,114	16,231	14,448
		Salm/Hlbt	67	0	0
		Tuna	1,002	1,761	1,663
		TOTAL	47,588	44,672	45,355
		Private			
		Halibut	387	485	259
		Salmon	58,009	38,044	45,066
		Bottomfish	2,207	2,137	2,300
		Salm/Hlbt	4	22	56
		Tuna	409	739	1,561
		TOTAL	61,016	41,427	49,242
WASHINGTON TOTALS					
		Charter	50,947	46,863	47,862
		Private	80,581	58,499	66,820
		TOTAL	131,528	105,362	114,682

Table 7-41b. Estimates of marine angler trips by type, target and region: Oregon (number of trips).

State	Region	Boat Type /	2005	2006	2007
OREGON					
	Astoria-Tillamook				
		Charter			
		Halibut	1,502	1,417	1,544
		Salmon	2,800	2,441	3,213
		Bottomfish	5,139	5,116	4,411
		Combo	494	176	507
		Tuna	157	146	431
		Other	168	123	58
		TOTAL	10,260	9,419	10,164
		Private			
		Halibut	1,867	2,308	1,666
		Salmon	19,793	19,669	26,379
		Bottomfish	6,169	5,672	4,235
		Combo	2,302	1,722	3,328
		Tuna	357	910	1,845
		Other	1,334	1,025	834
		TOTAL	31,822	31,306	38,287
	Newport				
		Charter			
		Halibut	2,473	2,934	2,591
		Salmon	3,109	2,459	4,378
		Bottomfish	22,333	22,272	21,999
		Combo	664	531	1,118
		Tuna	762	740	2,148
		Other	3	33	12
		TOTAL	29,344	28,969	32,246
		Private			
		Halibut	8,110	8,535	9,826
		Salmon	6,519	5,875	11,190
		Bottomfish	7,157	6,832	4,760
		Combo	3,137	1,531	3,939
		Tuna	994	1,031	4,074
		Other	1,519	1,471	1,624
		TOTAL	27,436	25,275	35,413
	Coos Bay				
		Charter			
		Halibut	509	610	657
		Salmon	2,427	1,970	1,946
		Bottomfish	4,172	4,544	4,694
		Combo	131	37	7
		Tuna	91	93	305
		Other	18	26	15
		TOTAL	7,348	7,280	7,624
		Private			
		Halibut	1,421	1,086	1,696
		Salmon	20,033	14,989	19,448
		Bottomfish	5,355	6,507	6,555
		Combo	2,016	1,175	1,546
		Tuna	33	233	2,244
		Other	3,398	2,333	1,405
		TOTAL	32,256	26,323	32,894
	Brookings				
		Charter			
		Halibut	23	23	0
		Salmon	248	189	184
		Bottomfish	4,596	3,909	4,507
		Combo	33	75	3
		Tuna	12	0	88
		Other	69	56	5
		TOTAL	4,981	4,252	4,787
		Private			
		Halibut	71	81	0
		Salmon	9,972	8,216	9,585
		Bottomfish	16,506	16,822	15,504
		Combo	2,326	2,141	1,341
		Tuna	49	195	945
		Other	1,261	1,515	1,440
		TOTAL	30,185	28,970	28,815
OREGON TOTALS					
		Charter	51,933	49,920	54,821
		Private	121,699	111,874	135,409
		TOTAL	173,632	161,794	190,230

Table 7-41c. Estimates of marine angler trips by type, target and region: Northern California (number of trips).

State	Region	Boat Type / Trip Target	2005	2006	2007
CALIFORNIA					
	North Coast: Humboldt and Del Norte counties				
		Charter			
		Halibut	0	0	0
		Salmon	302	651	1,245
		Bottomfish	1,050	2,117	3,154
		Combo	0	0	0
		HMS	876	547	614
		Other	0	0	5
		TOTAL	2,228	3,316	5,018
		Private			
		Halibut	0	0	0
		Salmon	22,544	22,879	22,430
		Bottomfish	15,230	15,940	16,113
		Combo	0	0	0
		HMS	17,320	35,531	29,401
		Other	509	459	594
		TOTAL	55,604	74,809	68,539
	North-Central Coast: Mendocino county				
		Charter			
		Halibut	0	0	0
		Salmon	0	0	0
		Bottomfish	788	0	1,881
		Combo	0	0	0
		HMS	0	0	0
		Other	0	0	0
		TOTAL	788	0	1,881
		Private			
		Halibut	0	0	0
		Salmon	31,106	18,073	13,756
		Bottomfish	7,910	8,614	9,271
		Combo	0	0	0
		HMS	2	58	1,668
		Other	121	11	57
		TOTAL	39,139	26,756	24,752
	North-Central Coast: San Mateo County through Sonoma County				
		Charter			
		Halibut	0	0	0
		Salmon	11,730	51	4,750
		Bottomfish	16,258	46,209	24,156
		Combo	0	0	0
		HMS	0	0	0
		Other	1,935	64	695
		TOTAL	29,924	46,324	29,601
		Private			
		Halibut	0	0	0
		Salmon	63,779	46,271	26,376
		Bottomfish	23,104	37,894	21,764
		Combo	0	0	0
		HMS	988	1,441	1,813
		Other	44,589	52,407	35,897
		TOTAL	132,460	138,012	85,850

Table 7-41d. Estimates of marine angler trips by type, target and region: Southern California (number of trips).

State	Region	Boat Type / Trip	2005	2006	2007
CALIFORNIA					
	South-Central Coast: San Luis Obispo County through Santa Cruz County				
		Charter			
		Halibut	0	0	0
		Salmon	1,745	229	1,628
		Bottomfish	22,037	26,456	31,920
		Combo	0	0	0
		HMS	0	0	0
		Other	609	490	8,891
		TOTAL	24,391	27,175	42,439
		Private			
		Halibut	0	0	0
		Salmon	42,096	23,894	31,743
		Bottomfish	30,798	40,367	36,364
		Combo	0	0	0
		HMS	1,055	1,674	2,763
		Other	11,822	9,318	9,223
		TOTAL	85,771	75,253	80,093
	South Coast: Ventura and Santa Barbara counties				
		Charter			
		Halibut	0	0	0
		Salmon	0	0	0
		Bottomfish	27,798	17,784	32,673
		Combo	0	0	0
		HMS	0	16	0
		Other	3,319	3,448	1,967
		TOTAL	31,117	21,247	34,640
		Private			
		Halibut	0	0	0
		Salmon	1,869	1,104	1,341
		Bottomfish	24,422	19,648	19,778
		Combo	0	0	0
		HMS	66	115	1,174
		Other	13,936	15,865	19,970
		TOTAL	40,294	36,732	42,262
	South Coast: San Diego County through Los Angeles County				
		Charter			
		Halibut	0	0	0
		Salmon	825	0	174
		Bottomfish	181,247	99,234	139,253
		Combo	0	0	0
		HMS	876	531	614
		Other	92,046	65,897	57,675
		TOTAL	274,995	165,662	197,716
		Private			
		Halibut	0	0	0
		Salmon	0	0	0
		Bottomfish	141,206	129,557	163,800
		Combo	0	0	0
		HMS	15,205	32,224	20,697
		Other	276,767	324,879	223,799
		TOTAL	433,178	486,660	408,295
CALIFORNIA TOTALS					
		Charter	363,442	263,725	311,295
		Private	786,445	838,221	709,792
		TOTAL	1,149,887	1,101,946	1,021,087

7.1.4 Buyers, Processors, and Seafood Markets

7.1.4.1 *Processors and Buyers*

Excluding Pacific whiting delivered to at-sea processors, vessels participating in groundfish fisheries deliver to shore-based processors within Washington, Oregon, and California. Buyers are located along the entire coast; however, processing capacity has been consolidating in recent years. Several companies have left the west coast or have chosen to quit the business entirely. Remaining companies have purchased some former, but other plants have remained inactive. This has led to trucking groundfish from certain landing ports to other communities for processing. Therefore, landings do not necessarily indicate processing activity in those communities. However, examination of the species composition of landed catch by state can lead to inferences of some processor characteristics.

According to PacFIN data, in 2005 Oregon had the largest share of non-whiting groundfish landings (46 percent), followed by California (28 percent) and Washington (25 percent). In 2007 these shares had shifted to 53 percent, 29 percent and 17 percent for Oregon, California and Washington, respectively (Table 7-42a). Oregon also had the largest share of whiting deliveries in 2005 (56 percent), followed by Washington (40 percent) and California (3 percent). In 2007 these shares were 50 percent, 46 percent and 4 percent for Oregon, Washington and California, respectively (Table 7-42b). The relatively large amount of Pacific whiting being landed in Oregon may indicate a case in which processors must maintain capacity to handle large quantities at a time. Some groundfish processors in Washington have received landings from Alaska fisheries. Depending on the amount of catch drawn from Alaska fisheries, some Washington groundfish processors may also require the capacity to process large amounts of product. California processors concentrating on non-whiting may focus on relatively smaller throughput of groundfish.

Table 7-42a. Share of non-whiting groundfish delivered to buyers by state.

State	2005	2006	2007
California	28.32%	28.21%	29.65%
Oregon	46.35%	50.82%	53.13%
Washington	25.33%	20.96%	17.22%
TOTAL	100%	100%	100%

Source: PacFIN monthly vessel summaries

Table 7-42b. Share of Pacific whiting delivered to buyers by state.

State	2005	2006	2007
California	2.86%	4.27%	3.51%
Oregon	56.58%	48.22%	50.30%
Washington	40.56%	47.51%	46.19%
TOTAL	100%	100%	100%

Source: PacFIN monthly vessel summaries

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 (such as Pacific whiting) also occurs offshore on factory ships.

According to data from the Bureau of Labor Statistics, the number of seafood processing establishments along the west coast has declined in recent years. Further examination of PacFIN data shows the number of agents (buyers) buying groundfish along the wwest coast has generally declined in recent years. When buyers are classified according to groundfish gear type—e.g., how many buyers purchased sablefish from fixed gear-sablefish fishermen—evidence of decline is apparent (Table 7-43). Because of the multi-species involvement of most buyers, it is hard to develop unique counts of buyers on a state basis. However, the total number of buyers from all fisheries can be uniquely determined. In California, the number of unique buyers in 2005 is estimated to be 465, a decrease of 21 percent from 2004. The number of Oregon buyers fell by 10 percent and the number of Washington buyers fell by 8 percent over the same time period.

Table 7-43. Number of dealers by fishing sector and state, 1986-2005.

State	Fishery	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
California																					
	Non-Whiting Groundfish Trawl	96	67	63	76	75	86	86	78	85	75	67	62	78	87	51	63	65	55	43	37
	Fixed Gear – Hook & Line and Pot	229	300	306	328	347	340	382	323	335	284	291	320	303	294	286	259	216	200	200	156
	Fixed Gear - Sablefish	34	28	33	48	40	44	66	48	40	52	51	62	43	60	60	53	56	60	48	34
	Whiting Trawl	2	4	3	5	5	3	3	3	4	3	3	4	4	3	4	4	1	2	2	2
	TOTAL (all fisheries)	**507**	**758**	**703**	**725**	**720**	**709**	**687**	**661**	**688**	**588**	**596**	**646**	**693**	**673**	**660**	**616**	**627**	**608**	**592**	**465**
Oregon																					
	Non-Whiting Groundfish Trawl	21	31	25	22	24	26	29	28	29	27	25	22	21	22	18	18	16	13	12	13
	Fixed Gear – Hook & Line and Pot	50	51	50	62	65	63	65	54	58	50	57	56	54	47	54	47	43	36	42	45
	Fixed Gear - Sablefish	26	23	17	23	20	24	28	24	31	34	36	27	22	28	31	29	29	39	36	30
	Whiting Trawl	6	3	5	1	4	8	6	7	8	9	7	10	7	8	8	7	7	8	5	5
	TOTAL (all fisheries)	**154**	**159**	**152**	**208**	**192**	**170**	**153**	**166**	**161**	**147**	**156**	**159**	**204**	**180**	**179**	**222**	**233**	**246**	**195**	**177**
Washington																					
	Non-Whiting Groundfish Trawl	41	29	35	28	28	27	29	25	20	14	16	15	12	8	12	15	9	8	6	7
	Fixed Gear – Hook & Line and Pot	60	67	61	58	55	46	47	48	45	32	26	27	22	17	19	13	7	7	8	10
	Fixed Gear - Sablefish	34	23	35	28	27	20	37	29	33	23	32	24	22	24	22	20	18	24	21	19
	Whiting Trawl	5	6	5	5	3	6	5	6	4	4	6	5	4	4	2	3	2	2	3	2
	TOTAL (all fisheries)	**354**	**358**	**363**	**356**	**347**	**367**	**340**	**367**	**273**	**261**	**237**	**236**	**245**	**210**	**229**	**233**	**258**	**277**	**242**	**223**

Processing Companies Purchasing Groundfish

In terms of quantity, the processing of west coast groundfish is dominated by a small number of companies. For this section, an estimate of unique groundfish companies was derived by grouping PacFIN information on groundfish buyers. Buyers with like names were assumed to be individual companies. For example, a hypothetical buyer with the name ZZZ seafood – Astoria was assumed to belong to the same company as a buyer with the name ZZZ seafood – Ilwaco. Using this approach, the results show that the three largest companies bought approximately 78 percent of commercially caught groundfish landed on the west coast in the years 2004 and 2005 (Table 7-44 and Figure 7-2). When a similar analysis is done based on exvessel revenues, the top three companies purchase about 56 percent of the groundfish sold. (For more accurate estimates, analysts would need to compile lists of affiliated companies and then map them to the PacFIN buyer codes. In addition, estimates of fish purchased by non-affiliated buyers and sold to a company for processing would also need to be developed.)

Supportive of this analysis is a description of the Top Ten Seafood suppliers in the United States according to Seafood Business (May 2006); three of which participate in Pacific groundfish fisheries. Their corporate strategies affect the Pacific groundfish fishery. Employment and location of facilities will vary as companies pursue profits, market share, and efficiencies. For example, the build up of Arctic Alaska Company (an Alaska-based company which built a surimi plant and fish meal plant in Newport, Oregon and brought down catcher-processors from Alaska to fish whiting, the company's eventual sale to Tyson's [a major poultry company which wanted to add seafood to its product line], and the subsequent selling out of Tyson's fishing business assets [including the shoreside surimi and fish meal plants, and several catcher-processors] to companies like Trident [which before the purchase had little involvement in Pacific groundfish) has indirectly reshaped the Pacific groundfish fishery. Below are the *Seafood Business* descriptions of Pacific Seafood Group (a shore-based company), Trident Seafoods Corporation (shore-based and at-sea), and American Seafoods Group (at-sea).

> Pacific Seafood Group #1 Sales-$874 million—Key Species: Dungeness crab, halibut, king crab, Pollock, salmon, shrimp. "With 2005 sales of $874 million, Pacific Seafood Group slid into the No. 1 spot on the Seafood Business Top 25 list for the first time this year. After an active 2003 and 2004, Pacific wasn't involved in any acquisitions or mergers last year or early this year. Instead the company grew organically, picking up new customers and increasing sales by approximately $174 million from 2004 to 2005. In 2004, Pacific acquired Seacliff Seafoods, a distributor with facilities in Houston, San Antonio and Wilmington, California. In 2003, the company purchased Starfish, a Bellevue Washington seafood processor and distributor and Craig & Hamilton, a Stockton, California value-added meat processor. Now Pacific operates 15 processing facilities along the West Coast and 10 distribution facilities in Washington, Oregon, California, Idaho, Montana, Nevada and Utah."
>
> Trident Seafood Corporations #3-Sales-$800 million—Key Species: cod, halibut, whiting, Pollock, king crab, salmon, snow crab. "Trident Seafoods Corp. has been busy growing over the past two months. In March, the company acquired Louis Kemp Seafood, which markets the No. 1 retail surimi-seafood brand, from Con-Agra Foods one of the nation's largest public conglomerates….Then, in April, Trident purchased Ocean Beauty Seafoods' seven Alaska processing facilities and merged its distribution and smoked-fish business with its Seattle rival. The acquisition of Louis Kemp and the deal with Ocean Beauty will surely push Trident's 2006 sales over the $1 billion mark. Trident's prior major acquisition occurred in 2004 when it bought Norquest Seafoods of Seattle and its Portlock and Silver Lining brands. Trident operates 25 fishing vessels and at-sea processors and 18 processing plants throughout Alaska, British Columbia,

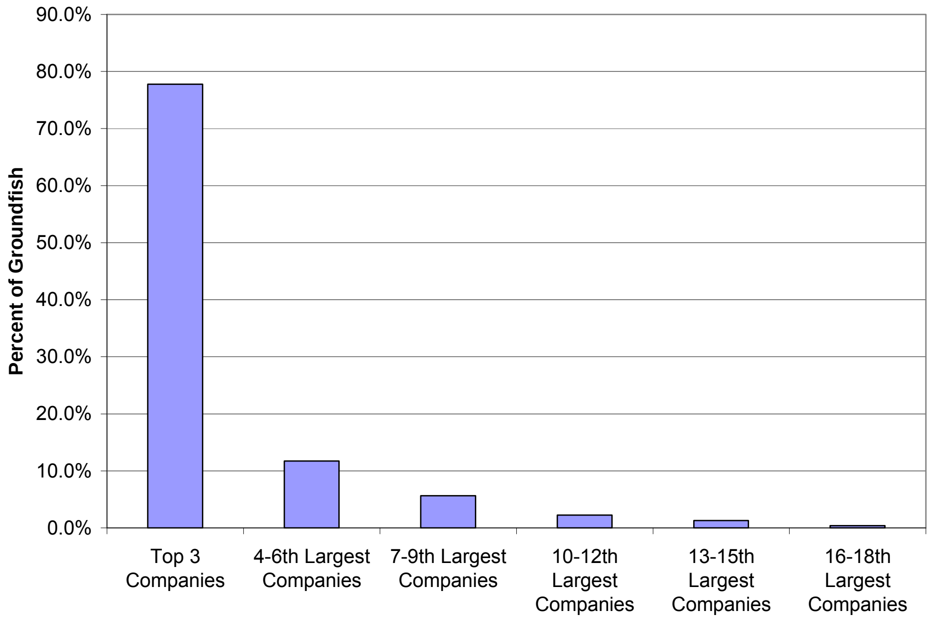
Washington and Oregon." (Note—In early May 2006 the proposed purchase of Ocean Beauty Seafoods was called off.)

American Seafoods Group #10-Sales $514 million. Key species: catfish, cod, hake, Pollock, scallops, yellowfin sole. "In February, Centre Partners Management sold its remaining 23 percent equity interest in American Seafoods Group to Coastal Villages Region Fund and a management group led by Chairman Berndt Bodal, increasing their ownership to 45 percent and 51 percent respectively of the company's voting equity. The buyers dished out nearly $82 million for the balance of Centre Partners' stake. Centre Partners is the New York investment Group that formed American Seafoods Group with Bodal in 2000, acquiring American Seafoods Co. and Frionor USA's New Bedford, Mass., processing facility from Norway Seafoods. The purchase came two years after the adoption of the American Fisheries Act, which forced many foreign owned fishing fleets out of U.S. waters. American Seafoods expanded in 2002 when it bought Southern Pride Catfish of Greensboro, Ala. Two years later, the company ditched a year and-a-half-long bid for an initial public offering."

Table 7-44. Rank of processing companies by volume of groundfish purchased on the west coast in 2004 and 2005.

Company Rank	Percent of Groundfish Landings	Weight of Groundfish Landings (mt)
Top 3 Companies	77.8%	178,222
4-6th Largest Companies	11.7%	26,922
7-9th Largest Companies	5.6%	12,919
10-12th Largest Companies	2.2%	5,119
13-15th Largest Companies	1.3%	2,960
16-18th Largest Companies	0.4%	854

Source: PacFIN ftl and ft tables. December 2005



Source: PacFIN ftl and ft tables. December 2005

Figure 7-2. Rank of processing companies by volume of groundfish purchased on the wwest coast in 2004 and 2005.

Processing Labor, Processing Capital and the Groundfish Fishery

<u>Processing Labor</u>

Employment and wage information from the Bureau of Labor Statistics shows that seafood processing along the west coast pays approximately 380-420 million dollars in the form of wages annually to seafood product preparation and packaging employees, and in most years this sector employs over 10,000 workers (Table 7-45). Washington State has the largest share of processing wages and employees, followed by California and Oregon. Washington benefits from the large degree of participation in Alaska-based fisheries, which make up a substantial portion of nationwide catch, while processing in Oregon and California is dominated by catch from west coast fisheries.

In support of the 2007-2008 Groundfish Specifications EIS, the Report: “Trends in Fishing and Seafood Processing Related Employment Statistics” was included to investigate all available Federal data on seafood processing and on employment. This report has shed some light on seasonality of employment, age and gender of seafood workers. For the seafood processing industry, the 35-44 age group is the predominant workforce in all three states, representing 30-35 percent of workers employed. The next largest group is the 45-54 age group. The gender distribution of employees in the seafood processing industry differs across states. California is the most evenly distributed with some counties where female employees outnumber males. In Oregon and Washington, male workers are the majority with approximately 60 percent and 70 percent respectively.

Processing labor can be generally divided into two types: specialized labor and unspecialized labor. Unspecialized labor is characterized as workers that can easily transition their skills to other industries and employers. For example, a forklift driver could be characterized as an employee within the unspecialized labor category. That worker can easily transition between a seafood processing employer and another employer that may be involved in warehousing office supplies for example. Specialized workers are those workers that have a particular skill set which is not easily converted to other industries. Workers in this category include those that fillet fish. Filleting is a skill that is specific to the seafood industry.

Table 7-45. Seafood processing employment and wage information by state and year (private sector employers).

Item	Year	Washington	Oregon	California	TOTAL
Number of employees in seafood product preparation and packaging	2001	7,043	1,093	3,030	11,166
	2002	6,359	1,002	2,530	9,891
	2003	6,391	1,020	2,738	10,149
	2004	6,432	995	2,605	10,032
	2005	6,562	1,029	2,521	10,112
	2006	6,591	1,031	2,328	9,950
Number of seafood product preparation and packaging establishments	2001	147	30	69	246
	2002	128	25	62	215
	2003	117	24	65	206
	2004	109	24	65	198
	2005	107	25	58	190
	2006	108	29	56	193
Total wages from seafood product preparation and packaging ($ thousands)	2001	$293,322	$21,478	$66,624	$381,424
	2002	$293,013	$21,178	$65,529	$379,720
	2003	$300,751	$21,115	$78,654	$400,520
	2004	$308,261	$21,507	$87,722	$417,490
	2005	$339,007	$23,275	$77,255	$439,537
	2006	$356,765	$23,342	$74,019	$454,126
Average weekly wage from seafood product preparation and packaging	2001	$801	$378	$423	
	2002	$886	$406	$498	
	2003	$905	$398	$552	
	2004	$922	$416	$648	
	2005	$994	$435	$589	
	2006	$1,041	$435	$611	
Average annual wage from seafood product preparation and packaging	2001	$41,648	$19,653	$21,989	
	2002	$46,080	$21,127	$25,898	
	2003	$47,058	$20,709	$28,728	
	2004	$47,924	$21,617	$33,673	
	2005	$51,129	$22.619	$30,645	
	2006	$54,129	$22,641	$31,791	

Source: Bureau of Labor Statistics. July 2008. Quarterly Census of Employment and Wages. http://data.bls.gov/PDQ/outside.jsp?survey=en

Workers within the unspecialized category are typically in higher supply and are relatively easy to hire. These workers require less training than specialized workers, and new laborers in the unspecialized category are unlikely to negatively impact productivity for any given amount of time. Specialized workers, on the other hand, are relatively short in supply, and if there is a shortage of workers in this category, newly hired specialized labor is likely to require training and will have relatively low productivity in the early stages of their career. In the seafood processing industry, many laborers are transient and their employment is often temporary in nature due to the cyclical nature of fisheries. However, processors are more likely to try to retain specialized laborers on a year round basis as re-hiring and re-training new workers in the specialized category will reduce productivity. This makes the groundfish fishery one of the most important fisheries for many seafood processors.

According to the Groundfish FMP, the Council attempts to manage the groundfish fishery on a year round basis, which is important to those processors that try to keep specialized labor employed year round. A year round fishery keeps product volume flowing through the plants, gives the fish filleters product to process, and ultimately keeps specialized laborers employed. Without a year round fishery, these laborers often find work elsewhere and this negatively affects processing revenue and product quality. Other fisheries are typically not managed on a year round basis because of several reasons including availability (salmon and albacore for example) and seasonal quality of the harvested species (Dungeness crab for example). Groundfish, however, can be available to fishers and marketable by processors all year.

Figure 7-3 depicts the monthly purchases by major buyers of groundfish—each line represents a buyer. The lines reflect the percent of total purchases by the buyer that are comprised of groundfish. From this graph, it can be inferred that there is not a single month when there is not at least one major buyer that is making a major purchase of groundfish.

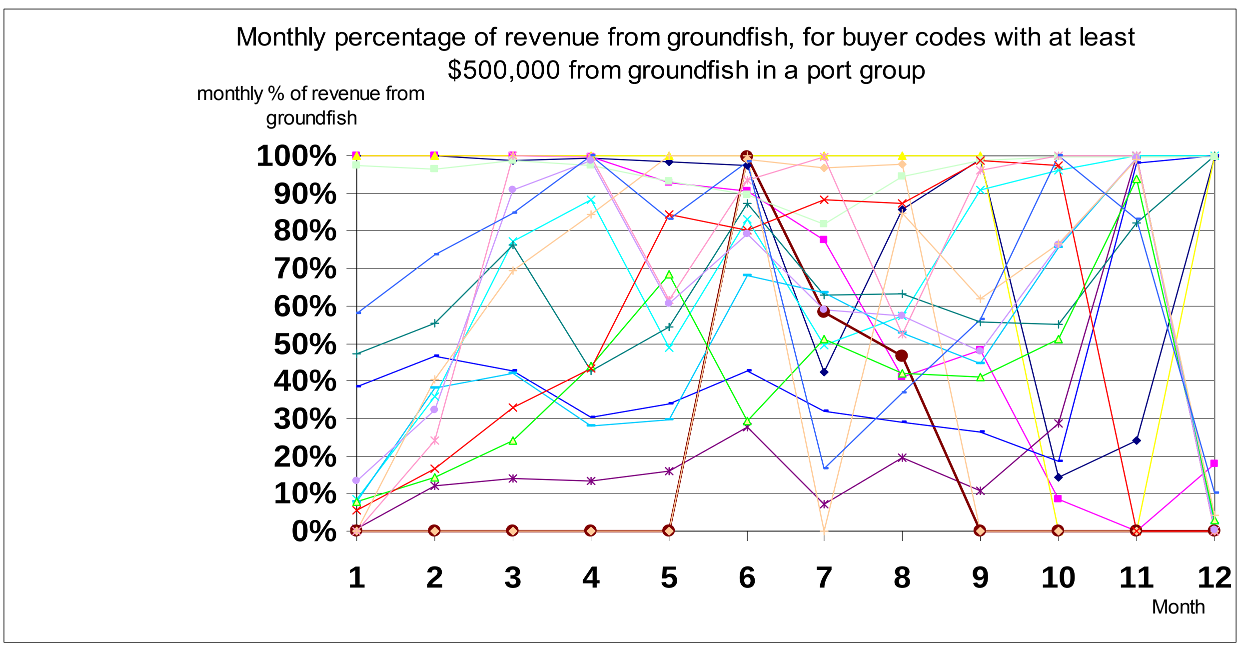


Figure 7-3. Seasonality of groundfish purchases by major buyers. (Note: Each line represents an individual buyer).

Processing Capital

Unlike many forms of processing labor, the capital involved in fish processing is not easily substitutable for use in other industries. Capital tends to be fixed in its location and designed to handle fish products as opposed to some other type of food product. A processing facility is constructed to handle seafood and produce fillets, surimi, headed and gutted fish, or some combination of products. The size of these facilities is typically constructed around some expectation of what quantities of commercial fisheries landings are expected in the future.

Many fisheries are characterized by swings in available product due to seasonality and year to year fluctuations in species abundance. This means that during the off-season, or years when there are declines in species abundance, processor capital is idle. Groundfish (excluding Pacific whiting) was historically one of the more stable fisheries on the west coast and is a fishery that is prosecuted on a year round basis. This sense of stability, combined with an expectation of year round landings, historically gave managers of processing plants some increased degree of certainty when planning for the future and investing in capital in an otherwise highly variable and uncertain industry. The recent decline in landings of traditional groundfish species has eliminated much of that certainty and meant that increasing amounts of processing capital have been left idle. Idle capital increases the cost of producing a unit of output, so some plants reliant on groundfish have closed down and consolidation has occurred within portions of the processing industry. This is exemplified by the general decrease in number of processing establishments over the past several years as reported by the Bureau of Labor Statistics (Table 7-45).

7.1.4.2 *Markets and Prices*

The following discussion is adapted from the 2005-2006 Groundfish Specifications EIS.

Live Fish Markets

An important and growing share of groundfish harvest is delivered live. These deliveries help feed the growing trade in live seafood consumed in restaurants. Groundfish delivered live were primarily nearshore rockfish and perch, but also included thornyheads, sablefish and lingcod. About 86 percent of live fish landings were in California with the remainder in Oregon (PFMC 2004a). 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 four dollars per pound, compared to less than one dollar for other deliveries of the same species.

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 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 comprised about two-thirds of west coast groundfish landings by weight, but only around 10 percent 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. Salmon aquaculture demonstrates the emerging importance of farmed species. While commercial salmon harvest is still near the 1980-97 annual average, world salmon supply has tripled since 1980 due to a nine-fold 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, groundfish harvesting occurs in every month, although beginning in the late 1990s, it took on increased importance during the summer months when sablefish harvest peaked during the primary limited entry fixed gear fishery. The bulk of whiting fishery also occurs during the summer.

Groundfish fishing has historically provided west coast commercial fisheries participants with a relatively steady source of income over the year, supplementing the other more seasonal fisheries. Though groundfish contributed only about 17 percent of total annual exvessel revenue in 2000, seasonal 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 value contribution by the groundfish fishery in 2000 was sablefish during August (20 percent of exvessel revenue). Flatfish harvest supplied between 3 percent and 9 percent of monthly exvessel revenue throughout the year, and rockfish contributed an additional 2.5 percent to 6.8 percent to monthly exvessel revenue. For northern parts of the coast, groundfish is particularly important just before the start of the December crab fishery.

Exvessel and Fuel Prices

Table 7-46 lists exvessel prices for several west coast species, total groundfish excluding whiting, fuel, and estimates of bottom trawl revenue per hour fished for the period 1999-2005. The period was chosen based on available fuel prices collected by the PSMFC. All prices are averages except the fuel price. Fuel prices which are June prices as reported by Newport, Oregon fuel docks. The trends in these prices give the following perspectives:

Whiting—prices appear to range very little from year to year (although prices received in 2006 and 2007 were significantly higher)

Flatfish—prices declined in 2004 and 2005 but not to the 1999 level

Rockfish—after a major increase in 2004, prices fell significantly in 2005

Total Groundfish—prices in 2004 and 2005 similar but not as low as that in 1999

Bottom trawl Revenue per hour—increased significantly in 2003 and 2004; increase in 2004 may be due to the Buyback Program due to which the fleet was reduced by one-third

Fuel—2004 and 2005 fuel prices significantly higher while total groundfish prices declined (fuel prices continued step increase in 2006, 2007 and 2008).

The implications from these trends are that all sectors are facing rising fuel prices, and some sectors, particularly bottom trawl, may also face declining exvessel prices.

Ex-processor and Wholesale Prices

While producer prices for groundfish products have not fared quite as badly as that for other frozen fish (including salmon), they still are significantly below recent highs. The trend may be flat or still lower in the future (Appendix A Table7-9 in PFMC 2004d). 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 and Domestic Demand

Most west coast groundfish compete in the fresh and frozen fish product markets. In 2000 the U.S. imported 1.8 million mt of edible fishery products, including 1.5 million mt of edible fresh and frozen fish products. In 2000 the U.S. exported about one million mt of edible fishery products, including 190,000 mt of edible, fresh or frozen flatfish and groundfish products. One-third of edible fishery exports were to Japan. While surimi was the single largest component of total fresh and frozen exports by weight, salmon was the most valuable export, generating 353 million dollars on the 100,000 mt of fresh and frozen product shipped, and another 146 million dollars from exports of canned product. Asia was the largest export region, absorbing 61 percent of U.S. fishery exports by volume. Japan alone bought 34 percent of total fishery exports, and South Korea and China took 11 percent and 10 percent, respectively (Appendix A Section 7.1 in PFMC 2004d).

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. Beginning in the early 1970s, per capita consumption increased, and in the mid 1980s 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 15.2 pounds. U.S. seafood consumption reached a record 16.6 pounds per capita in 2004.

Table 7-46. Exvessel and fuel price trends.

Inflation Adjusted Exvessel, Fuel Prices, and Revenues per Bottom Trawl Hour

	Whiting $/lb	Flatfish $/lb	Sablefish $/lb	Rockfish $/lb	Total Groundfish $/lb	Revenue/hour $/hr	Fuel $/gallon
1999	$0.04	$0.36	$1.36	$0.66	$0.64	$264.25	$0.93
2000	$0.05	$0.44	$1.66	$0.76	$0.78	$285.99	$1.17
2001	$0.04	$0.47	$1.59	$0.84	$0.80	$260.69	$1.21
2002	$0.05	$0.45	$1.55	$0.93	$0.75	$249.48	$0.97
2003	$0.05	$0.46	$1.66	$0.91	$0.80	$311.24	$1.12
2004	$0.04	$0.44	$1.37	$0.96	$0.73	$351.13	$1.70
2005	$0.05	$0.42	$1.45	$0.87	$0.74	$345.3[e/]	$2.20

Change in Prices Relative to 1999

	Whiting	Flatfish	Sablefish	Rockfish	Total Groundfish	Bottom Trawl Revenue/hour	Fuel
1999	100%	100%	100%	100%	100%	100%	100%
2000	125%	122%	122%	115%	122%	108%	126%
2001	100%	131%	117%	127%	125%	99%	130%
2002	125%	125%	114%	141%	117%	94%	104%
2003	125%	128%	122%	138%	125%	118%	120%
2004	100%	122%	101%	145%	114%	133%	182%
2005	125%	117%	107%	132%	116%		236%

Ex-vessel Prices PacFIN
Fuel Prices-June Marine Fuel Prices, Newport as collected by PSMFC
Bottom Trawl Revenue/Hour Fished, NMFS NWR-Burden (12/2005)
All prices deflated to 2005
[e/] preliminary estimate (logbook data not complete)

Market and Non-market Consumer Goods

For goods exchanged in markets where a consumer price can be determined (for example seafood), price and quantity information can be used to estimate the benefits consumers derive from consumption activities. A given regulatory action may have little or no impact on consumers if changes in the quantity of fish available are insufficient to have an effect on prices. This is especially true if imports or other protein substitutes are readily available. In the market for recreational experiences, individuals pay fees to participate in recreational fishing trips on charter boats. Price and quantity information from these trips might allow estimation of the benefits participants derive from this type of recreational fishing. However, charter trips may often be purchased as part of a bundle of goods and services that include non-fishing recreational activities. Therefore, the estimation of benefits from recreational charter activities is less straightforward than for marketed consumer goods.

For other consumer goods, especially bundles of goods and services such as a recreational fishing trip taken on a private vessel, the prices and quantities associated with each transaction are much more difficult to determine. For the private recreationalist, the amount spent on fishing gear, licenses, and other goods necessary to carry out a particular fishing trip is difficult to isolate. The term “private” is used here to designate a recreational fisher fishing from a private vessel, the shore, bank or a public pier, as opposed to using a charter vessel. Depending on the value a particular individual places on alternatives to fishing, the maximum benefit associated with a fishing trip may far exceed actual trip expenditures.

7.1.4.3 *Consumptive versus Non-consumptive Activities*

The sectors benefiting from a resource can generally be placed into one of three groups: consumptive users (e.g., recreational fishers, commercial harvesters, and processors), non-consumptive users (e.g., wildlife viewers), and non-users (e.g., members of the general public who derive value from knowing that a species is being maintained at a healthy biomass level). The following table displays the general relationship between use/non-use and consumptive/non-consumptive types of activities.

Relationship between Use/Non-use and Consumptive/Non-consumptive Activities

	Consumptive	Non-consumptive
Use	Commercial and Recreational Fishing, Processing.	Wildlife Viewing
Non-use	N/A	Existence Value, Alternatives Value, Bequeathal Value

In economic terms, renewable resource management entails a fundamental trade-off between current and future costs and benefits. When management needs call for a substantial reduction in allowable harvests, additional costs may be borne by the direct consumptive users, who may be left with much smaller harvests than that which they had been accustomed. While this near-term sacrifice may create much greater harvest opportunities in the future once the stock has been replenished—depending on the duration of the rebuilding period—many fishers and processors may be unable to weather a long down period, opting instead to go out of business.

Non-consumptive users may benefit from the use and non-use values provided by the resource. Wildlife viewing and the derivation of secondary benefits from ecosystem services are examples of non-consumptive use values. One or more of the following non-use benefits may accrue from the 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 the resource; (2) alternative 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) bequeathal value placed on knowing a fish population, habitat, or ecosystem is protected for the benefit of future generations. Offsite non-consumptive uses of resources are public in nature in that no one is excluded from deriving the identified benefits, and one person's enjoyment does not affect another's potential benefit.

The existence of coastal fishing communities in themselves may have intrinsic social value. For example, the Newport Beach (California) dory fishing fleet, founded in 1891, is a historical landmark designated by the Newport Beach Historical Society. The city grants the dory fleet use of the public beach in return for the business and tourism this unique fishery generates.

Value may also be placed on biological diversity. The value of biological diversity may be part of the total value placed on a site by non-consumptive users (onsite or offsite). Three levels of biological diversity have been identified, (1) genetic diversity within a species, (2) species diversity (richness, abundance, and taxonomic diversity), and (3) ecosystem diversity. Ecosystem diversity encompasses the variety of habitats, biotic communities, and ecological processes (Caribbean Fishery Management Council 1998). Healthy ecosystems characterized by high biological diversity are generally able to provide a wider range of ecosystem services than are available from damaged or less diverse ecological communities. Examples of such ecosystem services include the nutrient recycling and filtering capabilities of wetlands and the CO_2 sequestration function provided by the ocean (which is an important carbon sink).

The total societal value placed on offsite non-consumptive use of a stock or component of the ecosystem will also depend on: (1) the size of the human population, (2) the level of income, (3) education levels, and (4) environmental perceptions and preferences (Caribbean Fishery Management Council 1998).

The above relationships imply that as human populations and the affluence of those populations increase, and as fish stocks and their ecosystems are depleted, non-consumptive values associated with maintaining ocean resources are likely to increase. Another implication of these relationships is that once the basic integrity of ecosystem processes and marine fisheries components are preserved, the likely additional benefit from incremental increases biomass will decrease.

7.1.5 Fishing Communities (Non-Consumptive Users)

The MSA requires among other things that the time period for rebuilding an overfished species "be as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock within the marine ecosystem;…"

Figure 7-4 and Table 7-47 are provided to the reader as aids for reviewing references to ports, communities, counties, and recreational areas used in this section.

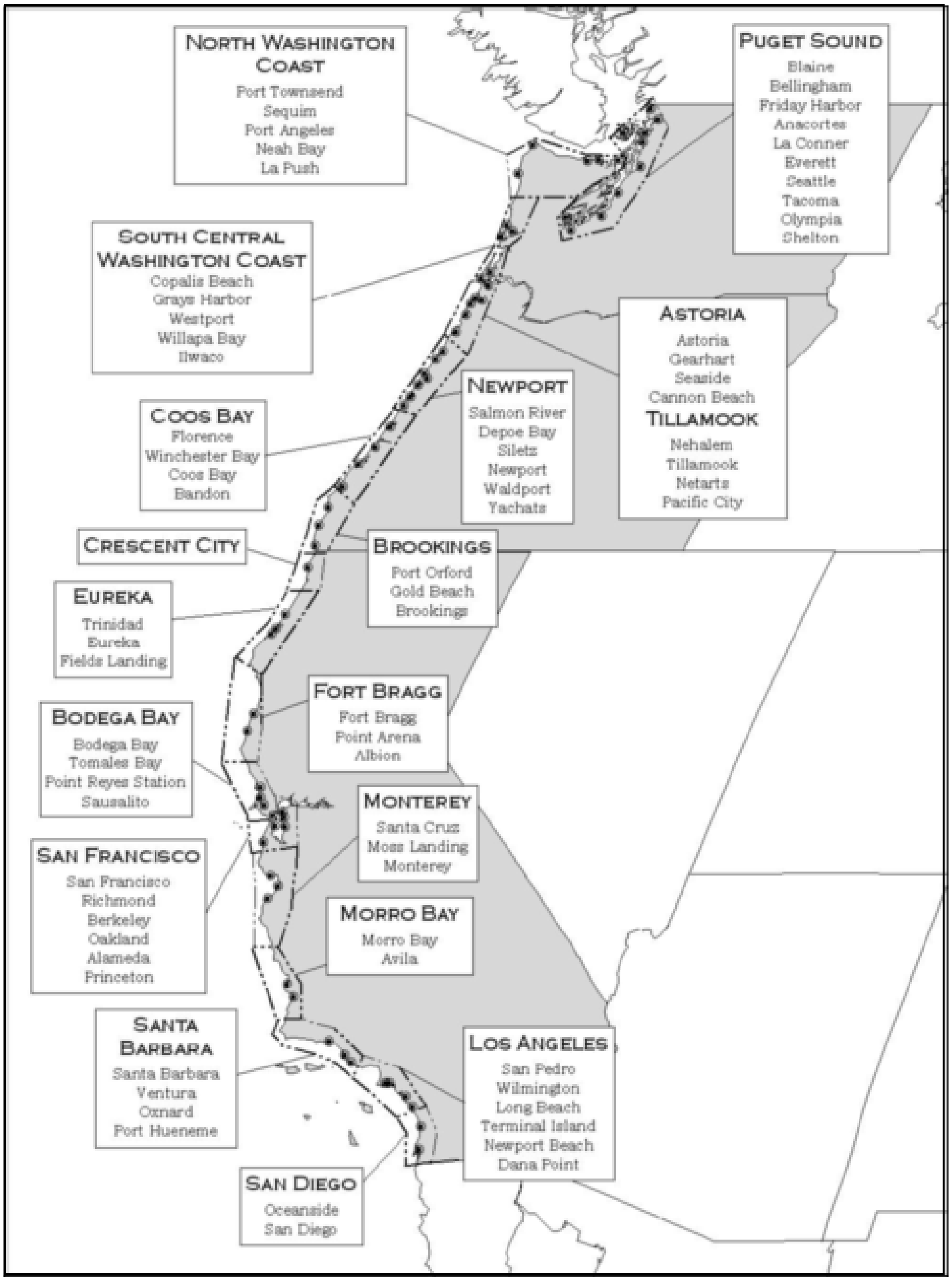


Figure 7-4. West coast fishing communities.

Table 7-47. Port group county community relationships.

Port Group Area	County	Name
Washington		
N. Puget Sound	Whatcom	Blaine
	Whatcom	Bellingham Bay
	San Juan	Friday Harbor
	Skagit	Anacortes
	Skagit	La Conner
	Snohomish	Other North Puget Sound Ports
S. Puget Sound	Snohomish	Everett
	King	Seattle
	Pierce	Tacoma
	Thurston	Olympia
	Mason	Shelton
	Unknown	Other South Puget Sound Ports
North Washington Coast	Jefferson	Port Townsend
	Clallam	Sequim
	Clallam	Port Angeles
	Clallam	Neah Bay
	Clallam	La Push
South & Central WA Coast	Grays Harbor	Copalis Beach
	Grays Harbor	Grays Harbor
	Grays Harbor	Westport
	Pacific	Willapa Bay
	Pacific	Ilwaco/Chinook
	Klickitat	Other Columbia River Ports
Unidentified WA	Pacific	Other Washington Coastal Ports
	Unknown	Unknown WA Ports
Oregon		
Astoria	Multnomah	Pseudo Port Code for Columbia R.
	Clatsop	Astoria
	Clatsop	Gearhart - Seaside
	Clatsop	Cannon Beach
	Unknown	Landed in WA; Transp. to OR
Tillamook	Tillamook	Nehalem Bay
	Tillamook	Tillamook / Garibaldi
	Tillamook	Netarts Bay
	Tillamook	Pacific City
Newport	Lincoln	Salmon River
	Lincoln	Siletz Bay
	Lincoln	Depoe Bay
	Lincoln	Newport
	Lincoln	Waldport
	Lincoln	Yachats
Coos Bay	Lane	Florence
	Douglas	Winchester Bay
	Coos	Coos Bay
	Coos	Bandon
Brookings	Curry	Port Orford
	Curry	Gold Beach
	Curry	Brookings

Table 7-47. Port group county community relationships (continued).

Port Group Area	County	Name
California Recreational Groupings		
North Coast: Humboldt and Del Norte Counties		
North-Central: Mendocino County		
North-Central: San Mateo County to Sonoma County		
South-Central Coast: San Luis Obispo to Santa Cruz		
South Coast: Ventura to Santa Barbara Counties		
South Coast: Los Angeles to San Diego Counties		
California		
Crescent City	Del Norte	Crescent City
	Del Norte	Other Del Norte County Ports
Eureka	Humboldt	Eureka (Includes Fields Landing)
	Humboldt	Fields Landing
	Humboldt	Trinidad
	Humboldt	Other Humboldt County Ports
Fort Bragg	Mendocino	Fort Bragg
	Mendocino	Albion
	Mendocino	Arena
	Mendocino	Other Mendocino County Ports
Bodega Bay	Sonoma	Bodega Bay
	Marin	Tomales Bay
	Marin	Point Reyes
	Marin	Other Son. & Mar. Co. Outer Coast Ports
	Marin	Sausalito
San Francisco	Alameda	Oakland
	Alameda	Alameda
	Alameda	Berkely
	Contra Costa	Richmond
	San Francisco	San Francisco
	San Mateo	Princeton
	San Francisco	San Francisco Area
	San Francisco	Other S.F. Bay & S.M. Co. Ports
California		
Monterey	Santa Cruz	Santa Cruz
	Monterey	Moss Landing
	Monterey	Monterey
	Monterey	Other S.C. and Mon. Co. Ports
Morro Bay	San Luis Obispo	Morro Bay
	San Luis Obispo	Avila
	San Luis Obispo	Other S.L..O. Co. Ports
Santa Barbara	Santa Barbara	Santa Barbara
	Santa Barbara	Santa Barbara Area
	Ventura	Port Hueneme
	Ventura	Oxnard
	Ventura	Ventura
	Ventura	Other S.B. and Ven. Co. Ports
Los Angeles	Los Angeles	Terminal Island
	Los Angeles	San Pedro Area
	Los Angeles	San Pedro
	Los Angeles	Willmington
	Los Angeles	Longbeach
	Orange	Newport Beach
	Orange	Dana Point
	Orange	Other LA and Orange Co. Ports
San Diego	San Diego	San Diego
	San Diego	Oceanside
	San Diego	San Diego Area
	San Diego	Other S.D. Co. Ports
Unidentified CA	Unknown	Unknown CA Ports

7.1.5.1 *Community Descriptions*

Many documents were used to develop the discussion found in this section. For more detail on the relationship of bycatch species to fisheries sector, port and community, the reader is directed to the study, "Economic Revenue and Distributional Impacts Associated with Overfished Species Management in West Coast Commercial Groundfish Fisheries." The reader also is directed to Tables 7-4a and 7-4b of this document. For additional reference, section 8.1.6 of the 2005-2006 Groundfish Specifications EIS and Chapter 8 of its associated Appendix A contain information on fishing communities. The NMFS Northwest Fisheries Science Center website contains detailed descriptions of west coast fishing communities: http://www.nwfsc.noaa.gov/research/divisions/sd/communityprofiles/index.cfm. In addition to these sources, data tables were developed by NMFS SWFSC from PacFIN data that describe the number of dealers, vessels, revenues, landings, and vessel trips by port and groundfish sector (see Appendix A section A.3 of the 2007-2008 Groundfish Specifications EIS). The key results of that study are reproduced below. The discussion of Environmental Justice in this section also identifies communities of concern with respect to minority and low income populations.

7.1.5.2 *Fishing Community Engagement, Dependence, Resilience and Identification of Potentially Vulnerable Communities*

To help the Council with determining the needs of fishing communities, numerous indicators were developed to characterize and rank counties and communities with respect to the likely effect on those communities of changes in commercial and recreational fisheries activity. These indicators include:

- "engagement"—level of involvement in fishing
- "dependence"—involvement in the groundfish fishery
- "resilience"—able to adapt to change
- "vulnerability"—"highly dependent" and "having low resilience"
- "most vulnerable" – "highest dependence" and "least resilient"

To qualify as a vulnerable area, a city or county must be ranked in the top one-third for at least one engagement or dependency indicator and one resiliency indicator. The conclusions of the study are summarized below.

Vulnerable Communities and Counties: Commercial Fishing

With regard to engagement in commercial fishing, twenty-nine cities were identified as "vulnerable" or "most vulnerable" areas. The "most vulnerable" area label indicates the highest levels of engagement or dependence and the lowest levels of resilience. (A note on how the scoring was constructed: the higher the "engagement score," the more engaged the community. However, high "resiliency scores" imply the opposite. High "resiliency scores" imply low resilience and low resilience scores imply high resilience.)

Ilwaco and Moss Landing are most vulnerable with respect to engagement in commercial fishing. Ilwaco and Moss Landing have the highest levels of engagement in fishing (score of four and three, respectively) and lowest resiliency (score of three and four, respectively). Other vulnerable areas include Astoria, Bellingham, Coos Bay, Crescent City, Eureka, Fort Bragg, Ilwaco, Moss Landing, Port Orford, Santa Cruz, and Winchester. All have high fishing engagement scores (two or greater) and low resiliency scores (two or greater). Newport, San Pedro and Westport all have high fishing engagement (score of four) but higher resiliency (scores of one).

With respect to dependency on the commercial groundfish fishery, 32 cities are identified as vulnerable areas. Neah Bay is identified as a most vulnerable area. Other vulnerable areas include Astoria, Bellingham, Coos Bay, Crescent City, Eureka, Fort Bragg, Moss Landing, Pacific City, and Port Orford. All have high groundfish dependency (scores of two or greater) and low resiliency (scores of two or greater). Morro Bay, Newport, and Oceanside all have high groundfish dependency (score of three) but higher resiliency (score of one). Chinook, Garibaldi, La Push, and Ilwaco all have higher groundfish dependence (score of one) and the lowest resiliency (scores of three or more).

Several vulnerable areas that are cities are identified as both highly engaged and highly dependent.

Astoria, Garibaldi, Gold Beach, and Westport rank in all city categories: commercial and recreational engagement and dependency as well as low resiliency.

Sixteen counties are identified as vulnerable areas with respect to commercial fishing engagement. Six counties are labeled as most vulnerable areas: Coos, Grays Harbor, Humboldt, Lincoln, Mendocino, and

Pacific counties. All have high commercial fishing engagement (scores of three or more) and low resiliency (scores of three or more). Grays Harbor and Lincoln counties score highest in fishing engagement (scores of four) and lowest in resiliency (scores of four).

Seventeen counties are identified as vulnerable areas with respect to groundfish dependence. Clatsop, Coos, Curry, Grays Harbor, Lincoln, and Los Angeles counties score as most highly dependent (scores of two or more) and least resilient (scores of two or more). Several vulnerable areas that are counties are identified as both highly engaged and highly dependent.

Vulnerable Communities and Counties: Recreational Fishing

Ten cities in Oregon and Washington are identified as vulnerable with respect to recreational fishing. Astoria, Depoe Bay, and Garibaldi are all highly engaged in the recreational fishery (score of two or more) and least resilient (score of two or more). Garibaldi is the only city labeled as "most vulnerable" due to its high scores in both engagement/dependence on recreational fisheries and low resiliency.

Other vulnerable cities with respect to recreational fisheries include Gold Beach, La Push, Neah Bay, Newport, Pacific City, Westport, and Winchester Bay. Newport has very high recreational fishery engagement (score of five) but also high resilience (score of one). La Push, Neah Bay and Winchester Bay all have lower levels of recreational engagement (scores of one) but also very low levels of resilience (scores of four or more).

It was not possible to identify recreationally engaged vulnerable areas in California due to the aggregated regional-level recreational data that was available with regard to recreational fishing. However, the study does identify some California communities as potentially vulnerable areas based on commercial engagement in and dependency on the groundfish fishery. San Luis Obispo through Santa Cruz counties and San Diego through Los Angeles counties are most engaged in recreational fishing and also dependent on the groundfish recreational fishery. Los Angeles, San Luis Obispo and Santa Barbara counties are all ranked as least resilient.

Summary

Thirty-eight cities and eighteen counties are identified as vulnerable areas with respect to commercial and/or recreational fisheries (areas with high engagement or dependence on commercial or recreational fisheries and low resilience to change). When stricter requirements are applied so that a community must be ranked in the top one-third at least twice under engagement and/or dependence and resilience, 17 cities and 15 counties qualify. The cities are: Astoria, Bellingham, Bodega Bay, Coos Bay, Crescent City, Depoe Bay, Eureka, Fort Bragg, Garibaldi, Ilwaco, Moss Landing, Neah Bay, Newport, Pacific City, Port Orford, Santa Cruz, and Winchester Bay. The 15 counties are: Clatsop, Coos, Curry, Del Norte, Grays Harbor, Humboldt, Lincoln, Los Angeles, Mendocino, Monterey, Pacific, San Luis Obispo, Tillamook, Wahkiakum, and Whatcom counties. If even stricter ranking requirements are applied so that a community must be ranked in the top one-third of an indicator three times under engagement and/or dependence and resilience, four cities and six counties are identified as "most vulnerable." The cities are: Garibaldi, Ilwaco, Moss Landing, and Neah Bay. The counties are: Coos, Grays Harbor, Humboldt, Lincoln, Mendocino, and Pacific counties.

7.1.5.3 *Environmental Justice Communities of Concern*

This section replicates the discussion found in The final EIS for the 2005-06 specification document (PFMC 2004d).

Identifying Communities of Concern

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires Federal agencies to identify and address "disproportionately high adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations in the United States." Fishery management actions promulgated by the Council and implemented by NMFS can have environmental and socioeconomic impacts over a very wide area; the affected area of many actions covers all west coast waters and adjacent coastal communities involved in fishing. This makes it difficult to identify minority and low-income populations that may be disproportionately affected.

Section 8.5 in Appendix A (PFMC 2004d) describes a methodology, using 2000 U.S. Census data, to identify potential "communities of concern" because their populations have a lower income or a higher proportion of minorities than comparable communities in their region. West coast ports identified in the PacFIN database were examined in this way. These ports were evaluated using five criteria: the percentage nonwhite population, percentage Native American population, percentage Hispanic population, average income, and the poverty rate. Data were evaluated for both census places and census block groups corresponding to the area around these census places. The values for these statistics were compared to the average value for one of three regions, covering coastal block groups in Washington, Oregon, and northern California; central California; and southern California. For each of the five statistics potential communities of concern were identified. These are communities that have a significantly higher percentage minority population and poverty rate or lower average income than the surrounding reference region.

About two-thirds of the port communities analyzed are above the cutoff threshold for one or more of the statistics, measured either by the census place value or the equivalent block groups. This suggests that additional criteria need to be applied to more realistically identify which ports should be of concern. It should be noted that the population affected by the proposed action, which would be predominantly fishers and those involved in allied industries (e.g., marine supplies, fish processing, recreational charter and equipment) is a small percentage of the population in most communities. It stands to reason that in larger communities and more urban areas, fishery participants are a smaller and potentially less representative component of the population. In isolated rural communities there are usually fewer alternative employment options, making it harder to find work or switch from one occupation to another in response to changes in one economic sector such as fisheries. Given these conditions, another criterion to focus on communities of concern would be population size and urbanization. Eliminating ports with a population greater than 50,000 and of those ports with a population less than 50,000, those for which the block group area is more than 75 percent urban leaves the list of ports shown in Table 7-48 as potential communities of concern.

It should be noted that fishery participants usually make up a small component of the population and fisheries may be a small part of the local economy in many places. Thus, even if a community has a high proportion of minority or low income residents, these people might not participate in fisheries and thus may be minimally affected by the proposed action. Furthermore, within the affected population some segments are more likely to be low income and minority than others. For example, employees in a fishing processing plant may be predominantly from a minority group, and crew on vessels are likely to have a lower earnings than the skipper or vessel owner, making them more likely to be low income. Unfortunately, the kind of detailed population data necessary to determine the characteristics of the population affected by the proposed action are not available. For this reason, the ports identified in Table 7-48 represent an initial screening. Note that Moss Landing, Port Orford, Neah Bay, and Winchester Bay are also described as "vulnerable communities" (see 7.1.5.2.3).

Table 7-48. Environmental Justice—Communities of Concern.

Name	Qualifying Demographic Criteria
Blaine, Washington	poverty rate
La Conner, Washington	% Hispanic
Neah Bay, Washington	% nonwhite, % Native American, average income, poverty rate
La Push, Washington	% nonwhite, % Native American, poverty rate
Copalis Beach, Washington	Income
Westport, Washington	income, poverty rate
Willapa Bay	income, poverty rate
Salmon River, Oregon	% Native American
Siletz Bay, Oregon	% Native American
Waldport, Oregon	Income
Winchester Bay, Oregon	income, poverty rate
Port Orford, Oregon	income, poverty rate
Brookings, Oregon	% Native American, income
Trinidad, California	% Native American, income, poverty rate
Fort Bragg, California	% Hispanic
Albion, California	% Hispanic
Point Arena, California	% Native American, % Hispanic
Moss Landing, California	% Native American, % Hispanic

7.2 The Economic Impacts of the Alternatives

7.2.1 Introduction

7.2.1.1 *Criteria Used to Evaluate Impacts*

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, which may accord with the best professional judgment of agency staff (40 CFR Part 1502.22). NMFS acknowledges that the information necessary to fully evaluate net national benefits associated with socio-economic impacts described below cannot be reasonably obtained at this time. Available information includes historic data on commercial vessel landings and exvessel revenue gleaned from fish tickets, projections of limited entry trawl vessel participation (landings and revenue) under the alternatives provided by the GMT trawl bycatch model, rough projections of non-trawl fisheries response (landings and revenue) under the alternatives produced by the Council's commercial fisheries data model, tribal fisheries projections (landings and revenue) under the alternatives provided by the GMT, estimates of recreational angler trips in recent years and under the alternatives provided by the GMT, and estimates of local personal income and employment impacts resulting under the alternatives generated using the Council's commercial and recreational fisheries economic assessment models (FEAM)[14/].

Additional information that is necessary to perform the required net benefits analysis includes production cost information for vessels; production cost, product volume and price information for processors; trip cost, trip volume and price information for charter operators; and angler willingness to pay information for recreational fishing experience. As noted below, efforts are underway to collect representative production cost information from participating commercial fishing vessels. However, that information is not currently available to inform this analysis, nor is the other information mentioned in this paragraph. Therefore the following evaluation is based on best professional judgment of NMFS and Council staff.

7.2.2 Commercial Fisheries

Changes in exvessel revenue are used to indicate the directions of change expected in net economic benefits derived from harvest by the commercial seafood vessels. Subgroups of the groundfish fleet are examined to determine if any particular group is experiencing greater effects than others. The primary divisions are between the limited entry trawl, limited entry fixed gear and open access fishery.

A complete assessment of the expected change in net revenue requires an assessment of changes in fishing costs[2/]. Comprehensive information on fishing costs for the west coast groundfish fishery is not currently available. An effort is underway by NMFS and PSMFC to fill this gap by collecting data on fixed and variable cost structures of vessels engaged in groundfish and other major west coast fisheries. 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.

The discussion of cumulative impacts will include the effects of the trawl vessel buyback program and possible future implementation of an ITQ program. These regulatory changes will be discussed in terms of their likely effects on vessel revenue and operational costs. Changes in revenue will also be used as an indicator of the magnitude of likely harvest pressure that may affect adjacent fisheries as a result of changes in opportunity in the groundfish fishery.

7.2.3 Buyers, Processors, and Seafood Markets

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 buyer's perspective, exvessel revenue represents expenditures for a primary production input.

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[14]/ FEAM includes estimates of industry (commercial vessels, processors and recreational angling businesses) cost and output parameters that have been gleaned from PacFIN data and formal and informal surveys over the past 20 years. The Council's economic modeling methodologies are discussed in Appendix D of 2005-2006 Groundfish Specifications EIS.

[15]/ In order to estimate net economic benefits, fishing costs must be adjusted by appropriate shadow prices to determine real opportunity costs. For example, expenditures for crew would not count as an economic opportunity cost if the labor would otherwise have been unemployed. Or if the labor would have been employed, but at a lower wage, then the difference between the wages in the fishery and the wage in the next best alternative employment would not be counted as an economic cost (i.e., only the next best available wage is counted as a cost).

Projected change in exvessel revenue under the alternatives can be stratified by different categories to examine impacts by buyer/processor relative size and level of involvement in or dependence on groundfish purchases.

Substitutability of other products, or the same product imported from elsewhere, greatly affects regional seafood markets. Flatfish are generally lower priced than rockfish, and production is more constrained by markets than by availability of the resource itself. Rockfish are higher priced in west coast fresh markets. However, similar products from South America, Mexico, Canada, and Alaska readily substitute for west coast production. Whiting, which is either headed and gutted or processed into surimi or fillets competes with other sources of supply such as Alaska pollock.

7.2.4 Tribal Fisheries

The criteria used to compare management alternatives for the tribal groundfish fisheries are total annual projected groundfish landings and resulting exvessel revenue.

7.2.5 Recreational Fisheries

7.2.5.1 *Private Recreational Anglers*

Recreational experiences generate economic value for individual anglers, as determined by their willingness to pay for the experience. The sum of anglers' net willingness to pay (minus actual expenditures) represents the net economic value contributed by the recreational fishery to the national economy. However, estimates of these parameters are not currently available. As a proxy, partial estimates of the change in the total number of angler trips and indicators of the probable direction and degree of change in the average value per trip are considered. The following discussion highlights some of the issues involved in estimating the net economic value of the recreational fishing experience.

Estimating Net Economic Value

The net value of a recreational fishing trip is a function of the willingness of potential anglers to pay for the experience.[3/] While expected catch (species, number and size) probably does not affect the value of a trip once it is undertaken, it may affect the likelihood of taking a given trip in the first place. Reduced bag limits, while reducing the number of trips per time period, may also allow for a longer season and an increased total number of angler trips. This could provide angling opportunities to a greater number of anglers, potentially increasing the marginal value of each fish. While the marginal value per angler of each additional fish caught decreases with increasing bag limits, so too does the cost per unit catch. Thus, the net effect of a change in bag limit on the value of recreational experiences is ambiguous.

While a loss of fishing opportunity may translate into a direct reduction in trip-related expenditures, the resulting change in net economic value will be considerably less than the change in expenditure. Presumably the recreationalist will still pursue another activity, even though this alternative experience may be somewhat inferior to 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. While analysis of the local impact would interpret the reduction in revenue of the recreational fishing-related businesses as a direct loss in local income, analysis of net

[16/] Arguments that might be used to estimate willingness to pay include, among others, attractiveness of the location and distance traveled by the fisher.

economic value would treat only the difference in the intrinsic value to the individual between the two types of experience 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 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 (although if a cap is non-binding, it may have no direct effect), change in seasons, or change in area or depth closures. Estimates of the change in the number of angler trips in each state's recreational ocean fishery under each management alternative are derived.

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 available approach for evaluating impacts given the data limitations.

Change in Quality (Value) of Trips

Management measures may affect the perceived value of the recreational experience as well as the amount of effort. Those anglers forced to change their desired fishing patterns will probably experience a reduction in economic value from the trip. While change in bag limits probably does affect the decision of whether or not to fish, historically west coast groundfish managers have observed little change in recreational effort in response to changes in bag limits. However, continued reductions in bag limits would be expected to eventually lead to reduced demand and lower levels of angler participation once some critical threshold had been crossed.

Change in Quantity of Trips

Greater restrictions (e.g., lower bag limits) on individual trips may allow a greater number of anglers to fish by spreading the recreational harvest out over a longer season. Yet if current bag limits are constraining retained catch, then lower bag limits may also reduce the likelihood that an individual will choose to go fishing in the first place. An increase in the number of trips results in increased total expenditures by recreational anglers. However, especially in the short term, these expenditures may represent dollars taken away from other places and other types of activities rather than "new" activity. Therefore even though net benefits may be unchanged, there may be a redistribution of expenditures among local businesses.

7.2.5.2 *Charter Boat Businesses*

Demand for charter trips is affected by some of the same factors that affect demand for private recreational fisheries, including bag limits, weather conditions during open seasons, and coincidental timing of open seasons with traditional vacation periods. For example, a closure during the months of July and August, the peak summer vacation period, will have a more adverse impact on charter operators than will closures during any other two-month period of the year. Impacts on charter boats under the alternatives are assessed based on estimated changes in total effort and timing of closure periods.

7.2.6 General Public

Directly measuring individuals' non-consumptive and non-use values for a marine resource is beyond the scope of this analysis. The metric used as a proxy is relative to the size of the RCAs. At current relative biomass levels for sensitive fish species, this measure is assumed to be proportional to enhanced non-consumptive and non-use values.

7.2.7 Communities

Impacts on communities have been assessed according to the commercial and recreational impacts described below. The study on "vulnerable communities" is also of relevance in this section.

7.2.7.1 *Commercial Fisheries and Recreational Fisheries Impacts*

Projected commercial landings under the alternatives are compared against recent landings to estimate change in landings by port area. Income multipliers generated by the FEAM and differentiated by species, vessel category, gear type, processing mode, and landing port are applied to the projected landings to estimate change in total personal income impacts resulting from the estimated change in harvest and processing activity under each alternative. A description of FEAM is found in (Jensen 1996), a recent update to the model is described in (Davis 2003), and Appendix D of the 2005-06 Groundfish Specifications EIS includes a further discussion of income impact estimating methodology. These impacts have been reviewed against the list of "vulnerable communities" as described above. Annual recreational fishing effort under the alternatives is estimated by region and compared against recent data. Change in effort is assumed to be roughly proportional to the change in estimated harvest. Regional income multipliers derived from the recreational FEAM and average trip expenditures for recreational fishers in the four regions derived from a recent study (Gentner 2001) are applied to the estimated change in effort to generate the change in regional income resulting from the level of recreational fishing activity expected under each alternative.

7.2.7.2 *Community Vulnerability*

The commercial and recreational impacts will be compared against the list of "vulnerable" communities and "communities of concern" (see discussion under 7.1.5.2).

7.2.7.3 *Safety*

Changes in vessel net income can have effects beyond economic effects. Reduced investment in maintenance and safety equipment can increase hazard associated with fishing. Reduced income opportunity could cause dislocation for crew members and their families. Individuals willing to work for lower paying jobs are generally less skilled and have fewer alternative employment opportunities. In addition to reduced operational efficiency, these factors could lead to deterioration in vessel safety conditions.

Safety of fishing vessels is also affected by the seasons and depth zones or areas open to fishing under the alternatives. Seasonal closures that push commercial and/or recreational vessels out to sea during poor weather months will increase the likelihood of safety problems for those vessels.

RCA boundaries and depth or area closures that pack vessels into shallow nearshore areas will also increase the likelihood of safety problems. Limits that push commercial and recreational fleets to fish in the same waters increase 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 risk to vessels.

Effects on vessel safety under the alternatives are evaluated by comparing revenue earning opportunities for commercial vessels and the pattern of season and depth/area closures for both commercial and recreational vessels.

7.2.7.4 *Key Impact Indicators*

As discussed above, the impacts of the alternatives were assessed primarily through the prediction of changes in landings, exvessel revenues, and personal income impacts for commercial fisheries. Total estimates are provided by alternative and then by sector and community (e.g. Shoreside Limited Entry Trawl, Astoria-Tillamook) and by state. For recreational fisheries, the key indicators are trips, angler expenditures and income impacts.

A separate analysis addresses the impacts of a “No Fishing” alternative, e.g., to simultaneously minimize mortality of all overfished species.

Tables 7-49a and 49b provide a quick reference to the major changes in OYs under the 2009 and 2010 OY alternatives and the Council preferred alternative compared with 2007-08 levels.

Table 7-49a. Optimum yields for rebuilding species and representative target species by 2009 OY alternative (mt).

		2009 OY Alternatives							Change from 2007-2008 OY						
Stock	2007-2008 OY a/	Alt 1 OY	Alt 2 OY	Alt 3 OY	Alt 4 OY	Alt 5 OY	Alt 6 OY	Final preferred OY alternative	Alt 1 OY	Alt 2 OY	Alt 3 OY	Alt 4 OY	Alt 5 OY	Alt 6 OY	Final preferred OY alternative
Lingcod - coastwide		5,205	5,278					5,278							
N of 42º (OR & WA)	5,558	4,593	4,593					4,593	-965	-965					-965
S of 42º (CA)	612	612	685					685	0	73					73
Pacific Cod	1,600	1,600						1,600	0						0
Pacific Whiting (U.S.)	269,545	134,773	269,545	404,318					-134,773	0	134,773				
Sablefish (Coastwide)	5,934	9,795	8,423	6,250				8,423	3,862	2,490	317				2,490
N of 36º (Monterey north)	5,723	9,452	7,052	5,233				7,052	3,729	1,329	-490				1,329
S of 36º (Conception area)	210	343	1,371	1,018				1,371	132	1,161	807				1,161
PACIFIC OCEAN PERCH	150	0	130	164	189			189		-20	14	39			39
Shortbelly Rockfish	13,900	3,475	6,950					6,950	-10,425	-6,950					-6,950
WIDOW ROCKFISH	368	0	371	522				522		3	154				154
CANARY ROCKFISH	44	0	35	44	85	105	155	105		-9	0	41	61	111	61
Chilipepper Rockfish	2,000	2,000	2,099	3,037				2,885	0	99	1,037				885
BOCACCIO	218	0	218	288				288		0	70				70
Splitnose Rockfish	461	461						461	0						0
Yellowtail Rockfish	4,548	4,562						4,562	14						14
Shortspine Thornyhead - coastwide															
Shortspine Thornyhead - N of 34º27'	1,634	1,608						1,608	-26						-26
Shortspine Thornyhead - S of 34º27'	421	414						414	-7						-7
Longspine Thornyhead - coastwide															
Longspine Thornyhead - N of 34º27'	2,220	2,231						2,231	11						11
Longspine Thornyhead - S of 34º27'	476	395						395	-81						-81
COWCOD	4	0	2	4				4		-2	0				0
DARKBLOTCHED	330	0	159	229	300			285		-171	-101	-30			-45
YELLOWEYE	20	0	13	17	15	17		17		-7	-3	-5	-3		-3
Black Rockfish (WA)	540	490						490	-50						-50
Black Rockfish (OR-CA)	722	920	1,000	1,469				1,000	198	278	747				278
Blue Rockfish (CA)				207	230										
Minor Rockfish North	2,270	2,280	2,283	2,255				2,283	10	13	-15				13
Nearshore Species	142	152	155	127				155	10	13	-15				13
Blue rockfish contribution		25	28												
Shelf Species	968	968						968	0						0
Slope Species	1,160	1,160						1,160	0						0
Minor Rockfish South	1,904	1,970	1,990	1,788				1,990	66	86	-116				86
Nearshore Species	564	630	650	448				650	66	86	-116				86
Blue rockfish contribution		182	202												
Shelf Species	714	714						714	0						0
Slope Species	626	626						626	0						0
California scorpionfish	175	111	175					175	-64	0					0
Cabezon (off CA only)	69	69	74	69				69	0	5	0				0
Dover Sole	16,500	16,500						16,500	0						0
English Sole	6,237	14,326						14,326	8,089						8,089
Petrale Sole (coastwide)	2,499	2,433						2,433	-66						-66
Arrowtooth Flounder	5,800	5,245	11,267					11,267	-555	5,467					5,467
Starry Flounder	890	1,004						1,004	114						114
Other Flatfish	4,884	4,884						4,884	0						0
Other Fish	7,300	6,399	5,951	3,872				5,600	-901	-1,349	-3,428				-1,700
Longnose Skate		901	1,349	3,428				1,349							
Kelp Greenling HG (OR)															

a/ The Council elected to average OY projections for 2007 and 2008. ABCs were year-specific.

Table 7-49b. Optimum yields for rebuilding species and representative target species by 2010 OY alternative (mt).

		2010 OY Alternatives							Change from 2007-2008 OY						
Stock	2007-2008 OY a/	Alt 1 OY	Alt 2 OY	Alt 3 OY	Alt 4 OY	Alt 5 OY	Alt 6 OY	Final preferred OY alternative	Alt 1 OY	Alt 2 OY	Alt 3 OY	Alt 4 OY	Alt 5 OY	Alt 6 OY	Final preferred OY alternative
Lingcod - coastwide		4,785	4,829					4,829							
N of 42º (OR & WA)	5,558	4,173	4,173					4,173	-1,385	-1,385					-1,385
S of 42º (CA)	612	612	656					656	0	44					44
Pacific Cod	1,600	1,600						1,600	0						0
Pacific Whiting (U.S.)	269,545	134,773	269,545	404,318					-134,773	0	134,773				
Sablefish (Coastwide)	5,934	8,988	7,729	5,777				7,729	3,055	1,796	-156				1,796
N of 36º (Monterey north)	5,723	8,673	6,471	4,837				6,471	2,950	748	-886				748
S of 36º (Conception area)	210	315	1,258	941				1,258	104	1,048	730				1,048
PACIFIC OCEAN PERCH	150	0	137	173	200			200		-13	23	50			50
Shortbelly Rockfish	13,900	3,475	6,950					6,950	-10,425	-6,950					-6,950
WIDOW ROCKFISH	368	0	362	509				509		-6	141				141
CANARY ROCKFISH	44	0	35	44	85	105	155	105		-9	0	41	61	111	61
Chilipepper Rockfish	2,000	2,000	2,099	2,576				2,447	0	99	576				447
BOCACCIO	218	0	227	302				288		9	84				70
Splitnose Rockfish	461	461						461	0						0
Yellowtail Rockfish	4,548	4,562						4,562	14						14
Shortspine Thornyhead - coastwide															
Shortspine Thornyhead - N of 34º27'	1,634	1,591						1,591	-43						-43
Shortspine Thornyhead - S of 34º27'	421	410						410	-11						-11
Longspine Thornyhead - coastwide															
Longspine Thornyhead - N of 34º27'	2,220	2,175						2,175	-45						-45
Longspine Thornyhead - S of 34º27'	476	385						385	-91						-91
COWCOD	4	0	2	4				4		-2	0				0
DARKBLOTCHED	330	0	165	235	306			291		-165	-95	-24			-39
YELLOWEYE	20	0	14	14	15	17		17		-6	-6	-5	-3		-3
Black Rockfish (WA)	540	464						464	-76						-76
Black Rockfish (OR-CA)	722	831	1,000	1,317				1,000	109	278	595				278
Blue Rockfish (CA)				207	230										
Minor Rockfish North	2,270	2,280	2,283	2,255				2,283	10	13	-15				13
Nearshore Species	142	152	155	127				155	10	13	-15				13
Blue rockfish contribution		25	28					28							
Shelf Species	968	968						968	0						0
Slope Species	1,160	1,160						1,160	0						0
Minor Rockfish South	1,904	1,970	1,990	1,788				1,990	66	86	-116				86
Nearshore Species	564	630	650	448				650	66	86	-116				86
Blue rockfish contribution		182	202					202							
Shelf Species	714	714						714	0						0
Slope Species	626	626						626	0						0
California scorpionfish	175	99	155					155	-76	-20					-20
Cabezon (off CA only)	69	69	74	79				79	0	5	10				10
Dover Sole	16,500	16,500						16,500	0						0
English Sole	6,237	9,745						9,745	3,508						3,508
Petrale Sole (coastwide)	2,499	2,393						2,393	-106						-106
Arrowtooth Flounder	5,800	5,245	10,112					10,112	-555	4,312					4,312
Starry Flounder	890	1,077						1,077	187						187
Other Flatfish	4,884	4,884						4,884	0						0
Other Fish	7,300	6,398	5,951	4,031				5,600	-902	-1,349	-3,269				-1,700
Longnose Skate		902	1,349	3,269				1,349							
Kelp Greenling HG (OR)															

a/ The Council elected to average OY projections for 2007 and 2008. ABCs were year-specific.

7.2.8 Economic Impact of Management Measures Designed to Achieve the OY Alternatives

This section discusses the economic impact of management measures that were designed to achieve the OYs shown in Table 7-49. These alternatives (discussed in Chapter 2) show a set of alternatives originally considered during the winter of 2008 which led to the Council's selection of preliminary preferred alternatives for target species, and a high and low preliminary preferred alternative for rebuilding species. These analyses led to the selection of the final Council-preferred alternative for 2009-10 ABCs and OYs for target and rebuilding species along with accompanying fishery management measures. The initial set of OY alternatives pertaining to overfished species are referred to as "rebuilding alternatives," the second set of alternatives that were selected by the Council for further analysis during April 2008 are referred to as "preferred OY alternatives" (for depleted species) or "action alternatives" (for management measures). The alternative ultimately adopted by the Council in June 2008 is referred to as the "final Council-preferred alternative".

7.2.8.1 *Overview*

The OY alternatives for target and rebuilding species differ from 2007-08 OYs. In some cases these differences are substantial, and in other cases the difference is smaller. The relative OYs of target and rebuilding species influence management regulations that are crafted in response to those OYs. Estimates of exvessel revenue, recreational effort, and the distribution of those economic impacts differ according to those crafted regulations. Note that under Alternative 1, all overfished species OYs are zero in order to afford maximum protection for rebuilding species. This "zero harvest" scenario is analyzed in section 7.2.10.

The OYs of several key target species will differ relative to 2007-08 seasons. The OYs for sablefish, chilipepper rockfish, English sole, and arrowtooth flounder will increase substantially based on the Council's final preferred alternative for abundant target species. In response, management measures could be crafted to allow fisheries to harvest more of these species, however, the take of these target species is constrained by rebuilding species, and in some cases, other target species. Some species will have a decrease in the OY compared to the 2007-08, most notably lingcod north of 42° North latitude. Shortbelly rockfish will experience a 50 percent reduction in OY, however this is a very under-exploited and' currently' commercially unimportant species. A large apparent reduction in OY for the "other fish" category is largely due to the removal of longnose skate from the other fish assemblage.

The 2009-10 Council preferred OYs for rebuilding species will differ little from 2008 in most cases. POP, widow rockfish, canary rockfish and bocaccio OYs will increase, somewhat easing constraints on target species catch imposed to protect those species. However OYs for darkblotched rockfish and, most notably, yelloweye rockfish will decline from 2008 levels, indicating increased measures to protect those two species.

Impacts under the management measure alternatives are described in the following sections. Where possible, integrated "packages" of alternatives for each sector were constructed, combining complete analyses for multiple sectors. However for the nearshore open access sector this was not possible due to the late development of the nearshore open access bycatch model. Consequently the nearshore open access sector has its own separate set of named management alternatives. Similarly, each state produced its own separate set of recreational fishery management alternatives. Consequently while the "zero harvest" alternatives (i.e., no allowed fishing mortality for yelloweye rockfish) do line up across the board for each state, there is not a correlation between, for example, "WA Rec Alt 2," "OR Rec Alt 2" and "CA Rec Alt 2." Impacts on the nearshore open access sector and recreational fishery sectors are thus evaluated separately except under the final Council preferred alternative, where the preferred alternatives for all commercial and recreational sectors are evaluated as a whole. Note that with the exception of the 'zero harvest' scenario, economic impacts on the limited entry fixed gear sector are assumed to be identical under each of the alternatives. This is because none of the bycatch species taken by this sector are considered to be constraining under the array of available management measures. Thus it is projected that the limited entry fixed gear sector would not be prevented from taking its full allocation of sablefish under any of the alternatives. The scenarios for the Pacific whiting assume that sectors would be able to catch whiting up to the projected amounts of constraining bycatch species likely to be available given currently assumed bycatch rates.

The integrated **commercial fisheries management alternatives** evaluated in the following sections include the following elements:

2007: Landings and deliveries recorded in 2007.

No Action: Projected landings and deliveries by commercial fisheries sectors in 2008.

Reb. Alt 1_09aCP: Estimated LE Trawl 2009 council preliminary preferred alternative + any fixed gear alternative (excluding nearshore OA) + 298,000 mt whiting catch.

Reb. Alt 1_09b: LE Trawl 2009 alternative 1 + any fixed gear alternative (excluding nearshore OA) + 280,000 mt whiting catch.

Reb. Alt 1_10CP: LE Trawl 2010 alternative 1 + any fixed gear alternative (excluding nearshore OA) + 298,000 mt whiting catch.

Reb. Alt 2: LE Trawl 2009 alternative 2 + any fixed gear alternative (excluding nearshore OA) + 228,000 mt whiting catch.

Reb. Alt 3: LE Trawl 2009 alternative 3 + any fixed gear alternative (excluding nearshore OA) + 190,000 mt whiting catch.

Reb. Alt 4: LE Trawl 2009 alternative 4 + any fixed gear alternative (excluding nearshore OA) + 329,000 mt whiting catch.

Reb. Alt 5a: LE Trawl 2009 alternative 5a + any fixed gear alternative (excluding nearshore OA) + 228,000 mt whiting catch.

Reb. Alt 5b: LE Trawl 2009 alternative 5b + any fixed gear alternative (excluding nearshore OA) + 329,000 mt whiting catch.

Final Council Preferred: LE Trawl final council preferred alternative + any fixed gear alternative (excluding nearshore OA) + 298,272 mt whiting catch.

Nearshore open access sector alternatives analyzed in the following sections are:

2007: Landings and deliveries recorded in 2007.

No Action: Projected landings and deliveries in 2008.

OA NS Alt 1: nearshore open access alternative 1.

OA NS Alt 2: nearshore open access alternative 2.

OA NS Alt 3: nearshore open access alternative 3.

OA NS Alt 4: nearshore open access alternative 4.

OA NS Alt 5: nearshore open access alternative 5.

OA NS Alt 6: nearshore open access alternative 6.

Final Council Preferred: same as OA NS Alt 5 (nearshore open access alternative 5).

Recreational fisheries management alternatives analyzed in the following sections include:

2007: Landings and deliveries recorded in 2007.

No Action: Projected landings and deliveries in 2008.

WA Rec Alt 0: Washington zero yellow mortality scenario.

WA Rec Alt 1: Washington recreational alternative 1.

WA Rec Alt 2: Washington recreational alternative 2.

WA Rec Alt 3: Washington recreational alternative 3.

OR Rec Alt 1: Oregon recreational alternative 1(zero yelloweye mortality scenario).

OR Rec Alt 2: Oregon recreational alternative 2.

OR Rec Alt 3: Oregon recreational alternative 3.

OR Rec Alt 4: Oregon recreational alternative 4.

OR Rec Alt 5: Oregon recreational alternative 5.

OR Rec Alt 5a: Oregon recreational alternative 5a.

OR Rec Alt 6: Oregon recreational alternative 6.

CA Rec Alt 0: California zero yellow mortality scenario.

CA Rec Alt 01: California recreational alternative 1.

CA Rec Alt 02: California recreational alternative 2.

CA Rec Alt 03: California recreational alternative 3.

CA Rec Alt 04: California recreational alternative 4.

CA Rec Alt 05: California recreational alternative 5.

CA Rec Alt 06: California recreational alternative 6.

Final Council Preferred: Combination of No Action alternative for Washington, OR Rec Alt 4 for Oregon, and a new "Council Preferred Alternative" for California.

Tables 7-50a and 7-50b summarize exvessel revenue impacts under each management alternative. Table 7-50a shows impacts on the following sectors: at-sea whiting (mothership and catcher-processor), shoreside whiting, non-whiting trawl, limited entry fixed gear, open access fixed gear (except nearshore open access), and the shoreside and at-sea treaty groundfish sectors. Table 7-50b shows impacts on the nearshore open access fixed gear sector, which were analyzed separately under a unique set of nearshore open access alternatives. Table 7-50a shows that compared with No Action, coastwide exvessel revenue generated by directed groundfish sectors increase under all the alternatives. The increase is smallest under Reb. Alt 2 (+$2.2 million) and greatest under Reb. Alt 4 (+$21.7 million). Increase under the Final

Council Preferred alternative is +$13.3 million. However the overall totals mask some intersector differences. For example, the whiting sectors are worse off under Reb. Alt 2, Reb. Alt 3 and Reb. Alt 5a than under No Action due to relatively low residual amounts of constraining species bycatch that would be available. Non-whiting trawl would be worse off than No Action under the three Reb. Alt 1 variants and Reb. Alt 3, but better off under all the remaining alternatives, and best off under the Final Council Preferred alternative. Limited entry fixed gear would be better off under any of the action alternatives due to increased sablefish OY and non-constraining bycatch allowances. The increase is greatest along the southern coast, as will be illustrated in subsequent sections.

Table 7-50b shows that the nearshore open access sector would be better off than No Action under only one of the nearshore open access alternatives: OA NS Alt 6; and would be worse off under two: OA NS Alt 2 and OA NS Alt 1. The Final Council Preferred alternative leaves the sector as well off as under No Action.

Table 7-50a. Coastwide exvessel revenue under directed groundfish sector alternatives (excluding nearshore open access sector) ($ million).

Estimated Exvessel Revenue Impacts for Groundfish Sectors from all Groundfish Species by Port Area Under the 2009-10 GF Spex Alternatives (Million $)

LE Trawl non-whiting, LE Trawl whiting, LE Fixed Gear, Open Access (except nearshore) and Treaty Sectors Alternatives

Directed Groundfish Sector	2007	No Action	Reb. Alt 1_09aCP	Reb. Alt 1_09b	Reb. Alt 1_10CP	Reb. Alt 2	Reb. Alt 3	Reb. Alt 4	Reb. Alt 5a	Reb. Alt 5b	Final Council Pref.
Whiting C-P	12.9	13.9	15.7	14.6	15.7	11.7	9.8	17.6	11.7	17.6	14.8
CV-Mothership	8.4	9.8	11.1	10.3	11.1	8.3	6.9	12.4	8.3	12.4	10.5
Shoreside Whiting	13.0	17.1	19.3	17.9	19.3	14.4	12.0	21.6	14.4	21.5	18.2
Non-whiting Trawl	24.0	24.2	18.4	18.4	23.4	24.4	17.1	26.8	26.5	26.5	27.0
Limited Entry Fixed Gear	10.5	10.5	15.1	15.1	14.0	15.1	15.1	15.1	15.1	15.1	15.1
Open Access Fixed Gear	3.9	3.9	4.8	4.8	4.6	4.8	4.8	4.8	4.8	4.8	5.0
Shoreside Treaty Groundfish	8.7	8.7	11.3	11.3	11.1	11.3	11.3	11.3	11.3	11.3	10.8
At-sea Treaty whiting	2.5	2.5	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.5
TOTAL	83.8	90.6	98.5	95.3	102.0	92.8	79.8	112.3	94.9	112.0	103.9

Table 7-50b. Coastwide exvessel revenue under the nearshore open access groundfish sector alternatives ($ million).

	2007	No Action	OA NS Alt 1	OA NS Alt 2	OA NS Alt 3	OA NS Alt 4	OA NS Alt 5	OA NS Alt 6	Final Council Pref.
Nearshore Open Access Fixed Gear	1.52	1.52	1.25	0.61	1.52	1.52	1.52	2.07	1.52

Table 7-51 shows that the "zero harvest" scenarios (WA Rec Alt 0, OR Rec Alt 1 and CA Rec Alt 0) virtually shut down the recreational fisheries in each state. Of the other Washington action alternatives, WA Rec Alt 1 is equivalent to No Action. WA Rec Alt 2 and WA Rec Alt 3 would reduce effort by about

1,000 angler trips. The Oregon recreational fishery sector is unambiguously better off under any of the non-zero Oregon recreational fishery action alternatives compared with No Action. The increase in Oregon angler effort is greatest under OR Rec Alt 3, OR Rec Alt 4, OR Rec Alt 5 and OR Rec Alt 6, which are equivalent. None of the California action alternatives leave the recreational fishery as well off as under No Action. Apart from the "zero harvest" scenario, the greatest reduction in angler effort is shown under CA Rec Alt 1. The smallest reduction with respect to No Action is seen under CA Rec Alt 6.

Table 7-51. Recreational effort estimates by state action alternative (thousands of angler trips).

WASHINGTON

Mode	2007	No Action	WA Rec Alt 0	WA Rec Alt 1	WA Rec Alt 2	WA Rec Alt 3	Council Preferred Alt
Charter	48	51	1	51	51	51	51
Private	67	78	1	78	77	77	78
TOTAL	115	128	2	128	128	128	128

OREGON

Mode	2007	No Action	OR REC ALT 1	OR REC ALT 2	OR REC ALT 3	OR REC ALT 3a	OR REC ALT 4	OR REC ALT 5	OR REC ALT 5a	OR REC ALT 6	Council Preferred Alt
Charter	55	45	2	49	56	54	56	56	54	56	56
Private	135	72	4	123	130	124	130	130	124	130	130
TOTAL	190	117	5	172	186	178	186	186	178	186	186

CALIFORNIA

Mode	2007	No Action	CA REC ALT 0	CA REC ALT 1	CA REC ALT 2	CA REC ALT 3	CA REC ALT 4	CA REC ALT 5	CA REC ALT 6	Council Preferred Alt
Charter	311	296	1	281	288	289	289	290	291	292
Private	710	689	26	616	643	651	656	663	671	666
TOTAL	1,021	986	26	898	931	940	946	953	962	957

TOTAL

Mode	2007	No Action	Council Preferred Alt
Charter	474	392	399
Private	912	839	873
TOTAL	1,326	1,231	1,272

7.2.8.2 *Final Council-Preferred Alternative*

The final Council-preferred alternative generates higher exvessel revenue on a coastwide basis compared with 2007 and No Action, but the distribution of these impacts varies somewhat across commercial fishery sectors. For the nearshore open access sector, the Final Council-preferred alternative is no worse off than under No Action and second only to OA NS Alt 6. In terms of recreational angler effort, the number of angler trips is higher under the final Council-preferred alternative when compared to No Action, but less than in 2007. However, Table 7-51 shows the increase in angler effort under the final Council preferred alternative is occurring exclusively in Oregon, while Washington shows no change and California is worse off than under No Action.

An economic impact of the final Council-preferred alternative that cannot be easily quantified, and is not necessarily present in the action alternatives, is the concept of economic risk and uncertainty. Risk implies that there is a known and measurable probability of an event occurring, whereas uncertainty implies that an event may occur, but its likelihood is not known. In the case of economic impacts to groundfish sectors, there is considerable uncertainty surrounding predictions of economic impacts to fishing sectors because catch levels often differ from predictions. When actual catches exceed predictions, there may be a response during the fishing season to constrain one or more sectors in order to stay within OYs or ABCs, and this often has negative economic repercussions. While it can almost always be anticipated that catches will differ from predictions, it is not always known where and to what degree those deviations will occur. In this case, one is uncertain about the outcome of fishery performance and economic impacts.

For some species caught in the west coast groundfish fishery, there has been an observed and anticipated deviation of catch occurring from predictions for three rebuilding species. Darkblotched rockfish, widow rockfish, and POP have all been experiencing increases in incidental catch rates despite bycatch avoidance behavior. The incidental catch rate of darkblotched and widow rockfish in particular has been increasing quickly over the past four to five years, and the final Council-preferred alternative takes those trends into account.

The key constraint around which management measures were constructed this time was the need to reduce OY of yelloweye rockfish to facilitate rebuilding of that species. The final Council preferred alternative accommodates this need and, by holding the yelloweye rockfish OY constant for two years, increases the level of certainty for participants in the 2009-10 groundfish fishery. The final Council-preferred alternative also accommodates the likelihood that actual catch will deviate from predicted catch by establishing buffers for constraining species, and in doing so, reduces the amount of uncertainty surrounding the economic impact predictions.

Impacts to the Limited Entry Bottom Trawl Fishery

The impacts to the non-whiting limited entry trawl sector under the final Council-preferred alternative are largely driven by the OYs for canary rockfish, bocaccio rockfish, darkblotched rockfish, cowcod, and POP. While this sector also encounters some yelloweye and widow rockfish, the non-whiting limited entry trawl sector does not encounter these species to the same degree as other sectors and therefore the management measures crafted for this sector are not necessarily driven by those species.

Under the final Council-preferred alternative, the limited entry bottom trawl sector is predicted to generate about $2.8-3 million more exvessel revenue than it in 2007 or under No Action. This increase is largely driven by increases in the abundance of sablefish, English sole and arrowtooth flounder as opposed to changes in rebuilding species OYs.

Table 7-52. Limited Entry bottom trawl exvessel revenue by region under the directed groundfish sector alternatives ($ million).

Region	2007	No Action	Reb. Alt 1_09aCP	Reb. Alt 1_09b	Reb. Alt 1_10 CP	Reb. Alt 2	Reb. Alt 3	Reb. Alt 4	Reb. Alt 5a	Reb. Alt 5b	Final Council Pref.
Northern Puget Sound	0.9	0.9	0.8	0.8	0.8	1.0	0.6	1.0	1.1	1.1	1.0
North Washington Coast	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1
South and Central Washington Coast	0.5	0.5	0.5	0.5	0.5	0.4	0.3	0.5	0.5	0.5	0.6
Astoria	6.6	6.6	5.3	5.3	6.1	6.3	3.9	7.3	7.3	7.3	7.4
Tillamook	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Newport	2.5	2.6	1.8	1.8	2.5	2.7	1.6	2.9	2.8	2.8	2.9
Coos Bay	4.0	4.0	3.0	3.0	3.9	4.4	2.5	4.5	4.5	4.5	4.6
Brookings	1.1	1.1	0.8	0.8	1.1	1.2	0.7	1.3	1.3	1.3	1.3
Crescent City	0.8	0.8	0.6	0.6	0.8	0.8	0.5	0.9	0.9	0.9	0.9
Eureka	3.5	3.4	2.6	2.6	3.4	3.7	2.3	3.9	3.8	3.8	3.8
Fort Bragg	1.9	2.1	1.4	1.4	2.1	2.0	2.6	2.2	2.1	2.1	2.3
Bodega Bay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
San Francisco	1.4	1.4	1.1	1.1	1.4	1.4	1.4	1.5	1.4	1.4	1.5
Monterey	0.5	0.6	0.4	0.4	0.6	0.5	0.7	0.6	0.6	0.6	0.6
Morro Bay	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
TOTAL	24.0	24.2	18.4	18.4	23.4	24.4	17.1	26.8	26.5	26.5	27.0

Impacts to the Limited Entry Whiting Trawl Fishery

Under the final Council-preferred alternative the limited entry whiting fishery is able to attain revenues that are at least as great as revenues generated under No Action. Rebuilding species that largely constrain the whiting fishery include widow and canary rockfish. The 2009 and 2010 final Council-preferred OYs for widow rockfish and canary rockfish are higher than in 2007-08. Recent years have witnessed an increase in the incidental take of widow rockfish in the whiting fisheries despite bycatch avoidance behavior. This trend is expected to continue. Setting the widow OY higher than recent catch levels is therefore not expected to result in significantly more liberal fishing opportunity since it is expected that the fishery will continue to encounter more widow rockfish as that stock rebuilds. It is important to note that the potential amount of exvessel revenue ultimately depends on the Pacific whiting stock assessment, which is adopted annually by the Council during the March meeting. The potential whiting vessel exvessel revenue shown in Table 7-53 only refers to the potential given the OY levels of incidentally caught rebuilding species.

Table 7-53. Limited Entry whiting trawl potential exvessel revenue by sector and region under the alternatives. ($ million)

Sector / Port Area	2007	No Action	Reb. Alt 1_09aCP	Reb. Alt 1_09b	Reb. Alt 1_10CP	Reb. Alt 2	Reb. Alt 3	Reb. Alt 4	Reb. Alt 5a	Reb. Alt 5b	Final Council Pref.
Whiting C-P	12.9	13.9	15.7	14.6	15.7	11.7	9.8	17.6	11.7	17.6	14.8
CV-Mothership	8.4	9.8	11.1	10.3	11.1	8.3	6.9	12.4	8.3	12.4	10.5
South and Central Washington Coast	4.8	6.4	7.2	6.7	7.2	5.4	4.5	8.1	5.4	8.1	6.8
Astoria	3.5	4.6	5.2	4.8	5.2	3.9	3.2	5.8	3.9	5.8	4.9
Newport	3.7	4.9	5.5	5.1	5.6	4.1	3.4	6.2	4.2	6.2	5.3
Coos Bay	0.5	0.7	0.8	0.7	0.8	0.6	0.5	0.8	0.6	0.8	0.7
Crescent City	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.2
Eureka	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.5	0.3	0.5	0.4
TOTAL	34.3	40.8	46.1	42.9	46.2	34.4	28.6	51.5	34.4	51.5	43.6

Impacts to Offshore Fixed Gear Sectors

West coast limited entry fixed gear vessels typically use longline and fish pots (traps) for catching groundfish, particularly sablefish. Open access fixed gear sectors use the same types of gear to target sablefish and other species, but are subject to much lower cumulative trip limits. Management measures imposed on the fixed gear sectors are designed to reduce the catch of overfished species, particularly yelloweye rockfish and, to a lesser extent, canary rockfish. These management measures are generally limited to adjusting depth restrictions so as to change the average bycatch rate for yelloweye and canary rockfish. Depending on the alternative, the minimum fishable depth for the offshore fixed gear sectors varies between 100 and 150 fm in different sections along the coast.

Since sablefish comprises the highest value component of the offshore fixed gear sectors' catch, economic modeling of these sectors focuses on sablefish. Since the alternative management measures have all been crafted so as to afford access to sablefish stocks while minimizing bycatch, it is assumed that fixed gear sectors will be able to access their entire sablefish allocation under any and all of the management measure alternatives. Sablefish OYs increase substantially north and south of 36° N latitude under the final Council-preferred alternative. For these reasons, exvessel revenues are projected to increase coastwide compared with No Action. Table 7-54 illustrates this result for the limited entry fixed gear sectors, and table 7-55 for the non-nearshore open access sectors, including the DTL sector.

Table 7-54. Limited entry fixed gear exvessel revenue by region under the limited entry fixed gear alternatives. ($ million)

Port Area	2007	No Action	2009 Alternative	2010 Alternative	Final Council Pref.
Northern Puget Sound	1.7	1.7	2.2	2.1	2.2
Southern Puget Sound	0.1	0.1	0.1	0.1	0.1
North Washington Coast	0.8	0.8	1.0	1.0	1.0
South and Central Washington Coast	0.8	0.8	1.0	0.9	1.0
Astoria	0.6	0.6	0.8	0.7	0.8
Tillamook	0.0	0.0	0.0	0.0	0.0
Newport	1.6	1.6	2.1	1.9	2.1
Coos Bay	1.0	1.0	1.3	1.2	1.3
Brookings	0.6	0.6	0.8	0.8	0.8
Crescent City	0.2	0.2	0.3	0.3	0.3
Eureka	0.4	0.4	0.5	0.5	0.5
Fort Bragg	0.4	0.4	0.5	0.5	0.5
Bodega Bay	0.0	0.0	0.0	0.0	0.0
San Francisco	0.1	0.1	0.2	0.2	0.2
Monterey	0.5	0.5	0.6	0.6	0.6
Morro Bay	0.0	0.0	0.1	0.1	0.1
Santa Barbara	0.3	0.3	0.5	0.4	0.5
Los Angeles	0.8	0.8	2.0	1.9	2.0
San Diego	0.4	0.4	1.1	1.0	1.1
TOTAL	10.5	10.5	15.1	14.0	15.1

Table 7-55. Open access fixed gear exvessel revenue by region under the open access fixed gear (DTL) alternatives. (excluding nearshore fisheries) ($ million)

Port Area	2007	No Action	2009 Alternative	2010 Alternative	Final Council Pref.
Northern Puget Sound	0.0	0.0	0.0	0.0	0.0
Southern Puget Sound	0.0	0.0	0.0	0.0	0.0
North Washington Coast	0.1	0.1	0.2	0.2	0.2
South and Central Washington Coast	0.2	0.2	0.2	0.2	0.2
Astoria	0.1	0.1	0.1	0.1	0.1
Tillamook	0.0	0.0	0.0	0.0	0.0
Newport	0.0	0.0	0.1	0.1	0.1
Coos Bay	0.2	0.2	0.2	0.2	0.2
Brookings	0.5	0.5	0.5	0.5	0.5
Crescent City	0.2	0.2	0.2	0.2	0.1
Eureka	0.1	0.1	0.2	0.1	0.1
Fort Bragg	0.4	0.4	0.5	0.5	0.5
Bodega Bay	0.0	0.0	0.0	0.0	0.0
San Francisco	0.2	0.2	0.2	0.2	0.2
Monterey	0.3	0.3	0.4	0.3	0.4
Morro Bay	1.1	1.1	1.2	1.2	1.2
Santa Barbara	0.2	0.2	0.2	0.2	0.2
Los Angeles	0.1	0.1	0.3	0.3	0.3
San Diego	0.1	0.1	0.3	0.3	0.3
TOTAL	3.9	3.9	4.8	4.6	4.6

Impacts to Nearshore Groundfish Fisheries

Under the final Council-preferred alternative, the nearshore groundfish fishery is able to attain exvessel revenues that are equivalent to status quo while providing for some additional fishing opportunity for lingcod. Fishing opportunity and economic impacts to the nearshore groundfish sector are largely driven by the need to protect canary and yelloweye rockfish. In areas south of 40°10' N latitude, observer data has not shown an interaction with yelloweye rockfish, so canary rockfish is the driving constraint.

Under the final Council-preferred alternative, the shoreward RCA boundary is moved in from 30 fm under No Action to 20 fm between 40°10' and 43° N latitude. From 40°10' N latitude south, the shoreward non-trawl RCA boundary is fixed at 30 fm during all periods, as under No Action.

Table 7-56 shows that projected exvessel revenues under the final Council-preferred alternative are equivalent to No Action in all port areas coastwide.

Table 7-56. Nearshore open access fixed gear exvessel revenue by region under the nearshore open access alternatives. ($ million)

Port Area	2007	No Action	OA NS Alt 1	OA NS Alt 2	OA NS Alt 3	OA NS Alt 4	OA NS Alt 5	OA NS Alt 6	Final Council Pref.
Northern Puget Sound	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Southern Puget Sound	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
North Washington Coast	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01
South and Central Washington Coast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Astoria	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tillamook	0.16	0.16	0.13	0.06	0.16	0.16	0.16	0.23	0.16
Newport	0.05	0.05	0.04	0.02	0.05	0.05	0.05	0.06	0.05
Coos Bay	0.03	0.03	0.03	0.01	0.03	0.03	0.03	0.04	0.03
Brookings	0.48	0.48	0.38	0.19	0.48	0.48	0.48	0.68	0.48
Crescent City	0.32	0.32	0.26	0.13	0.32	0.32	0.32	0.48	0.32
Eureka	0.05	0.05	0.04	0.02	0.05	0.05	0.05	0.08	0.05
Fort Bragg	0.07	0.07	0.06	0.03	0.07	0.07	0.07	0.08	0.07
Bodega Bay	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01
San Francisco	0.04	0.04	0.02	0.02	0.04	0.04	0.04	0.09	0.04
Monterey	0.05	0.05	0.05	0.02	0.05	0.05	0.05	0.06	0.05
Morro Bay	0.24	0.24	0.22	0.10	0.24	0.24	0.24	0.25	0.24
Santa Barbara	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Los Angeles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
San Diego	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	**1.52**	**1.52**	**1.25**	**0.61**	**1.52**	**1.52**	**1.52**	**2.07**	**1.52**

Impacts to Recreational Sectors

The impacts to recreational sectors are driven by the OYs for yelloweye rockfish, canary rockfish, and to a lesser extent, bocaccio and widow rockfish. The 2009-10 yelloweye rockfish OYs under the final Council-preferred alternative represent a decrease of 3 mt from No Action levels. Management measures designed so as not to exceed the yelloweye rockfish OY are also sufficient to keep recreational catch within harvest guidelines for other potentially constraining species, such as canary rockfish. Proposed Council-preferred management measures to achieve the reductions in the bycatch of yelloweye rockfish include restricting recreational fisheries to depths shallower than 20 fm in certain areas and/or during certain months and expanding closed areas to protect yelloweye rockfish.

Under the final Council-preferred alternative, the total number of recreational angler trips is expected to be slightly higher than under No Action, but with regional variations. The increase in angler trips occurs in Oregon, while angler effort in California is expected to decline by about 3 percent. Washington angler effort is expected to be the same as status quo (No Action) levels.

7.2.9 Additional Analysis of Management Measure Alternatives

7.2.9.1 *Commercial Fisheries Impacts*

This section provides additional detailed comparisons of impacts by commercial fisheries sectors and geographic regions. The following tables and graphs are included to assist comparison of impacts under the management measure alternatives:

Tables:

- 7-57a Commercial fisheries harvest projection by major sector grouping
- 7-57b Commercial fisheries exvessel revenue projections by major sector grouping
- 7-57c Commercial fisheries income impacts by major sector grouping
- 7-58a Income impacts by commercial fisheries sector
- 7-58b Income impacts for the nearshore open access sector
- 7-59a Income impacts by commercial fisheries sector and port area
- 7-59b Income impacts for the nearshore open access sector by port area
- 7-60a Change in fisheries income impacts by sector and port area
- 7-60b Change in fisheries income impacts for the nearshore open access sector by port area

Figures:

- 7-5 Income impacts by commercial fisheries sector
- 7-6 Income impacts for the nearshore open access sector
- 7-7 Commercial fisheries income impacts by port area
- 7-8 Income impacts for the nearshore open access sector by port area

Tables 7-57a, 7-57b and 7-57c show projected landings, exvessel revenue and income impacts, respectively, for various groupings of commercial fisheries sectors under the management alternatives, as well as the change for each of those groupings relative to No Action. Note that the Council-preferred alternative for the nearshore open access sector is assumed in all cases. It also should be noted that the item “Total west coast Landings (includes at-sea and tribal)” includes estimates for all west coast fisheries, including groundfish.

Tables 7-58a and 7-58b show projected income impacts for individual commercial fisheries sectors. (Table 7-58b shows projected income impacts under the nearshore open access sector alternatives).

Tables 7-59a and 7-59b show projected income impacts by port area for individual commercial fisheries sectors (Table 7-59b shows projected income impacts by port area under the nearshore open access sector alternatives).

Tables 7-60a and 7-60b show the change in projected income impacts by port area for individual commercial fisheries sectors relative to No Action (Table 7-60b shows change in projected income impacts by port area under the nearshore open access sector alternatives relative to No Action).

Table 7-57a. Exvessel revenue from shoreside landings and at-sea deliveries in Council-managed commercial fisheries in 2007 and projected annual exvessel revenue under the management alternatives.

Landings and Deliveries (million $)	2007	No Action	Reb. Alt 1_09aCP	Reb. Alt 1_09b	Reb. Alt 1_10CP	Reb. Alt 2	Reb. Alt 3	Reb. Alt 4	Reb. Alt 5a	Reb. Alt 5b	Final Council Pref.
Total West Coast Landings (including at-sea and tribal)	311.3	318.0	325.9	322.7	329.4	320.2	307.2	339.7	322.3	339.4	331.3
Non-Tribal Groundfish Landings (including at-sea)	74.2	80.9	86.1	82.9	89.8	80.3	67.3	99.9	82.4	99.5	92.2
Total LE Trawl Groundfish Landings (including at-sea)	58.3	65.0	64.5	61.3	69.6	58.8	45.8	78.4	60.9	78.0	70.6
Shoreside LE Trawl Groundfish Landings Including Whiting	37.0	41.3	37.7	36.3	42.7	38.8	29.1	48.4	40.9	48.0	45.2
Shoreside LE Trawl Groundfish Landings Excluding Whiting	24.2	24.4	18.6	18.6	23.6	24.6	17.3	27.1	26.7	26.7	27.2
LE Trawl Whiting Landings (shoreside and at-sea)	34.1	40.6	46.0	42.8	46.0	34.2	28.5	51.3	34.2	51.3	43.3
LE Fixed Gear Groundfish Landings	10.5	10.5	15.1	15.1	14.0	15.1	15.1	15.1	15.1	15.1	15.1
Open Access Groundfish Landings*	5.5	5.5	6.4	6.4	6.2	6.4	6.4	6.4	6.4	6.4	6.6
Tribal Groundfish Shoreside Landings (including whiting)	8.7	8.7	11.3	11.3	11.1	11.3	11.3	11.3	11.3	11.3	10.8
Tribal Groundfish At-Sea Landings (whiting)	2.5	2.5	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.5
Change compared to No Action (million $)											
Total West Coast Landings (including at-sea and tribal)			+7.9	+4.7	+11.4	+2.2	-10.8	+21.8	+4.3	+21.4	+13.3
Non-Tribal Groundfish Landings (including at-sea)			+5.1	+1.9	+8.9	-0.6	-13.6	+19.0	+1.5	+18.6	+11.3
Total LE Trawl Groundfish Landings (including at-sea)			-0.5	-3.7	+4.6	-6.2	-19.2	+13.4	-4.1	+13.0	+5.6
Shoreside LE Trawl Groundfish Landings Including Whiting			-3.6	-4.9	+1.5	-2.4	-12.1	+7.1	-0.4	+6.8	+4.0
Shoreside LE Trawl Groundfish Landings Excluding Whiting			-5.8	-5.8	-0.8	+0.2	-7.1	+2.7	+2.3	+2.3	+2.8
LE Trawl Whiting Landings (shoreside and at-sea)			+5.4	+2.1	+5.4	-6.4	-12.1	+10.7	-6.4	+10.7	+2.7
LE Fixed Gear Groundfish Landings			+4.6	+4.6	+3.5	+4.6	+4.6	+4.6	+4.6	+4.6	+4.6
Open Access Groundfish Landings*			+1.0	+1.0	+0.8	+1.0	+1.0	+1.0	+1.0	+1.0	+1.1
Tribal Groundfish Shoreside Landings (including whiting)			+2.6	+2.6	+2.4	+2.6	+2.6	+2.6	+2.6	+2.6	+2.1
Tribal Groundfish At-Sea Landings (whiting)			+0.2	+0.2	+0.2	+0.2	+0.2	+0.2	+0.2	+0.2	-0.1
Change compared to No Action (percent)											
Total West Coast Landings (including at-sea and tribal)			+2.5%	+1.5%	+3.6%	+0.7%	-3.4%	+6.8%	+1.4%	+6.7%	+4.2%
Non-Tribal Groundfish Landings (including at-sea)			+6.3%	+2.4%	+11.0%	-0.7%	-16.8%	+23.4%	+1.8%	+23.0%	+14.0%
Total LE Trawl Groundfish Landings (including at-sea)			-0.7%	-5.7%	+7.1%	-9.6%	-29.6%	+20.6%	-6.3%	+20.0%	+8.6%
Shoreside LE Trawl Groundfish Landings Including Whiting			-8.8%	-12.0%	+3.6%	-5.9%	-29.4%	+17.2%	-0.9%	+16.4%	+9.6%
Shoreside LE Trawl Groundfish Landings Excluding Whiting			-23.9%	-23.9%	-3.1%	+1.0%	-29.1%	+10.9%	+9.5%	+9.5%	+11.6%
LE Trawl Whiting Landings (shoreside and at-sea)			+13.2%	+5.3%	+13.2%	-15.9%	-29.9%	+26.3%	-15.9%	+26.3%	+6.7%
LE Fixed Gear Groundfish Landings			+44.2%	+44.2%	+33.7%	+44.2%	+44.2%	+44.2%	+44.2%	+44.2%	+44.2%
Open Access Groundfish Landings*			+18.2%	+18.2%	+13.9%	+18.2%	+18.2%	+18.2%	+18.2%	+18.2%	+20.7%
Tribal Groundfish Shoreside Landings (including whiting)			+30.2%	+30.2%	+27.1%	+30.2%	+30.2%	+30.2%	+30.2%	+30.2%	+24.0%
Tribal Groundfish At-Sea Landings (whiting)			+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	-3.1%

* Assumes the Council preferred Nearshore OA alternative (OA NS Alt 5) in each case.

Table 7-57b. Shoreside landings and at-sea deliveries in Council-managed commercial fisheries in 2007 and projected landings under the management alternatives.

Landings and Deliveries (thousand metric tons)	2007	No Action	Reb. Alt 1_09aCP	Reb. Alt 1_09b	Reb. Alt 1_10CP	Reb. Alt 2	Reb. Alt 3	Reb. Alt 4	Reb. Alt 5a	Reb. Alt 5b	Final Council Pref.
Total West Coast Landings (including at-sea and tribal)	502.1	539.4	592.4	574.0	596.9	529.9	490.7	631.4	532.5	630.6	580.5
Non-Tribal Groundfish Landings (including at-sea)	219.4	256.8	283.3	264.9	287.9	220.8	181.6	322.3	223.4	321.6	276.6
Total LE Trawl Groundfish Landings (including at-sea)	216.0	253.4	278.7	260.3	283.6	216.2	177.0	317.7	218.8	316.9	271.9
Shoreside LE Trawl Groundfish Landings Including Whiting	94.8	118.4	125.8	118.1	130.7	102.6	82.3	147.2	105.2	146.4	127.8
Shoreside LE Trawl Groundfish Landings Excluding Whiting	21.1	20.8	15.4	15.4	20.3	20.5	14.0	23.9	23.1	23.1	23.7
LE Trawl Whiting Landings (shoreside and at-sea)	194.9	232.6	263.3	244.9	263.3	195.7	163.1	293.8	195.7	293.8	248.3
LE Fixed Gear Groundfish Landings	2.3	2.3	3.3	3.3	3.1	3.3	3.3	3.3	3.3	3.3	3.3
Open Access Groundfish Landings*	1.1	1.1	1.3	1.3	1.2	1.3	1.3	1.3	1.3	1.3	1.3
Tribal Groundfish Shoreside Landings (including whiting)	22.5	22.5	41.4	41.4	41.3	41.4	41.4	41.4	41.4	41.4	37.8
Tribal Groundfish At-Sea Landings (whiting)	9.2	9.2	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	15.2
Change compared to No Action (thousand metric tons)											
Total West Coast Landings (including at-sea and tribal)			+52.9	+34.5	+57.5	-9.5	-48.7	+92.0	-6.9	+91.2	+41.1
Non-Tribal Groundfish Landings (including at-sea)			+26.5	+8.1	+31.1	-36.0	-75.2	+65.5	-33.4	+64.8	+19.8
Total LE Trawl Groundfish Landings (including at-sea)			+25.3	+6.9	+30.2	-37.2	-76.4	+64.3	-34.6	+63.6	+18.5
Shoreside LE Trawl Groundfish Landings Including Whiting			+7.4	-0.3	+12.3	-15.8	-36.1	+28.8	-13.2	+28.0	+9.4
Shoreside LE Trawl Groundfish Landings Excluding Whiting			-5.4	-5.4	-0.5	-0.3	-6.9	+3.1	+2.3	+2.3	+2.8
LE Trawl Whiting Landings (shoreside and at-sea)			+30.7	+12.3	+30.7	-36.9	-69.5	+61.2	-36.9	+61.2	+15.7
LE Fixed Gear Groundfish Landings			+1.0	+1.0	+0.7	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0
Open Access Groundfish Landings*			+0.2	+0.2	+0.2	+0.2	+0.2	+0.2	+0.2	+0.2	+0.3
Tribal Groundfish Shoreside Landings (including whiting)			+18.9	+18.9	+18.8	+18.9	+18.9	+18.9	+18.9	+18.9	+15.3
Tribal Groundfish At-Sea Landings (whiting)			+7.6	+7.6	+7.6	+7.6	+7.6	+7.6	+7.6	+7.6	+6.0
Change compared to No Action (percent)											
Total West Coast Landings (including at-sea and tribal)			+9.8%	+6.4%	+10.7%	-1.8%	-9.0%	+17.1%	-1.3%	+16.9%	+7.6%
Non-Tribal Groundfish Landings (including at-sea)			+10.3%	+3.1%	+12.1%	-14.0%	-29.3%	+25.5%	-13.0%	+25.2%	+7.7%
Total LE Trawl Groundfish Landings (including at-sea)			+10.0%	+2.7%	+11.9%	-14.7%	-30.1%	+25.4%	-13.7%	+25.1%	+7.3%
Shoreside LE Trawl Groundfish Landings Including Whiting			+6.3%	-0.2%	+10.4%	-13.4%	-30.5%	+24.3%	-11.2%	+23.7%	+8.0%
Shoreside LE Trawl Groundfish Landings Excluding Whiting			-26.1%	-26.0%	-2.5%	-1.4%	-32.9%	+14.8%	+11.1%	+11.1%	+13.6%
LE Trawl Whiting Landings (shoreside and at-sea)			+13.2%	+5.3%	+13.2%	-15.9%	-29.9%	+26.3%	-15.9%	+26.3%	+6.7%
LE Fixed Gear Groundfish Landings			+41.0%	+41.0%	+31.3%	+41.0%	+41.0%	+41.0%	+41.0%	+41.0%	+41.0%
Open Access Groundfish Landings*			+22.7%	+22.7%	+17.1%	+22.7%	+22.7%	+22.7%	+22.7%	+22.7%	+24.0%
Tribal Groundfish Shoreside Landings (including whiting)			+83.7%	+83.7%	+83.4%	+83.7%	+83.7%	+83.7%	+83.7%	+83.7%	+67.7%
Tribal Groundfish At-Sea Landings (whiting)			+82.8%	+82.8%	+82.8%	+82.8%	+82.8%	+82.8%	+82.8%	+82.8%	+65.7%

* Assumes the Council preferred Nearshore OA alternative (OA NS Alt 5) in each case.

Table 7-57c. Estimated income impacts from shoreside landings and at-sea deliveries in Council-managed commercial fisheries in 2007 and projected annual income impacts under the management alternatives. (Income impacts are a measure of total harvesting, processing, and support activities connected with Council-managed ocean area commercial fisheries.)

Landings and Deliveries (million $)	2007	No Action	Reb. Alt 1_09aCP	Reb. Alt 1_09b	Reb. Alt 1_10CP	Reb. Alt 2	Reb. Alt 3	Reb. Alt 4	Reb. Alt 5a	Reb. Alt 5b	Final Council Pref.
Total West Coast Landings (including at-sea and tribal)	677.8	695.4	710.5	702.8	717.6	692.8	666.8	738.7	696.6	737.9	717.5
Non-Tribal Groundfish Landings (including at-sea)	144.5	162.2	172.0	164.3	179.4	154.3	128.3	200.2	158.1	199.4	181.5
Total LE Trawl Groundfish Landings (including at-sea)	122.6	140.3	142.4	134.7	151.6	124.7	98.6	170.5	128.5	169.8	151.7
Shoreside LE Trawl Groundfish Landings Including Whiting	79.9	92.7	88.5	84.6	97.8	84.7	65.3	110.4	88.5	109.7	100.9
Shoreside LE Trawl Groundfish Landings Excluding Whiting	42.0	42.5	31.7	31.8	41.0	42.5	30.1	47.1	46.3	46.3	47.3
LE Trawl Whiting Landings (shoreside and at-sea)	80.6	97.7	110.6	102.9	110.6	82.2	68.5	123.5	82.2	123.5	104.3
LE Fixed Gear Groundfish Landings	14.5	14.5	20.9	20.9	19.4	20.9	20.9	20.9	20.9	20.9	20.9
Open Access Groundfish Landings*	7.3	7.3	8.7	8.7	8.4	8.7	8.7	8.7	8.7	8.7	8.9
Tribal Groundfish Shoreside Landings (including whiting)	24.7	24.7	29.6	29.6	29.3	29.6	29.6	29.6	29.6	29.6	27.6
Tribal Groundfish At-Sea Landings (whiting)	5.1	5.1	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	4.9
Change compared to No Action (million $)											
Total West Coast Landings (including at-sea and tribal)			+15.0	+7.3	+22.2	-2.6	-28.7	+43.2	+1.2	+42.4	+22.0
Non-Tribal Groundfish Landings (including at-sea)			+9.8	+2.1	+17.3	-7.9	-33.9	+38.0	-4.0	+37.2	+19.3
Total LE Trawl Groundfish Landings (including at-sea)			+2.1	-5.6	+11.4	-15.6	-41.6	+30.3	-11.8	+29.5	+11.4
Shoreside LE Trawl Groundfish Landings Including Whiting			-4.2	-8.1	+5.1	-8.0	-27.4	+17.7	-4.2	+17.0	+8.2
Shoreside LE Trawl Groundfish Landings Excluding Whiting			-10.8	-10.8	-1.5	-0.1	-12.4	+4.5	+3.8	+3.8	+4.8
LE Trawl Whiting Landings (shoreside and at-sea)			+12.9	+5.2	+12.9	-15.5	-29.2	+25.7	-15.5	+25.7	+6.6
LE Fixed Gear Groundfish Landings			+6.3	+6.3	+4.8	+6.3	+6.3	+6.3	+6.3	+6.3	+6.3
Open Access Groundfish Landings*			+1.4	+1.4	+1.1	+1.4	+1.4	+1.4	+1.4	+1.4	+1.6
Tribal Groundfish Shoreside Landings (including whiting)			+4.9	+4.9	+4.5	+4.9	+4.9	+4.9	+4.9	+4.9	+2.9
Tribal Groundfish At-Sea Landings (whiting)			+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	-0.2
Change compared to No Action (percent)											
Total West Coast Landings (including at-sea and tribal)			+2.2%	+1.1%	+3.2%	-0.4%	-4.1%	+6.2%	+0.2%	+6.1%	+3.2%
Non-Tribal Groundfish Landings (including at-sea)			+6.1%	+1.3%	+10.6%	-4.8%	-20.9%	+23.4%	-2.5%	+22.9%	+11.9%
Total LE Trawl Groundfish Landings (including at-sea)			+1.5%	-4.0%	+8.1%	-11.1%	-29.7%	+21.6%	-8.4%	+21.0%	+8.1%
Shoreside LE Trawl Groundfish Landings Including Whiting			-4.5%	-8.8%	+5.5%	-8.7%	-29.6%	+19.1%	-4.5%	+18.3%	+8.8%
Shoreside LE Trawl Groundfish Landings Excluding Whiting			-25.4%	-25.3%	-3.6%	-0.1%	-29.2%	+10.7%	+8.8%	+8.8%	+11.3%
LE Trawl Whiting Landings (shoreside and at-sea)			+13.2%	+5.3%	+13.2%	-15.9%	-29.9%	+26.3%	-15.9%	+26.3%	+6.7%
LE Fixed Gear Groundfish Landings			+43.5%	+43.5%	+33.2%	+43.5%	+43.5%	+43.5%	+43.5%	+43.5%	+43.5%
Open Access Groundfish Landings*			+18.9%	+18.9%	+14.4%	+18.9%	+18.9%	+18.9%	+18.9%	+18.9%	+21.4%
Tribal Groundfish Shoreside Landings (including whiting)			+19.7%	+19.7%	+18.3%	+19.7%	+19.7%	+19.7%	+19.7%	+19.7%	+11.6%
Tribal Groundfish At-Sea Landings (whiting)			+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	-3.1%

* Assumes the Council preferred Nearshore OA alternative (OA NS Alt 5) in each case.

Table 7-58a. Income impacts from commercial fishing activities by directed groundfish sector (excluding nearshore open access) in 2007 and under the management alternatives ($ million). (Income impacts are a measure of total harvesting, processing, and support activities connected with Council-managed ocean area commercial fisheries.)

Directed Groundfish Sector	2007	No Action	Reb. Alt 1_09aCP	Reb. Alt 1_09b	Reb. Alt 1_10CP	Reb. Alt 2	Reb. Alt 3	Reb. Alt 4	Reb. Alt 5a	Reb. Alt 5b	Final Council Pref.
		Income impacts for directed groundfish sectors except nearshore open access									
Whiting C-P	26	28	32	29	32	23	20	35	23	35	30
CV-Mothership	17	20	22	21	22	17	14	25	17	25	21
Shoreside Whiting	38	51	57	53	57	43	35	64	43	64	54
Non-whiting Trawl	42	42	31	31	41	42	30	47	46	46	47
Limited Entry Fixed Gear	15	15	21	21	19	21	21	21	21	21	21
Open Access Fixed Gear	5	5	7	7	6	7	7	7	7	7	7
Shoreside Treaty Groundfish	25	25	30	30	29	30	30	30	30	30	28
At-sea Treaty whiting	5	5	5	5	5	5	5	5	5	5	5
	172	190	205	197	212	187	161	233	191	232	212
		Change from No Action									
Whiting C-P		*28*	+3.7	+1.5	+3.7	-4.4	-8.3	+7.3	-4.4	+7.3	+1.9
CV-Mothership		*20*	+2.6	+1.0	+2.6	-3.1	-5.9	+5.2	-3.1	+5.2	+1.3
Shoreside Whiting		*51*	+6.5	+2.5	+6.6	-8.0	-15.1	+13.2	-8.0	+13.2	+3.4
Non-whiting Trawl		*42*	-10.7	-10.7	-1.5	-0.0	-12.3	+4.5	+3.7	+3.7	+4.8
Limited Entry Fixed Gear		*15*	+6.3	+6.3	+4.8	+6.3	+6.3	+6.3	+6.3	+6.3	+6.3
Open Access Fixed Gear		*5*	+1.4	+1.4	+1.1	+1.4	+1.4	+1.4	+1.4	+1.4	+1.6
Shoreside Treaty Groundfish		*25*	+4.9	+4.9	+4.5	+4.9	+4.9	+4.9	+4.9	+4.9	+2.9
At-sea Treaty whiting		*5*	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	-0.2
		190	+15.0	+7.3	+22.2	-2.6	-28.7	+43.2	+1.2	+42.4	+22.0

Table 7-58b. Income impacts from commercial fishing activities by nearshore open access sector in 2007 and under the management alternatives ($ million). (Income impacts are a measure of total harvesting, processing, and support activities connected with Council-managed ocean area commercial fisheries.)

	2007	No Action	OA NS Alt 1	OA NS Alt 2	OA NS Alt 3	OA NS Alt 4	OA NS Alt 5	OA NS Alt 6	Final Council Pref.
Open Access Fixed Gear	1.88	1.88	1.56	0.76	1.88	1.88	1.88	2.49	1.88
		Change from No Action							
			-0.32	-1.12	+0.00	+0.00	+0.00	+0.61	+0.00

Table 7-59a. Income impacts from commercial fishing activities by port area and directed groundfish sector (excluding nearshore open access) in 2007 and under the management alternatives ($ million). (Income impacts are a measure of total harvesting, processing, and support activities connected with Council-managed ocean area commercial fisheries.)

		Estimated Income Impacts for Groundfish Sectors from all Groundfish Species by Port Area Under the 2009-10 GF Spex Alternatives (Million $)										
		LE Trawl non-whiting, LE Trawl whiting, LE Fixed Gear, Open Access (except nearshore) and Treaty Sectors										
Groundfish Sector	Port Area	2,007	No Action	Reb. Alt 1_09aCP	Reb. Alt 1_09b	Reb. Alt 1_10CP	Reb. Alt 2	Reb. Alt 3	Reb. Alt 4	Reb. Alt 5a	Reb. Alt 5b	Final Council Pref.
Whiting C-P		25.83	27.87	31.56	29.35	31.56	23.45	19.54	35.22	23.45	35.22	29.76
CV-Mothership		16.87	19.69	22.29	20.73	22.29	16.57	13.81	24.88	16.57	24.88	21.02
Shoreside Whiting	South and Central Washington Coast	17.15	22.67	25.61	23.83	25.62	19.07	15.90	28.59	19.09	28.59	24.18
	Astoria	9.24	12.19	13.75	12.80	13.77	10.27	8.55	15.36	10.28	15.36	13.01
	Newport	9.26	12.23	13.79	12.83	13.83	10.31	8.55	15.44	10.32	15.43	13.06
	Coos Bay	1.10	1.46	1.65	1.53	1.65	1.23	1.02	1.84	1.23	1.84	1.55
	Crescent City	0.43	0.57	0.65	0.60	0.65	0.48	0.40	0.72	0.48	0.72	0.61
	Eureka	1.13	1.49	1.68	1.56	1.68	1.26	1.04	1.88	1.26	1.88	1.59
	Morro Bay	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-whiting Trawl	Northern Puget Sound	1.67	1.62	1.39	1.39	1.53	1.79	0.99	1.93	1.93	1.93	1.92
	North Washington Coast	0.20	0.20	0.19	0.19	0.20	0.04	0.03	0.20	0.20	0.20	0.20
	South and Central Washington Coast	0.90	0.90	0.81	0.82	0.82	0.72	0.57	0.95	0.94	0.94	0.96
	Astoria	11.02	11.13	8.75	8.76	10.34	10.66	6.51	12.42	12.28	12.28	12.55
	Tillamook	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02
	Newport	4.06	4.20	2.86	2.87	4.00	4.37	2.56	4.66	4.58	4.58	4.70
	Coos Bay	6.90	6.76	4.99	4.99	6.65	7.31	4.22	7.76	7.68	7.68	7.77
	Brookings	1.82	1.76	1.22	1.22	1.72	1.84	1.04	2.06	1.99	1.99	2.01
	Crescent City	1.43	1.41	1.05	1.05	1.36	1.38	0.88	1.61	1.55	1.55	1.55
	Eureka	6.28	6.19	4.60	4.60	6.04	6.52	4.08	6.92	6.78	6.78	6.89
	Fort Bragg	3.58	3.93	2.51	2.51	3.95	3.68	4.79	4.02	3.90	3.90	4.19
	Bodega Bay	0.08	0.08	0.07	0.07	0.08	0.07	0.07	0.09	0.09	0.09	0.08
	San Francisco	2.63	2.75	2.11	2.11	2.76	2.65	2.84	2.83	2.78	2.78	2.88
	Monterey	0.98	1.06	0.77	0.77	1.05	0.95	1.15	1.07	1.06	1.06	1.10
	Morro Bay	0.07	0.09	0.05	0.05	0.07	0.06	0.10	0.07	0.07	0.07	0.08
Limited Entry Fixed Gear	Northern Puget Sound	2.66	2.66	3.40	3.40	3.15	3.40	3.40	3.40	3.40	3.40	3.40
	Southern Puget Sound	0.08	0.08	0.11	0.11	0.10	0.11	0.11	0.11	0.11	0.11	0.11
	North Washington Coast	1.07	1.07	1.40	1.40	1.29	1.40	1.40	1.40	1.40	1.40	1.40
	South and Central Washington Coast	1.09	1.09	1.43	1.43	1.31	1.43	1.43	1.43	1.43	1.43	1.43
	Astoria	0.70	0.70	0.92	0.92	0.84	0.92	0.92	0.92	0.92	0.92	0.92
	Tillamook	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Newport	2.07	2.07	2.74	2.74	2.51	2.74	2.74	2.74	2.74	2.74	2.74
	Coos Bay	1.29	1.29	1.70	1.70	1.56	1.70	1.70	1.70	1.70	1.70	1.70
	Brookings	0.83	0.83	1.06	1.06	0.98	1.06	1.06	1.06	1.06	1.06	1.06
	Crescent City	0.32	0.32	0.40	0.40	0.37	0.40	0.40	0.40	0.40	0.40	0.40
	Eureka	0.57	0.57	0.76	0.76	0.69	0.76	0.76	0.76	0.76	0.76	0.76
	Fort Bragg	0.60	0.60	0.79	0.79	0.72	0.79	0.79	0.79	0.79	0.79	0.79
	Bodega Bay	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
	San Francisco	0.24	0.24	0.31	0.31	0.28	0.31	0.31	0.31	0.31	0.31	0.31
	Monterey	0.79	0.79	0.96	0.96	0.90	0.96	0.96	0.96	0.96	0.96	0.96
	Morro Bay	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
	Santa Barbara	0.40	0.40	0.63	0.63	0.60	0.63	0.63	0.63	0.63	0.63	0.63
	Los Angeles	1.24	1.24	2.87	2.87	2.72	2.87	2.87	2.87	2.87	2.87	2.87
	San Diego	0.51	0.51	1.31	1.31	1.23	1.31	1.31	1.31	1.31	1.31	1.31
Open Access Fixed Gear	Northern Puget Sound	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Southern Puget Sound	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	North Washington Coast	0.18	0.18	0.23	0.23	0.22	0.23	0.23	0.23	0.23	0.23	0.23
	South and Central Washington Coast	0.22	0.22	0.28	0.28	0.26	0.28	0.28	0.28	0.28	0.28	0.28
	Astoria	0.10	0.10	0.13	0.13	0.12	0.13	0.13	0.13	0.13	0.13	0.13
	Tillamook	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03
	Newport	0.06	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
	Coos Bay	0.21	0.21	0.28	0.28	0.25	0.28	0.28	0.28	0.28	0.28	0.28
	Brookings	0.58	0.58	0.68	0.68	0.64	0.68	0.68	0.68	0.68	0.68	0.71
	Crescent City	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.23
	Eureka	0.19	0.19	0.25	0.25	0.23	0.25	0.25	0.25	0.25	0.25	0.24
	Fort Bragg	0.62	0.62	0.77	0.77	0.71	0.77	0.77	0.77	0.77	0.77	0.79
	Bodega Bay	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	San Francisco	0.34	0.34	0.37	0.37	0.36	0.37	0.37	0.37	0.37	0.37	0.37
	Monterey	0.45	0.45	0.53	0.53	0.50	0.53	0.53	0.53	0.53	0.53	0.54
	Morro Bay	1.50	1.50	1.63	1.63	1.59	1.63	1.63	1.63	1.63	1.63	1.74
	Santa Barbara	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
	Los Angeles	0.16	0.16	0.51	0.51	0.48	0.51	0.51	0.51	0.51	0.51	0.51
	San Diego	0.10	0.10	0.33	0.33	0.31	0.33	0.33	0.33	0.33	0.33	0.33
Shoreside Treaty Groundfish	Northern Puget Sound	0.02	0.02	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	North Washington Coast	3.80	3.80	6.39	6.39	6.12	6.39	6.39	6.39	6.39	6.39	6.39
	South and Central Washington Coast	20.21	20.21	22.24	22.24	22.24	22.24	22.24	22.24	22.24	22.24	20.23
	Unidentified Washington	0.71	0.71	0.95	0.95	0.87	0.95	0.95	0.95	0.95	0.95	0.95
At-sea Treaty whiting		5.10	5.10	5.46	5.46	5.46	5.46	5.46	5.46	5.46	5.46	4.95
TOTAL		**172.40**	**190.03**	**205.08**	**197.37**	**212.18**	**187.41**	**161.36**	**233.26**	**191.23**	**232.48**	**212.07**

Table 7-59b. Income impacts from commercial fishing activities by port area for the nearshore open access sector in 2007 and under the management alternatives ($ million). (Income impacts are a measure of total harvesting, processing, and support activities connected with Council-managed ocean area commercial fisheries.)

			Nearshore Open Access Sector Alternatives						
Port Area	2007	No Action	OA NS Alt 1	OA NS Alt 2	OA NS Alt 3	OA NS Alt 4	OA NS Alt 5	OA NS Alt 6	Final Council Pref.
Northern Puget Sound	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Southern Puget Sound	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
North Washington Coast	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01
South and Central Washington Coast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Astoria	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tillamook	0.18	0.18	0.14	0.07	0.18	0.18	0.18	0.25	0.18
Newport	0.06	0.06	0.05	0.03	0.06	0.06	0.06	0.07	0.06
Coos Bay	0.04	0.04	0.03	0.02	0.04	0.04	0.04	0.05	0.04
Brookings	0.57	0.57	0.46	0.23	0.57	0.57	0.57	0.81	0.57
Crescent City	0.39	0.39	0.31	0.15	0.39	0.39	0.39	0.60	0.39
Eureka	0.07	0.07	0.05	0.03	0.07	0.07	0.07	0.10	0.07
Fort Bragg	0.08	0.08	0.08	0.03	0.08	0.08	0.08	0.09	0.08
Bodega Bay	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01
San Francisco	0.05	0.05	0.03	0.02	0.05	0.05	0.05	0.06	0.05
Monterey	0.06	0.06	0.06	0.03	0.06	0.06	0.06	0.06	0.06
Morro Bay	0.34	0.34	0.32	0.14	0.34	0.34	0.34	0.36	0.34
Santa Barbara	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Los Angeles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
San Diego	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	**1.88**	**1.88**	**1.56**	**0.76**	**1.88**	**1.88**	**1.88**	**2.49**	**1.88**

Table 7-60a. Change from No Action in projected income impacts from commercial fishing activities by directed groundfish sector (excluding nearshore open access) and port area under the management alternatives ($ million). (Income impacts are a measure of total harvesting, processing, and support activities connected with Council-managed ocean area commercial fisheries.)

Estimated Income Impacts for Groundfish Sectors from all Groundfish Species by Port Area Under the 2009-10 GF Spex Alternatives: Change from No Action (Million $)

LE Trawl non-whiting, LE Trawl whiting, LE Fixed Gear, Open Access (except nearshore) and Treaty Sectors Alternatives

Groundfish Sector	Port Area	2007 *No Action*	Reb. Alt 1_09aCP	Reb. Alt 1_09b	Reb. Alt 1_10CP	Reb. Alt 2	Reb. Alt 3	Reb. Alt 4	Reb. Alt 5a	Reb. Alt 5b	Final Council Pref.
Whiting C-P		*27.87*	+3.68	+1.48	+3.68	-4.42	-8.33	+7.34	-4.42	+7.34	+1.88
CV-Mothership		*19.69*	+2.60	+1.04	+2.60	-3.12	-5.88	+5.19	-3.12	+5.19	+1.33
Shoreside Whiting	South and Central Washington Coast	*22.67*	+2.95	+1.16	+2.95	-3.60	-6.77	+5.93	-3.58	+5.93	+1.51
	Astoria	*12.19*	+1.56	+0.60	+1.58	-1.92	-3.64	+3.17	-1.91	+3.17	+0.81
	Newport	*12.23*	+1.56	+0.60	+1.59	-1.92	-3.68	+3.20	-1.92	+3.20	+0.83
	Coos Bay	*1.46*	+0.19	+0.08	+0.19	-0.23	-0.44	+0.38	-0.23	+0.38	+0.10
	Crescent City	*0.57*	+0.07	+0.03	+0.07	-0.09	-0.17	+0.15	-0.09	+0.15	+0.04
	Eureka	*1.49*	+0.19	+0.07	+0.19	-0.23	-0.45	+0.39	-0.23	+0.39	+0.10
	Morro Bay	*0.00*	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	+0.00
Non-whiting Trawl	Northern Puget Sound	*1.62*	-0.23	-0.23	-0.09	+0.17	-0.64	+0.31	+0.31	+0.31	+0.30
	North Washington Coast	*0.20*	-0.01	-0.01	-0.00	-0.16	-0.17	+0.00	+0.00	+0.00	+0.00
	South and Central Washington Coast	*0.90*	-0.09	-0.09	-0.08	-0.18	-0.33	+0.05	+0.04	+0.04	+0.06
	Astoria	*11.13*	-2.38	-2.37	-0.79	-0.48	-4.62	+1.29	+1.15	+1.15	+1.42
	Tillamook	*0.02*	-0.00	-0.00	-0.00	-0.01	-0.01	+0.00	+0.00	+0.00	+0.00
	Newport	*4.20*	-1.33	-1.33	-0.19	+0.18	-1.64	+0.46	+0.39	+0.39	+0.50
	Coos Bay	*6.76*	-1.77	-1.77	-0.11	+0.55	-2.54	+1.00	+0.92	+0.92	+1.01
	Brookings	*1.76*	-0.54	-0.54	-0.04	+0.08	-0.72	+0.29	+0.23	+0.23	+0.25
	Crescent City	*1.41*	-0.35	-0.35	-0.04	-0.02	-0.53	+0.20	+0.14	+0.14	+0.15
	Eureka	*6.19*	-1.59	-1.59	-0.16	+0.33	-2.11	+0.73	+0.59	+0.59	+0.70
	Fort Bragg	*3.93*	-1.42	-1.42	+0.02	-0.25	+0.87	+0.10	-0.03	-0.03	+0.26
	Bodega Bay	*0.08*	-0.01	-0.01	+0.00	-0.01	-0.01	+0.00	+0.00	+0.00	+0.00
	San Francisco	*2.75*	-0.64	-0.64	+0.01	-0.10	+0.10	+0.09	+0.03	+0.03	+0.13
	Monterey	*1.06*	-0.30	-0.30	-0.01	-0.11	+0.09	+0.01	-0.01	-0.01	+0.04
	Morro Bay	*0.09*	-0.04	-0.04	-0.02	-0.03	+0.01	-0.02	-0.02	-0.02	-0.01
Limited Entry Fixed Gear	Northern Puget Sound	*2.66*	+0.75	+0.75	+0.49	+0.75	+0.75	+0.75	+0.75	+0.75	+0.75
	Southern Puget Sound	*0.08*	+0.03	+0.03	+0.02	+0.03	+0.03	+0.03	+0.03	+0.03	+0.03
	North Washington Coast	*1.07*	+0.33	+0.33	+0.22	+0.33	+0.33	+0.33	+0.33	+0.33	+0.33
	South and Central Washington Coast	*1.09*	+0.34	+0.34	+0.23	+0.34	+0.34	+0.34	+0.34	+0.34	+0.34
	Astoria	*0.70*	+0.22	+0.22	+0.15	+0.22	+0.22	+0.22	+0.22	+0.22	+0.22
	Tillamook	*0.00*	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00
	Newport	*2.07*	+0.67	+0.67	+0.44	+0.67	+0.67	+0.67	+0.67	+0.67	+0.67
	Coos Bay	*1.29*	+0.41	+0.41	+0.27	+0.41	+0.41	+0.41	+0.41	+0.41	+0.41
	Brookings	*0.83*	+0.23	+0.23	+0.15	+0.23	+0.23	+0.23	+0.23	+0.23	+0.23
	Crescent City	*0.32*	+0.08	+0.08	+0.05	+0.08	+0.08	+0.08	+0.08	+0.08	+0.08
	Eureka	*0.57*	+0.18	+0.18	+0.12	+0.18	+0.18	+0.18	+0.18	+0.18	+0.18
	Fort Bragg	*0.60*	+0.18	+0.18	+0.12	+0.18	+0.18	+0.18	+0.18	+0.18	+0.18
	Bodega Bay	*0.03*	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00
	San Francisco	*0.24*	+0.07	+0.07	+0.05	+0.07	+0.07	+0.07	+0.07	+0.07	+0.07
	Monterey	*0.79*	+0.18	+0.18	+0.12	+0.18	+0.18	+0.18	+0.18	+0.18	+0.18
	Morro Bay	*0.06*	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01
	Santa Barbara	*0.40*	+0.23	+0.23	+0.21	+0.23	+0.23	+0.23	+0.23	+0.23	+0.23
	Los Angeles	*1.24*	+1.64	+1.64	+1.48	+1.64	+1.64	+1.64	+1.64	+1.64	+1.64
	San Diego	*0.51*	+0.80	+0.80	+0.72	+0.80	+0.80	+0.80	+0.80	+0.80	+0.80
Open Access Fixed Gear	Northern Puget Sound	*0.01*	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00
	Southern Puget Sound	*0.01*	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00
	North Washington Coast	*0.18*	+0.06	+0.06	+0.04	+0.06	+0.06	+0.06	+0.06	+0.06	+0.06
	South and Central Washington Coast	*0.22*	+0.07	+0.07	+0.05	+0.07	+0.07	+0.07	+0.07	+0.07	+0.07
	Astoria	*0.10*	+0.03	+0.03	+0.02	+0.03	+0.03	+0.03	+0.03	+0.03	+0.03
	Tillamook	*0.02*	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.02
	Newport	*0.06*	+0.02	+0.02	+0.01	+0.02	+0.02	+0.02	+0.02	+0.02	+0.02
	Coos Bay	*0.21*	+0.07	+0.07	+0.04	+0.07	+0.07	+0.07	+0.07	+0.07	+0.07
	Brookings	*0.58*	+0.10	+0.10	+0.07	+0.10	+0.10	+0.10	+0.10	+0.10	+0.13
	Crescent City	*0.25*	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	-0.01
	Eureka	*0.19*	+0.06	+0.06	+0.04	+0.06	+0.06	+0.06	+0.06	+0.06	+0.06
	Fort Bragg	*0.62*	+0.15	+0.15	+0.10	+0.15	+0.15	+0.15	+0.15	+0.15	+0.18
	Bodega Bay	*0.05*	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.01
	San Francisco	*0.34*	+0.03	+0.03	+0.02	+0.03	+0.03	+0.03	+0.03	+0.03	+0.03
	Monterey	*0.45*	+0.08	+0.08	+0.05	+0.08	+0.08	+0.08	+0.08	+0.08	+0.09
	Morro Bay	*1.50*	+0.13	+0.13	+0.09	+0.13	+0.13	+0.13	+0.13	+0.13	+0.24
	Santa Barbara	*0.35*	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01
	Los Angeles	*0.16*	+0.35	+0.35	+0.31	+0.35	+0.35	+0.35	+0.35	+0.35	+0.35
	San Diego	*0.10*	+0.23	+0.23	+0.21	+0.23	+0.23	+0.23	+0.23	+0.23	+0.23
Shoreside Treaty Groundfish	Northern Puget Sound	*0.02*	+0.02	+0.02	+0.02	+0.02	+0.02	+0.02	+0.02	+0.02	+0.02
	North Washington Coast	*3.80*	+2.59	+2.59	+2.32	+2.59	+2.59	+2.59	+2.59	+2.59	+2.59
	South and Central Washington Coast	*20.21*	+2.02	+2.02	+2.02	+2.02	+2.02	+2.02	+2.02	+2.02	+0.02
	Unidentified Washington	*0.71*	+0.24	+0.24	+0.16	+0.24	+0.24	+0.24	+0.24	+0.24	+0.24
At-sea Treaty whiting		*5.10*	+0.35	+0.35	+0.35	+0.35	+0.35	+0.35	+0.35	+0.35	-0.16
	TOTAL	***190.03***	**+15.05**	**+7.33**	**+22.15**	**-2.63**	**-28.68**	**+43.22**	**+1.19**	**+42.44**	**+22.04**

Table 7-60b. Change from No Action in projected income impacts from commercial fishing activities for the nearshore open access sector by port area under the management alternatives ($ million). (Income impacts are a measure of total harvesting, processing, and support activities connected with Council-managed ocean area commercial fisheries.)

		Nearshore Open Access Sector Alternatives						
Port Area	*No Action*	**OA NS Alt 1**	**OA NS Alt 2**	**OA NS Alt 3**	**OA NS Alt 4**	**OA NS Alt 5**	**OA NS Alt 6**	**Final Council Pref.**
Northern Puget Sound	*0.00*	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00
Southern Puget Sound	*0.00*	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00
North Washington Coast	*0.01*	-0.00	-0.00	+0.00	+0.00	+0.00	+0.00	+0.00
South and Central Washington Coast	*0.00*	-0.00	-0.00	+0.00	+0.00	+0.00	+0.00	+0.00
Astoria	*0.00*	-0.00	-0.00	+0.00	+0.00	+0.00	+0.00	+0.00
Tillamook	*0.18*	-0.03	-0.11	+0.00	+0.00	+0.00	+0.08	+0.00
Newport	*0.06*	-0.01	-0.04	+0.00	+0.00	+0.00	+0.01	+0.00
Coos Bay	*0.04*	-0.01	-0.03	+0.00	+0.00	+0.00	+0.00	+0.00
Brookings	*0.57*	-0.11	-0.34	+0.00	+0.00	+0.00	+0.24	+0.00
Crescent City	*0.39*	-0.08	-0.23	+0.00	+0.00	+0.00	+0.22	+0.00
Eureka	*0.07*	-0.01	-0.04	+0.00	+0.00	+0.00	+0.03	+0.00
Fort Bragg	*0.08*	-0.01	-0.05	+0.00	+0.00	+0.00	+0.01	+0.00
Bodega Bay	*0.01*	-0.00	-0.01	+0.00	+0.00	+0.00	+0.00	+0.00
San Francisco	*0.05*	-0.02	-0.03	+0.00	+0.00	+0.00	+0.01	+0.00
Monterey	*0.06*	-0.00	-0.04	+0.00	+0.00	+0.00	+0.00	+0.00
Morro Bay	*0.34*	-0.03	-0.20	+0.00	+0.00	+0.00	+0.02	+0.00
Santa Barbara	*0.00*	+0.00	-0.00	+0.00	+0.00	+0.00	+0.00	+0.00
Los Angeles	*0.00*	-0.00	-0.00	+0.00	+0.00	+0.00	+0.00	+0.00
San Diego	*0.00*	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00	+0.00
TOTAL	***1.88***	**-0.32**	**-1.12**	**+0.00**	**+0.00**	**+0.00**	**+0.61**	**+0.00**

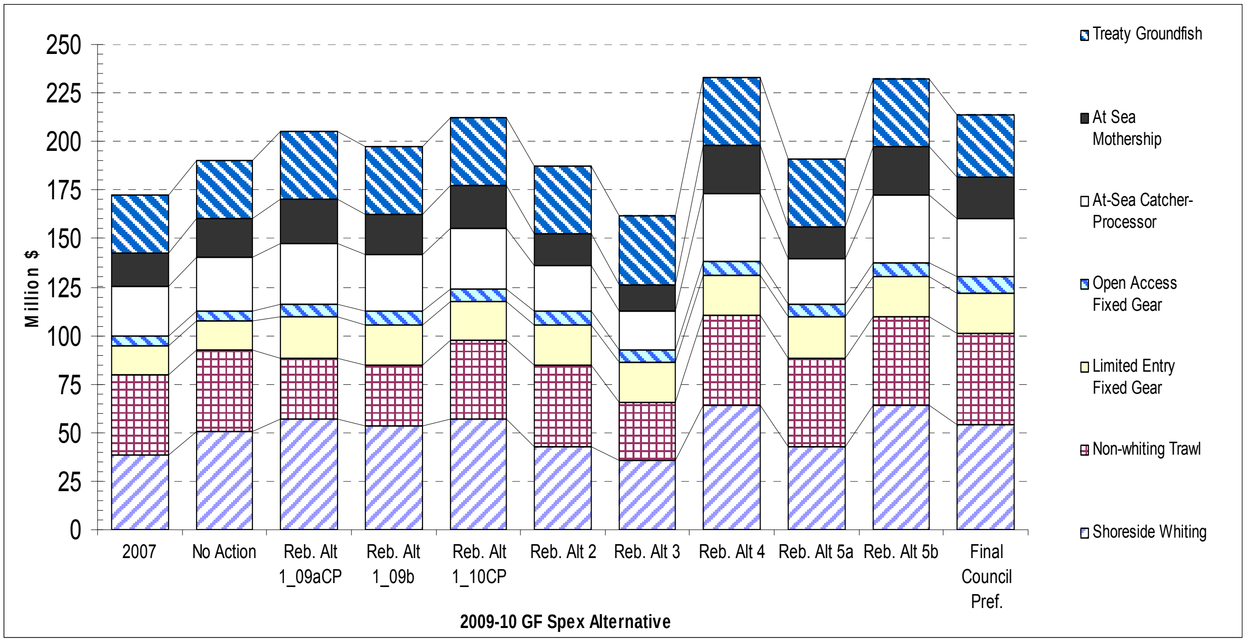

Figure 7-5. Income impacts by directed groundfish sector under the 2009-2010 management alternatives (including treaty groundfish, excluding nearshore open access). (Income impacts are a measure of total harvesting, processing, and support activities connected with Council-managed ocean area commercial fisheries.)

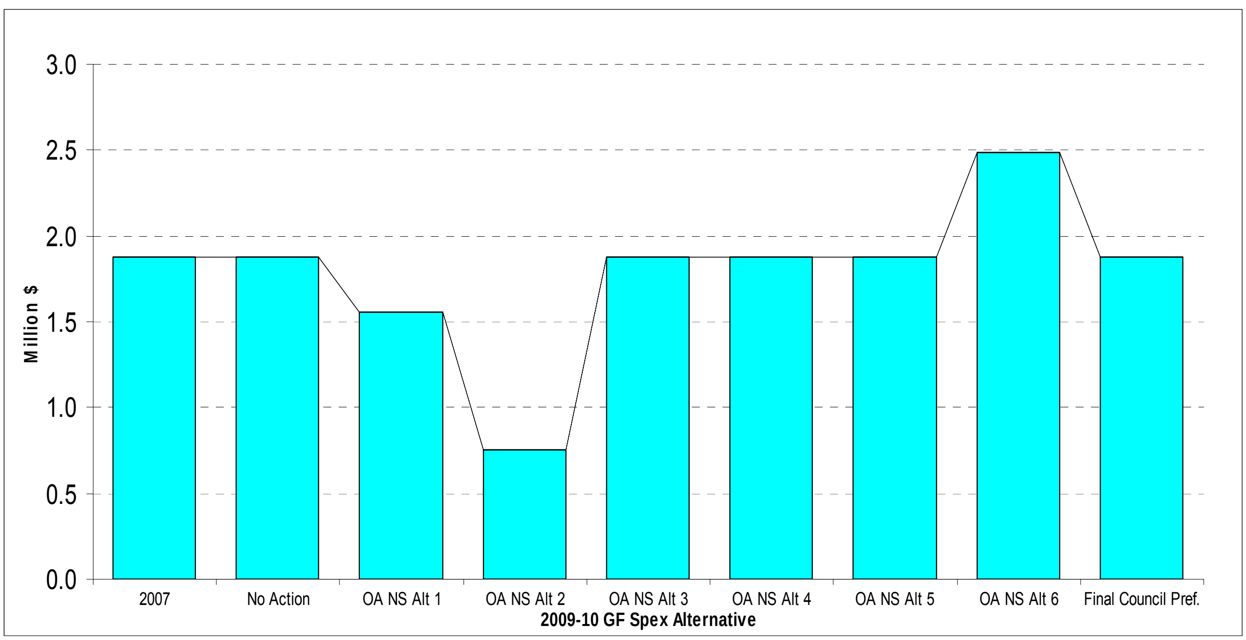

Figure 7-6. Nearshore open access groundfish sector income impacts under the 2009-2010 management alternatives. (Income impacts are a measure of total harvesting, processing, and support activities connected with Council-managed ocean area commercial fisheries.)

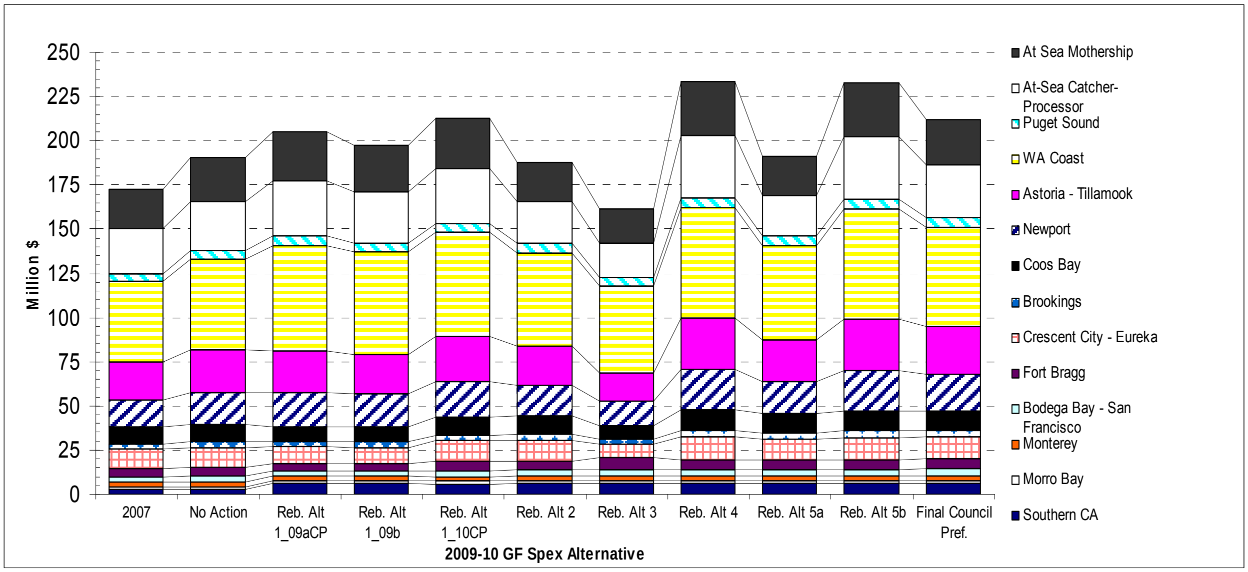

Figure 7-7. Income impacts by port area under the 2009-2010 management alternatives (including treaty groundfish, excluding nearshore open access). (Income impacts are a measure of total harvesting, processing, and support activities connected with Council-managed ocean area commercial fisheries.)

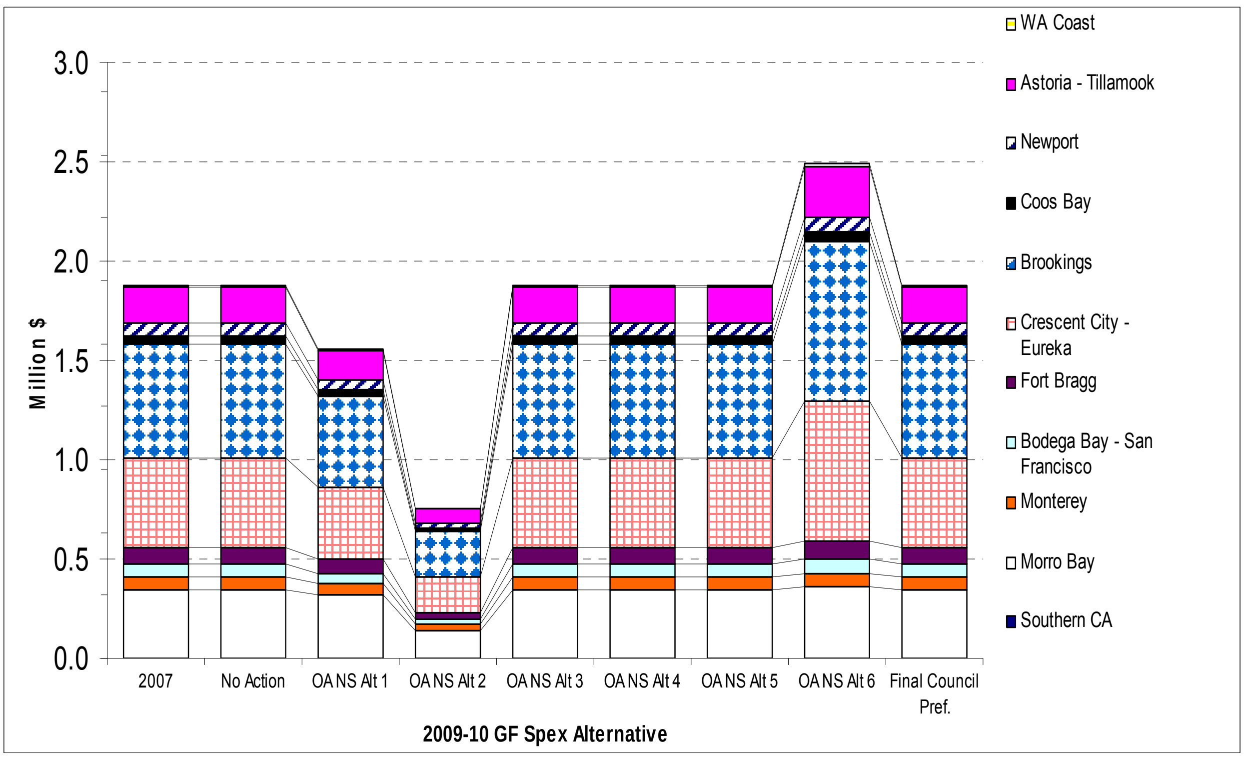

Figure 7-8. Nearshore open access groundfish sector income impacts by port area under the 2009-2010 management alternatives. (Income impacts are a measure of total harvesting, processing, and support activities connected with Council-managed ocean area commercial fisheries.)

7.2.9.2 *Recreational Fisheries Impacts*

In a similar manner to the presentations for the commercial fishery, the following tables have been developed to illustrate recreational fishing impacts. Shortened titles for tables included in this sector are:

Table 7-61a. Summary of estimated Washington recreational ocean angler effort by region in 2005, 2006 and 2007 and projected effort under the recreational fishery alternatives (angler trips).

State	Region	Boat Type / Trip Target	2005	2006	2007	No Action	WA Rec Alt 0	WA Rec Alt 1	WA Rec Alt 2	WA Rec Alt 3	Council Preferred Alt
WASHINGTON											
	North Washington Coast										
		Charter									
		Halibut	1,067	763	895	895	0	895	895	895	895
		Salmon	1,688	1,000	939	1,464	0	1,464	1,464	1,464	1,464
		Bottomfish	566	384	589	939	0	939	852	852	939
		Salm/Hlbt	2	0	21	6	0	6	6	6	6
		Tuna	36	44	63	40	40	40	40	40	40
		TOTAL	3,359	2,191	2,507	3,343	40	3,343	3,256	3,256	3,343
		Private									
		Halibut	4,156	4,379	4,200	4,200	0	4,200	4,200	4,200	4,200
		Salmon	10,821	8,616	8,636	10,420	0	10,420	10,420	10,420	10,420
		Bottomfish	4,520	3,975	4,298	4,298	0	4,298	3,583	3,583	4,298
		Salm/Hlbt	0	0	139	38	0	38	38	38	38
		Tuna	68	102	305	129	129	129	129	129	129
		TOTAL	19,565	17,072	17,578	19,084	129	19,084	18,369	18,369	19,084
	South & Central WA Coast										
		Charter									
		Halibut	3,435	2,750	2,700	2,700	0	2,700	2,700	2,700	2,700
		Salmon	29,970	23,930	26,544	28,742	0	28,742	28,742	28,742	28,742
		Bottomfish	13,114	16,231	14,448	14,448	0	14,448	14,448	14,448	14,448
		Salm/Hlbt	67	0	0	33	0	33	33	33	33
		Tuna	1,002	1,761	1,663	1,407	1,407	1,407	1,407	1,407	1,407
		TOTAL	47,588	44,672	45,355	47,330	1,407	47,330	47,330	47,330	47,330
		Private									
		Halibut	387	485	259	259	0	259	259	259	259
		Salmon	58,009	38,044	45,066	55,272	0	55,272	55,272	55,272	55,272
		Bottomfish	2,207	2,137	2,300	2,300	0	2,300	2,300	2,300	2,300
		Salm/Hlbt	4	22	56	29	0	29	29	29	29
		Tuna	409	739	1,561	739	739	739	739	739	739
		TOTAL	61,016	41,427	49,242	58,598	739	58,598	58,598	58,598	58,598
WASHINGTON TOTALS											
		Charter	50,947	46,863	47,862	50,673	1,447	50,673	50,586	50,586	50,673
		Private	80,581	58,499	66,820	77,682	867	77,682	76,967	76,967	77,682
		TOTAL	131,528	105,362	114,682	128,355	2,314	128,355	127,553	127,553	128,355

Table 7-61b. Summary of estimated Oregon recreational ocean angler effort by region in 2005, 2006 and 2007 and projected effort under the recreational fishery alternatives (angler trips).

State	Region	Boat Type / Trip Target	2005	2006	2007	No Action	OR Rec Alt 1	OR Rec Alt 2	OR Rec Alt 3	OR Rec Alt 3a	OR Rec Alt 4	OR Rec Alt 5	OR Rec Alt 5a	OR Rec Alt 6	Council Preferred Alt
OREGON															
	Astoria-Tillamook														
		Charter													
		Halibut	1,502	1,417	1,544	1,439	0	1,322	1,322	661	1,322	1,322	661	1,322	1,322
		Salmon	2,800	2,441	3,213	715	0	3,324	3,324	3,324	3,324	3,324	3,324	3,324	3,324
		Bottomfish	5,139	5,116	4,411	4,835	0	4,220	5,260	5,260	5,260	5,260	5,260	5,260	5,260
		Combo	494	176	507	461	0	461	461	461	461	461	461	461	461
		Tuna	157	146	431	214	214	214	214	214	214	214	214	214	214
		Other	168	123	58	9	0	9	9	9	9	9	9	9	9
		TOTAL	10,260	9,419	10,164	7,674	214	9,550	10,590	9,929	10,590	10,590	9,929	10,590	10,590
		Private													
		Halibut	1,867	2,308	1,666	1,958	0	1,798	1,798	899	1,798	1,798	899	1,798	1,798
		Salmon	19,793	19,669	26,379	5,640	0	26,216	26,216	26,216	26,216	26,216	26,216	26,216	26,216
		Bottomfish	6,169	5,672	4,235	4,645	0	4,054	5,054	5,054	5,054	5,054	5,054	5,054	5,054
		Combo	2,302	1,722	3,328	2,653	0	2,653	2,653	2,653	2,653	2,653	2,653	2,653	2,653
		Tuna	357	910	1,845	852	852	852	852	852	852	852	852	852	852
		Other	1,334	1,025	834	100	0	100	100	100	100	100	100	100	100
		TOTAL	31,822	31,306	38,287	15,847	852	35,673	36,672	35,773	36,672	36,672	35,773	36,672	36,672
	Newport														
		Charter													
		Halibut	2,473	2,934	2,591	2,723	0	2,501	2,501	1,250	2,501	2,501	1,250	2,501	2,501
		Salmon	3,109	2,459	4,378	1,067	0	4,958	4,958	4,958	4,958	4,958	4,958	4,958	4,958
		Bottomfish	22,333	22,272	21,999	21,133	0	18,443	22,990	22,990	22,990	22,990	22,990	22,990	22,990
		Combo	664	531	1,118	866	0	866	866	866	866	866	866	866	866
		Tuna	762	740	2,148	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139
		Other	3	33	12	2	0	2	2	2	2	2	2	2	2
		TOTAL	29,344	28,969	32,246	26,930	1,139	27,909	32,456	31,205	32,456	32,456	31,205	32,456	32,456
		Private													
		Halibut	8,110	8,535	9,826	8,653	0	7,946	7,946	3,973	7,946	7,946	3,973	7,946	7,946
		Salmon	6,519	5,875	11,190	2,563	0	11,916	11,916	11,916	11,916	11,916	11,916	11,916	11,916
		Bottomfish	7,157	6,832	4,760	5,736	0	5,006	6,240	6,240	6,240	6,240	6,240	6,240	6,240
		Combo	3,137	1,531	3,939	3,086	0	3,086	3,086	3,086	3,086	3,086	3,086	3,086	3,086
		Tuna	994	1,031	4,074	1,793	1,793	1,793	1,793	1,793	1,793	1,793	1,793	1,793	1,793
		Other	1,519	1,471	1,624	128	0	128	128	128	128	128	128	128	128
		TOTAL	27,436	25,275	35,413	21,959	1,793	29,875	31,109	27,136	31,109	31,109	27,136	31,109	31,109
	Coos Bay														
		Charter													
		Halibut	509	610	657	663	0	608	608	304	608	608	304	608	608
		Salmon	2,427	1,970	1,946	536	0	2,489	2,489	2,489	2,489	2,489	2,489	2,489	2,489
		Bottomfish	4,172	4,544	4,694	4,432	0	3,868	4,822	4,822	4,822	4,822	4,822	4,822	4,822
		Combo	131	37	7	91	0	91	91	91	91	91	91	91	91
		Tuna	91	93	305	189	189	189	189	189	189	189	189	189	189
		Other	18	26	15	2	0	2	2	2	2	2	2	2	2
		TOTAL	7,348	7,280	7,624	5,913	189	7,249	8,202	7,898	8,202	8,202	7,898	8,202	8,202
		Private													
		Halibut	1,421	1,086	1,696	1,444	0	1,326	1,326	663	1,326	1,326	663	1,326	1,326
		Salmon	20,033	14,989	19,448	4,807	0	22,347	22,347	22,347	22,347	22,347	22,347	22,347	22,347
		Bottomfish	5,355	6,507	6,555	5,393	0	4,707	5,867	5,867	5,867	5,867	5,867	5,867	5,867
		Combo	2,016	1,175	1,546	1,591	0	1,591	1,591	1,591	1,591	1,591	1,591	1,591	1,591
		Tuna	33	233	2,244	801	801	801	801	801	801	801	801	801	801
		Other	3,398	2,333	1,405	222	0	222	222	222	222	222	222	222	222
		TOTAL	32,256	26,323	32,894	14,258	801	30,994	32,154	31,491	32,154	32,154	31,491	32,154	32,154
	Brookings														
		Charter													
		Halibut	23	23	0	27	0	25	25	13	25	25	13	25	25
		Salmon	248	189	184	64	0	298	298	298	298	298	298	298	298
		Bottomfish	4,596	3,909	4,507	4,300	0	3,753	4,678	4,678	4,678	4,678	4,678	4,678	4,678
		Combo	33	75	3	52	0	52	52	52	52	52	52	52	52
		Tuna	12	0	88	53	53	53	53	53	53	53	53	53	53
		Other	69	56	5	4	0	4	4	4	4	4	4	4	4
		TOTAL	4,981	4,252	4,787	4,501	53	4,185	5,110	5,098	5,110	5,110	5,098	5,110	5,110
		Private													
		Halibut	71	81	0	76	0	70	70	35	70	70	35	70	70
		Salmon	9,972	8,216	9,585	2,308	0	10,731	10,731	10,731	10,731	10,731	10,731	10,731	10,731
		Bottomfish	16,506	16,822	15,504	15,123	0	13,199	16,452	16,452	16,452	16,452	16,452	16,452	16,452
		Combo	2,326	2,141	1,341	2,121	0	2,121	2,121	2,121	2,121	2,121	2,121	2,121	2,121
		Tuna	49	195	945	437	437	437	437	437	437	437	437	437	437
		Other	1,261	1,515	1,440	116	0	116	116	116	116	116	116	116	116
		TOTAL	30,185	28,970	28,815	20,182	437	26,674	29,928	29,893	29,928	29,928	29,893	29,928	29,928
OREGON TOTALS															
		Charter	51,933	49,920	54,821	45,017	1,595	48,893	56,359	54,131	56,359	56,359	54,131	56,359	56,359
		Private	121,699	111,874	135,409	72,247	3,883	123,215	129,863	124,293	129,863	129,863	124,293	129,863	129,863
		TOTAL	173,632	161,794	190,230	117,264	5,479	172,108	186,222	178,424	186,222	186,222	178,424	186,222	186,222

Table 7-61c. Summary of estimated northern California recreational ocean angler effort by region in 2005, 2006 and 2007 and projected effort under the recreational fishery alternatives (angler trips).

State	Region	Boat Type / Trip Target	2005	2006	2007	No Action	CA Rec Alt 0	CA Rec Alt 1	CA Rec Alt 2	CA Rec Alt 3	CA Rec Alt 4	CA Rec Alt 5	CA Rec Alt 6	Council Preferred Alt
CALIFORNIA														
	North Coast: Humboldt and Del Norte counties													
		Charter												
		Halibut	0	0	0	0	0	0	0	0	0	0	0	0
		Salmon	302	651	1,245	733	0	306	450	511	609	671	609	622
		Bottomfish	1,050	2,117	3,154	2,107	0	558	1,271	1,537	1,828	1,951	1,828	1,805
		Combo	0	0	0	0	0	0	0	0	0	0	0	0
		HMS	876	547	614	0	0	0	0	0	0	0	0	0
		Other	0	0	5	2	0	0	1	2	2	2	2	2
		TOTAL	2,228	3,316	5,018	2,841	0	864	1,722	2,050	2,439	2,623	2,439	2,429
		Private												
		Halibut	0	0	0	0	0	0	0	0	0	0	0	0
		Salmon	22,544	22,879	22,430	22,618	0	9,454	13,895	15,775	18,797	20,707	18,797	19,196
		Bottomfish	15,230	15,940	16,113	15,759	0	4,173	9,506	11,502	13,677	14,591	13,677	13,504
		Combo	0	0	0	0	0	0	0	0	0	0	0	0
		HMS	17,320	35,531	29,401	436	1	1	401	424	425	431	425	430
		Other	509	459	594	520	0	31	234	487	519	519	519	504
		TOTAL	55,604	74,809	68,539	39,333	1	13,659	24,035	28,188	33,417	36,249	33,417	33,634
	North-Central Coast: Mendocino county													
		Charter												
		Halibut	0	0	0	0	0	0	0	0	0	0	0	0
		Salmon	0	0	0	0	0	0	0	0	0	0	0	0
		Bottomfish	788	0	1,881	872	0	32	32	149	149	266	525	398
		Combo	0	0	0	0	0	0	0	0	0	0	0	0
		HMS	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0
		TOTAL	788	0	1,881	872	0	32	32	149	149	266	525	398
		Private												
		Halibut	0	0	0	0	0	0	0	0	0	0	0	0
		Salmon	31,106	18,073	13,756	16,766	0	5,267	5,267	8,207	8,207	11,146	16,396	15,078
		Bottomfish	7,910	8,614	9,271	8,429	0	311	311	1,440	1,440	2,570	5,076	3,845
		Combo	0	0	0	0	0	0	0	0	0	0	0	0
		HMS	2	58	1,668	576	0	0	0	279	279	557	576	567
		Other	121	11	57	62	0	5	5	12	12	19	29	24
		TOTAL	39,139	26,756	24,752	25,833	0	5,583	5,583	9,938	9,938	14,292	22,077	19,514
	North-Central Coast: San Mateo County through Sonoma County													
		Charter												
		Halibut	0	0	0	0	0	0	0	0	0	0	0	0
		Salmon	11,730	51	4,750	4,778	0	3,587	4,398	4,398	4,398	4,398	4,398	4,340
		Bottomfish	16,258	46,209	24,156	27,693	0	18,376	23,653	23,653	23,653	23,653	23,653	25,017
		Combo	0	0	0	0	0	0	0	0	0	0	0	0
		HMS	0	0	0	0	0	0	0	0	0	0	0	0
		Other	1,935	64	695	636	0	524	595	595	595	595	595	551
		TOTAL	29,924	46,324	29,601	33,107	0	22,488	28,646	28,646	28,646	28,646	28,646	29,908
		Private												
		Halibut	0	0	0	0	0	0	0	0	0	0	0	0
		Salmon	63,779	46,271	26,376	39,429	0	29,606	36,294	36,294	36,294	36,294	36,294	35,819
		Bottomfish	23,104	37,894	21,764	26,458	0	17,557	22,599	22,599	22,599	22,599	22,599	23,902
		Combo	0	0	0	0	0	0	0	0	0	0	0	0
		HMS	988	1,441	1,813	1,411	919	919	1,407	1,407	1,407	1,407	1,407	1,411
		Other	44,589	52,407	35,897	31,385	0	25,839	29,359	29,359	29,359	29,359	29,359	27,167
		TOTAL	132,460	138,012	85,850	98,683	919	73,922	89,659	89,659	89,659	89,659	89,659	88,299

Table 7-61d. Summary of estimated southern California recreational ocean angler effort by region in 2005, 2006 and 2007 and projected effort under the recreational fishery alternatives (angler trips).

State	Region	Boat Type / Trip Target	2005	2006	2007	No Action	CA Rec Alt 0	CA Rec Alt 1	CA Rec Alt 2	CA Rec Alt 3	CA Rec Alt 4	CA Rec Alt 5	CA Rec Alt 6	Council Preferred Alt
CALIFORNIA														
	South-Central Coast: San Luis Obispo County through Santa Cruz County													
		Charter												
		Halibut	0	0	0	0	0	0	0	0	0	0	0	0
		Salmon	1,745	229	1,628	708	0	708	708	708	708	708	708	708
		Bottomfish	22,037	26,456	31,920	26,244	0	24,731	24,731	24,731	24,731	24,731	26,244	25,487
		Combo	0	0	0	0	0	0	0	0	0	0	0	0
		HMS	0	0	0	0	0	0	0	0	0	0	0	0
		Other	609	490	8,891	3,147	0	3,121	3,121	3,121	3,121	3,121	3,147	3,134
		TOTAL	24,391	27,175	42,439	30,099	0	28,559	28,559	28,559	28,559	28,559	30,099	29,329
		Private												
		Halibut	0	0	0	0	0	0	0	0	0	0	0	0
		Salmon	42,096	23,894	31,743	19,208	0	19,208	19,208	19,208	19,208	19,208	19,208	19,208
		Bottomfish	30,798	40,367	36,364	35,094	0	33,071	33,071	33,071	33,071	33,071	35,094	34,082
		Combo	0	0	0	0	0	0	0	0	0	0	0	0
		HMS	1,055	1,674	2,763	1,831	1,820	1,820	1,820	1,820	1,820	1,820	1,831	1,825
		Other	11,822	9,318	9,223	9,564	0	9,484	9,484	9,484	9,484	9,484	9,564	9,524
		TOTAL	85,771	75,253	80,093	65,697	1,820	63,583	63,583	63,583	63,583	63,583	65,697	64,640
	South Coast: Ventura and Santa Barbara counties													
		Charter												
		Halibut	0	0	0	0	0	0	0	0	0	0	0	0
		Salmon	0	0	0	0	0	0	0	0	0	0	0	0
		Bottomfish	27,798	17,784	32,673	25,423	0	25,423	25,423	25,423	25,423	25,423	25,423	25,423
		Combo	0	0	0	0	0	0	0	0	0	0	0	0
		HMS	0	16	0	5	5	5	5	5	5	5	5	5
		Other	3,319	3,448	1,967	2,752	0	2,752	2,752	2,752	2,752	2,752	2,752	2,752
		TOTAL	31,117	21,247	34,640	28,181	5	28,181	28,181	28,181	28,181	28,181	28,181	28,181
		Private												
		Halibut	0	0	0	0	0	0	0	0	0	0	0	0
		Salmon	1,869	1,104	1,341	1,438	0	1,438	1,438	1,438	1,438	1,438	1,438	1,438
		Bottomfish	24,422	19,648	19,778	20,743	0	20,743	20,743	20,743	20,743	20,743	20,743	20,743
		Combo	0	0	0	0	0	0	0	0	0	0	0	0
		HMS	66	115	1,174	446	446	446	446	446	446	446	446	446
		Other	13,936	15,865	19,970	15,686	0	15,686	15,686	15,686	15,686	15,686	15,686	15,686
		TOTAL	40,294	36,732	42,262	38,313	446	38,313	38,313	38,313	38,313	38,313	38,313	38,313
	South Coast: San Diego County through Los Angeles County													
		Charter												
		Halibut	0	0	0	0	0	0	0	0	0	0	0	0
		Salmon	825	0	174	333	0	333	333	333	333	333	333	333
		Bottomfish	181,247	99,234	139,253	131,708	0	131,708	131,708	131,708	131,708	131,708	131,708	131,708
		Combo	0	0	0	0	0	0	0	0	0	0	0	0
		HMS	876	531	614	670	670	670	670	670	670	670	670	670
		Other	92,046	65,897	57,675	68,554	0	68,554	68,554	68,554	68,554	68,554	68,554	68,554
		TOTAL	274,995	165,662	197,716	201,265	670	201,265	201,265	201,265	201,265	201,265	201,265	201,265
		Private												
		Halibut	0	0	0	0	0	0	0	0	0	0	0	0
		Salmon	0	0	0	0	0	0	0	0	0	0	0	0
		Bottomfish	141,206	129,557	163,800	136,361	0	136,361	136,361	136,361	136,361	136,361	136,361	136,361
		Combo	0	0	0	0	0	0	0	0	0	0	0	0
		HMS	15,205	32,224	20,697	22,579	22,579	22,579	22,579	22,579	22,579	22,579	22,579	22,579
		Other	276,767	324,879	223,799	262,442	0	262,442	262,442	262,442	262,442	262,442	262,442	262,442
		TOTAL	433,178	486,660	408,295	421,382	22,579	421,382	421,382	421,382	421,382	421,382	421,382	421,382
CALIFORNIA TOTALS														
		Charter	363,442	263,725	311,295	296,364	675	281,389	288,405	288,850	289,239	289,540	291,155	291,509
		Private	786,445	838,221	709,792	689,241	25,765	616,441	642,555	651,062	656,292	663,478	670,545	665,782
		TOTAL	1,149,887	1,101,946	1,021,087	985,605	26,441	897,830	930,960	939,912	945,531	953,018	961,699	957,291

Table 7-62a. Change in projected Washington recreational effort across action alternatives compared with No Action (angler trips).

State	Region	Boat Type / Trip Target	*No Action*	WA Rec Alt 0	WA Rec Alt 1	WA Rec Alt 2	WA Rec Alt 3	Council Preferred Alt
WASHINGTON								
	North Washington Coast							
		Charter						
		Halibut	*895*	-895	0	0	0	0
		Salmon	*1,464*	-1,464	0	0	0	0
		Bottomfish	*939*	-939	0	-87	-87	0
		Salm/Hlbt	*6*	-6	0	0	0	0
		Tuna	*40*	0	0	0	0	0
		TOTAL	*3,343*	-3,303	0	-87	-87	0
		Private						
		Halibut	*4,200*	-4,200	0	0	0	0
		Salmon	*10,420*	-10,420	0	0	0	0
		Bottomfish	*4,298*	-4,298	0	-715	-715	0
		Salm/Hlbt	*38*	-38	0	0	0	0
		Tuna	*129*	0	0	0	0	0
		TOTAL	*19,084*	-18,956	0	-715	-715	0
	South & Central WA Coast							
		Charter						
		Halibut	*2,700*	-2,700	0	0	0	0
		Salmon	*28,742*	-28,742	0	0	0	0
		Bottomfish	*14,448*	-14,448	0	0	0	0
		Salm/Hlbt	*33*	-33	0	0	0	0
		Tuna	*1,407*	0	0	0	0	0
		TOTAL	*47,330*	-45,923	0	0	0	0
		Private						
		Halibut	*259*	-259	0	0	0	0
		Salmon	*55,272*	-55,272	0	0	0	0
		Bottomfish	*2,300*	-2,300	0	0	0	0
		Salm/Hlbt	*29*	-29	0	0	0	0
		Tuna	*739*	0	0	0	0	0
		TOTAL	*58,598*	-57,859	0	0	0	0
WASHINGTON TOTALS								
		Charter	*50,673*	-49,226	0	-87	-87	0
		Private	*77,682*	-76,815	0	-715	-715	0
		TOTAL	*128,355*	-126,041	0	-802	-802	0

Table 7-62b. Change in projected Oregon recreational effort across action alternatives compared with No Action (angler trips).

State	Region	Boat Type / Trip Target	*No Action*	OR Rec Alt 1	OR Rec Alt 2	OR Rec Alt 3	OR Rec Alt 3a	OR Rec Alt 4	OR Rec Alt 5	OR Rec Alt 5a	OR Rec Alt 6	Council Preferred Alt
OREGON												
	Astoria-Tillamook											
		Charter										
		Halibut	*1,439*	-1,439	-118	-118	-778	-118	-118	-778	-118	-118
		Salmon	*715*	-715	2,609	2,609	2,609	2,609	2,609	2,609	2,609	2,609
		Bottomfish	*4,835*	-4,835	-615	425	425	425	425	425	425	425
		Combo	*461*	-461	0	0	0	0	0	0	0	0
		Tuna	*214*	0	0	0	0	0	0	0	0	0
		Other	*9*	-9	0	0	0	0	0	0	0	0
		TOTAL	*7,674*	-7,460	1,876	2,916	2,256	2,916	2,916	2,256	2,916	2,916
		Private										
		Halibut	*1,958*	-1,958	-160	-160	-1,059	-160	-160	-1,059	-160	-160
		Salmon	*5,640*	-5,640	20,576	20,576	20,576	20,576	20,576	20,576	20,576	20,576
		Bottomfish	*4,645*	-4,645	-591	408	408	408	408	408	408	408
		Combo	*2,653*	-2,653	0	0	0	0	0	0	0	0
		Tuna	*852*	0	0	0	0	0	0	0	0	0
		Other	*100*	-100	0	0	0	0	0	0	0	0
		TOTAL	*15,847*	-14,996	19,825	20,825	19,926	20,825	20,825	19,926	20,825	20,825
	Newport											
		Charter										
		Halibut	*2,723*	-2,723	-222	-222	-1,473	-222	-222	-1,473	-222	-222
		Salmon	*1,067*	-1,067	3,891	3,891	3,891	3,891	3,891	3,891	3,891	3,891
		Bottomfish	*21,133*	-21,133	-2,689	1,858	1,858	1,858	1,858	1,858	1,858	1,858
		Combo	*866*	-866	0	0	0	0	0	0	0	0
		Tuna	*1,139*	0	0	0	0	0	0	0	0	0
		Other	*2*	-2	0	0	0	0	0	0	0	0
		TOTAL	*26,930*	-25,790	980	5,526	4,276	5,526	5,526	4,276	5,526	5,526
		Private										
		Halibut	*8,653*	-8,653	-707	-707	-4,680	-707	-707	-4,680	-707	-707
		Salmon	*2,563*	-2,563	9,353	9,353	9,353	9,353	9,353	9,353	9,353	9,353
		Bottomfish	*5,736*	-5,736	-730	504	504	504	504	504	504	504
		Combo	*3,086*	-3,086	0	0	0	0	0	0	0	0
		Tuna	*1,793*	0	0	0	0	0	0	0	0	0
		Other	*128*	-128	0	0	0	0	0	0	0	0
		TOTAL	*21,959*	-20,166	7,916	9,150	5,177	9,150	9,150	5,177	9,150	9,150
	Coos Bay											
		Charter										
		Halibut	*663*	-663	-54	-54	-358	-54	-54	-358	-54	-54
		Salmon	*536*	-536	1,954	1,954	1,954	1,954	1,954	1,954	1,954	1,954
		Bottomfish	*4,432*	-4,432	-564	390	390	390	390	390	390	390
		Combo	*91*	-91	0	0	0	0	0	0	0	0
		Tuna	*189*	0	0	0	0	0	0	0	0	0
		Other	*2*	-2	0	0	0	0	0	0	0	0
		TOTAL	*5,913*	-5,724	1,336	2,289	1,985	2,289	2,289	1,985	2,289	2,289
		Private										
		Halibut	*1,444*	-1,444	-118	-118	-781	-118	-118	-781	-118	-118
		Salmon	*4,807*	-4,807	17,540	17,540	17,540	17,540	17,540	17,540	17,540	17,540
		Bottomfish	*5,393*	-5,393	-686	474	474	474	474	474	474	474
		Combo	*1,591*	-1,591	0	0	0	0	0	0	0	0
		Tuna	*801*	0	0	0	0	0	0	0	0	0
		Other	*222*	-222	0	0	0	0	0	0	0	0
		TOTAL	*14,258*	-13,458	16,735	17,896	17,233	17,896	17,896	17,233	17,896	17,896
	Brookings											
		Charter										
		Halibut	*27*	-27	-2	-2	-15	-2	-2	-15	-2	-2
		Salmon	*64*	-64	234	234	234	234	234	234	234	234
		Bottomfish	*4,300*	-4,300	-547	378	378	378	378	378	378	378
		Combo	*52*	-52	0	0	0	0	0	0	0	0
		Tuna	*53*	0	0	0	0	0	0	0	0	0
		Other	*4*	-4	0	0	0	0	0	0	0	0
		TOTAL	*4,501*	-4,448	-316	609	597	609	609	597	609	609
		Private										
		Halibut	*76*	-76	-6	-6	-41	-6	-6	-41	-6	-6
		Salmon	*2,308*	-2,308	8,422	8,422	8,422	8,422	8,422	8,422	8,422	8,422
		Bottomfish	*15,123*	-15,123	-1,924	1,329	1,329	1,329	1,329	1,329	1,329	1,329
		Combo	*2,121*	-2,121	0	0	0	0	0	0	0	0
		Tuna	*437*	0	0	0	0	0	0	0	0	0
		Other	*116*	-116	0	0	0	0	0	0	0	0
		TOTAL	*20,182*	-19,745	6,492	9,746	9,711	9,746	9,746	9,711	9,746	9,746
OREGON TOTALS												
		Charter	*45,017*	-43,422	3,876	11,342	9,114	11,342	11,342	9,114	11,342	11,342
		Private	*72,247*	-68,364	50,969	57,617	52,047	57,617	57,617	52,047	57,617	57,617
		TOTAL	*117,264*	-111,785	54,844	68,958	61,160	68,958	68,958	61,160	68,958	68,958

Table 7-62c. Change in projected northern California recreational effort across action alternatives compared with No Action (angler trips).

State	Region	Boat Type / Trip Target	*No Action*	CA Rec Alt 0	CA Rec Alt 1	CA Rec Alt 2	CA Rec Alt 3	CA Rec Alt 4	CA Rec Alt 5	CA Rec Alt 6	Council Preferred Alt
CALIFORNIA											
	North Coast: Humboldt and Del Norte counties										
		Charter									
		Halibut	*0*	0	0	0	0	0	0	0	0
		Salmon	*733*	-733	-426	-283	-222	-124	-62	-124	-111
		Bottomfish	*2,107*	-2,107	-1,549	-836	-569	-278	-156	-278	-301
		Combo	*0*	0	0	0	0	0	0	0	0
		HMS	*0*	0	0	0	0	0	0	0	0
		Other	*2*	-2	-2	-1	0	0	0	0	0
		TOTAL	*2,841*	-2,841	-1,977	-1,119	-791	-402	-218	-402	-412
		Private									
		Halibut	*0*	0	0	0	0	0	0	0	0
		Salmon	*22,618*	-22,618	-13,164	-8,723	-6,843	-3,821	-1,911	-3,821	-3,421
		Bottomfish	*15,759*	-15,759	-11,586	-6,253	-4,257	-2,081	-1,167	-2,081	-2,255
		Combo	*0*	0	0	0	0	0	0	0	0
		HMS	*436*	-435	-435	-35	-13	-11	-6	-11	-6
		Other	*520*	-520	-489	-287	-33	-2	-1	-2	-16
		TOTAL	*39,333*	-39,332	-25,674	-15,298	-11,145	-5,916	-3,084	-5,916	-5,699
	North-Central Coast: Mendocino county										
		Charter									
		Halibut	*0*	0	0	0	0	0	0	0	0
		Salmon	*0*	0	0	0	0	0	0	0	0
		Bottomfish	*872*	-872	-840	-840	-723	-723	-606	-347	-474
		Combo	*0*	0	0	0	0	0	0	0	0
		HMS	*0*	0	0	0	0	0	0	0	0
		Other	*0*	0	0	0	0	0	0	0	0
		TOTAL	*872*	-872	-840	-840	-723	-723	-606	-347	-474
		Private									
		Halibut	*0*	0	0	0	0	0	0	0	0
		Salmon	*16,766*	-16,766	-11,499	-11,499	-8,560	-8,560	-5,620	-370	-1,688
		Bottomfish	*8,429*	-8,429	-8,118	-8,118	-6,988	-6,988	-5,859	-3,352	-4,584
		Combo	*0*	0	0	0	0	0	0	0	0
		HMS	*576*	-576	-576	-576	-297	-297	-19	0	-9
		Other	*62*	-62	-57	-57	-50	-50	-43	-34	-38
		TOTAL	*25,833*	-25,833	-20,251	-20,251	-15,896	-15,896	-11,541	-3,756	-6,319
	North-Central Coast: San Mateo County through Sonoma County										
		Charter									
		Halibut	*0*	0	0	0	0	0	0	0	0
		Salmon	*4,778*	-4,778	-1,190	-380	-380	-380	-380	-380	-437
		Bottomfish	*27,693*	-27,693	-9,317	-4,040	-4,040	-4,040	-4,040	-4,040	-2,676
		Combo	*0*	0	0	0	0	0	0	0	0
		HMS	*0*	0	0	0	0	0	0	0	0
		Other	*636*	-636	-112	-41	-41	-41	-41	-41	-86
		TOTAL	*33,107*	-33,107	-10,619	-4,460	-4,460	-4,460	-4,460	-4,460	-3,199
		Private									
		Halibut	*0*	0	0	0	0	0	0	0	0
		Salmon	*39,429*	-39,429	-9,823	-3,135	-3,135	-3,135	-3,135	-3,135	-3,610
		Bottomfish	*26,458*	-26,458	-8,901	-3,859	-3,859	-3,859	-3,859	-3,859	-2,556
		Combo	*0*	0	0	0	0	0	0	0	0
		HMS	*1,411*	-493	-493	-4	-4	-4	-4	-4	0
		Other	*31,385*	-31,385	-5,545	-2,026	-2,026	-2,026	-2,026	-2,026	-4,218
		TOTAL	*98,683*	-97,764	-24,762	-9,024	-9,024	-9,024	-9,024	-9,024	-10,384

Table 7-62d. Change in projected southern California recreational effort across action alternatives compared with No Action (angler trips).

State	Region	Boat Type / Trip Target	*No Action*	CA Rec Alt 0	CA Rec Alt 1	CA Rec Alt 2	CA Rec Alt 3	CA Rec Alt 4	CA Rec Alt 5	CA Rec Alt 6	Council Preferred Alt
CALIFORNIA											
	South-Central Coast: San Luis Obispo County through Santa Cruz County										
		Charter									
		Halibut	*0*	0	0	0	0	0	0	0	0
		Salmon	*708*	-708	0	0	0	0	0	0	0
		Bottomfish	*26,244*	-26,244	-1,513	-1,513	-1,513	-1,513	-1,513	0	-756
		Combo	*0*	0	0	0	0	0	0	0	0
		HMS	*0*	0	0	0	0	0	0	0	0
		Other	*3,147*	-3,147	-26	-26	-26	-26	-26	0	-13
		TOTAL	*30,099*	-30,099	-1,539	-1,539	-1,539	-1,539	-1,539	0	-770
		Private									
		Halibut	*0*	0	0	0	0	0	0	0	0
		Salmon	*19,208*	-19,208	0	0	0	0	0	0	0
		Bottomfish	*35,094*	-35,094	-2,023	-2,023	-2,023	-2,023	-2,023	0	-1,012
		Combo	*0*	0	0	0	0	0	0	0	0
		HMS	*1,831*	-11	-11	-11	-11	-11	-11	0	-5
		Other	*9,564*	-9,564	-80	-80	-80	-80	-80	0	-40
		TOTAL	*65,697*	-63,877	-2,114	-2,114	-2,114	-2,114	-2,114	0	-1,057
	South Coast: Ventura and Santa Barbara counties										
		Charter									
		Halibut	*0*	0	0	0	0	0	0	0	0
		Salmon	*0*	0	0	0	0	0	0	0	0
		Bottomfish	*25,423*	-25,423	0	0	0	0	0	0	0
		Combo	*0*	0	0	0	0	0	0	0	0
		HMS	*5*	0	0	0	0	0	0	0	0
		Other	*2,752*	-2,752	0	0	0	0	0	0	0
		TOTAL	*28,181*	-28,175	0	0	0	0	0	0	0
		Private									
		Halibut	*0*	0	0	0	0	0	0	0	0
		Salmon	*1,438*	-1,438	0	0	0	0	0	0	0
		Bottomfish	*20,743*	-20,743	0	0	0	0	0	0	0
		Combo	*0*	0	0	0	0	0	0	0	0
		HMS	*446*	0	0	0	0	0	0	0	0
		Other	*15,686*	-15,686	0	0	0	0	0	0	0
		TOTAL	*38,313*	-37,867	0	0	0	0	0	0	0
	South Coast: San Diego County through Los Angeles County										
		Charter									
		Halibut	*0*	0	0	0	0	0	0	0	0
		Salmon	*333*	-333	0	0	0	0	0	0	0
		Bottomfish	*131,708*	-131,708	0	0	0	0	0	0	0
		Combo	*0*	0	0	0	0	0	0	0	0
		HMS	*670*	0	0	0	0	0	0	0	0
		Other	*68,554*	-68,554	0	0	0	0	0	0	0
		TOTAL	*201,265*	-200,595	0	0	0	0	0	0	0
		Private									
		Halibut	*0*	0	0	0	0	0	0	0	0
		Salmon	*0*	0	0	0	0	0	0	0	0
		Bottomfish	*136,361*	-136,361	0	0	0	0	0	0	0
		Combo	*0*	0	0	0	0	0	0	0	0
		HMS	*22,579*	0	0	0	0	0	0	0	0
		Other	*262,442*	-262,442	0	0	0	0	0	0	0
		TOTAL	*421,382*	-398,803	0	0	0	0	0	0	0
CALIFORNIA TOTALS											
		Charter	*296,364*	-295,689	-14,975	-7,959	-7,514	-7,125	-6,824	-5,209	-4,855
		Private	*689,241*	-663,476	-72,800	-46,687	-38,180	-32,950	-25,764	-18,696	-23,460
		TOTAL	*985,605*	-959,165	-87,775	-54,646	-45,693	-40,075	-32,588	-23,906	-28,314

Table 7-63a. Summary of estimated Washington recreational ocean angler expenditures by region in 2005, 2006 and 2007 and projected expenditures under the alternatives (million $).

State	Region	Boat Type / Trip Target	2005	2006	2007	No Action	WA Rec Alt 0	WA Rec Alt 1	WA Rec Alt 2	WA Rec Alt 3	Council Preferred Alt
WASHINGTON											
	North Washington Coast										
		Charter									
		Halibut	0.3	0.2	0.2	0.2	0.0	0.2	0.2	0.2	0.2
		Salmon	0.4	0.2	0.2	0.4	0.0	0.4	0.4	0.4	0.4
		Bottomfish	0.1	0.1	0.1	0.2	0.0	0.2	0.2	0.2	0.2
		Salm/Hlbt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	0.8	0.5	0.6	0.8	0.0	0.8	0.8	0.8	0.8
		Private									
		Halibut	0.2	0.2	0.2	0.2	0.0	0.2	0.2	0.2	0.2
		Salmon	0.6	0.5	0.5	0.5	0.0	0.5	0.5	0.5	0.5
		Bottomfish	0.2	0.2	0.2	0.2	0.0	0.2	0.2	0.2	0.2
		Salm/Hlbt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	1.0	0.9	0.9	1.0	0.0	1.0	1.0	1.0	1.0
	South & Central WA Coast										
		Charter									
		Halibut	0.8	0.7	0.6	0.6	0.0	0.6	0.6	0.6	0.6
		Salmon	7.2	5.7	6.4	6.9	0.0	6.9	6.9	6.9	6.9
		Bottomfish	3.1	3.9	3.5	3.5	0.0	3.5	3.5	3.5	3.5
		Salm/Hlbt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	0.2	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL	11.4	10.7	10.9	11.3	0.3	11.3	11.3	11.3	11.3
		Private									
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	3.0	2.0	2.4	2.9	0.0	2.9	2.9	2.9	2.9
		Bottomfish	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1
		Salm/Hlbt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	3.2	2.2	2.6	3.1	0.0	3.1	3.1	3.1	3.1
WASHINGTON TOTALS											
		Charter	12.2	11.2	11.5	12.1	0.3	12.1	12.1	12.1	12.1
		Private	4.2	3.1	3.5	4.1	0.0	4.1	4.0	4.0	4.1
		TOTAL	16.4	14.3	15.0	16.2	0.4	16.2	16.2	16.2	16.2

Table 7-63b. Summary of estimated Oregon recreational ocean angler expenditures by region in 2005, 2006 and 2007 and projected expenditures under the alternatives (million $).

State	Region	Boat Type / Trip Target	2005	2006	2007	No Action	OR Rec Alt 1	OR Rec Alt 2	OR Rec Alt 3	OR Rec Alt 3a	OR Rec Alt 4	OR Rec Alt 5	OR Rec Alt 5a	OR Rec Alt 6	Council Preferred Alt
OREGON															
	Astoria-Tillamook														
		Charter													
		Halibut	0.3	0.3	0.3	0.3	0.0	0.3	0.3	0.1	0.3	0.3	0.1	0.3	0.3
		Salmon	0.6	0.5	0.6	0.1	0.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
		Bottomfish	1.0	1.0	0.9	1.0	0.0	0.9	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		Combo	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Tuna	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	2.1	1.9	2.1	1.6	0.0	1.9	2.1	2.0	2.1	2.1	2.0	2.1	2.1
		Private													
		Halibut	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Salmon	1.2	1.2	1.6	0.3	0.0	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		Bottomfish	0.4	0.3	0.3	0.3	0.0	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		Combo	0.1	0.1	0.2	0.2	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		Tuna	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Other	0.1	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	1.9	1.9	2.3	1.0	0.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	Newport														
		Charter													
		Halibut	0.5	0.6	0.5	0.6	0.0	0.5	0.5	0.3	0.5	0.5	0.3	0.5	0.5
		Salmon	0.6	0.5	0.9	0.2	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		Bottomfish	4.5	4.5	4.4	4.3	0.0	3.7	4.6	4.6	4.6	4.6	4.6	4.6	4.6
		Combo	0.1	0.1	0.2	0.2	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		Tuna	0.2	0.1	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	5.9	5.9	6.5	5.4	0.2	5.6	6.6	6.3	6.6	6.6	6.3	6.6	6.6
		Private													
		Halibut	0.5	0.5	0.6	0.5	0.0	0.5	0.5	0.2	0.5	0.5	0.2	0.5	0.5
		Salmon	0.4	0.4	0.7	0.2	0.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
		Bottomfish	0.4	0.4	0.3	0.3	0.0	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		Combo	0.2	0.1	0.2	0.2	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		Tuna	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Other	0.1	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	1.7	1.5	2.2	1.3	0.1	1.8	1.9	1.6	1.9	1.9	1.6	1.9	1.9
	Coos Bay														
		Charter													
		Halibut	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Salmon	0.5	0.4	0.4	0.1	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		Bottomfish	0.8	0.9	0.9	0.9	0.0	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	1.5	1.5	1.5	1.2	0.0	1.5	1.7	1.6	1.7	1.7	1.6	1.7	1.7
		Private													
		Halibut	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1
		Salmon	1.2	0.9	1.2	0.3	0.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
		Bottomfish	0.3	0.4	0.4	0.3	0.0	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		Combo	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Tuna	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.2	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	2.0	1.6	2.0	0.9	0.0	1.9	2.0	1.9	2.0	2.0	1.9	2.0	2.0
	Brookings														
		Charter													
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Bottomfish	0.9	0.8	0.9	0.9	0.0	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	1.0	0.9	1.0	0.9	0.0	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		Private													
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	0.6	0.5	0.6	0.1	0.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
		Bottomfish	1.0	1.0	0.9	0.9	0.0	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		Combo	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Tuna	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.1	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	1.8	1.8	1.8	1.2	0.0	1.6	1.8	1.8	1.8	1.8	1.8	1.8	1.8
OREGON TOTALS															
		Charter	10.5	10.1	11.1	9.1	0.3	9.9	11.4	10.9	11.4	11.4	10.9	11.4	11.4
		Private	7.4	6.8	8.2	4.4	0.2	7.5	7.9	7.6	7.9	7.9	7.6	7.9	7.9
		TOTAL	17.9	16.9	19.3	13.5	0.6	17.4	19.3	18.5	19.3	19.3	18.5	19.3	19.3

Table 7-63c. Summary of estimated northern California recreational ocean angler expenditures by region in 2005, 2006 and 2007 and projected expenditures under the alternatives (million $).

State	Region	Boat Type / Trip Target	2005	2006	2007	No Action	CA Rec Alt 0	CA Rec Alt 1	CA Rec Alt 2	CA Rec Alt 3	CA Rec Alt 4	CA Rec Alt 5	CA Rec Alt 6	Council Preferred Alt
CALIFORNIA														
	North Coast: Humboldt and Del Norte counties													
		Charter												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Bottomfish	0.2	0.4	0.6	0.4	0.0	0.1	0.2	0.3	0.3	0.3	0.3	0.3
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	0.4	0.6	0.9	0.5	0.0	0.2	0.3	0.4	0.4	0.5	0.4	0.4
		Private												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	1.3	1.3	1.3	1.3	0.0	0.5	0.8	0.9	1.1	1.2	1.1	1.1
		Bottomfish	0.9	0.9	0.9	0.9	0.0	0.2	0.5	0.6	0.8	0.8	0.8	0.8
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	1.0	2.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	3.1	4.2	3.8	2.2	0.0	0.8	1.3	1.6	1.9	2.0	1.9	1.9
	North-Central Coast: Mendocino county													
		Charter												
		Halibut	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	0.1	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	0.1	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
		Private												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	1.7	1.0	0.8	0.9	0.0	0.3	0.3	0.5	0.5	0.6	0.9	0.8
		Bottomfish	0.4	0.5	0.5	0.5	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.2
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	2.2	1.5	1.4	1.4	0.0	0.3	0.3	0.6	0.6	0.8	1.2	1.1
	North-Central Coast: San Mateo County through Sonoma County													
		Charter												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	2.1	0.0	0.8	0.8	0.0	0.6	0.8	0.8	0.8	0.8	0.8	0.8
		Bottomfish	2.9	8.2	4.3	4.9	0.0	3.2	4.2	4.2	4.2	4.2	4.2	4.4
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.3	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		TOTAL	5.3	8.2	5.2	5.8	0.0	4.0	5.1	5.1	5.1	5.1	5.1	5.3
		Private												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	3.6	2.6	1.5	2.2	0.0	1.7	2.0	2.0	2.0	2.0	2.0	2.0
		Bottomfish	1.3	2.1	1.2	1.5	0.0	1.0	1.3	1.3	1.3	1.3	1.3	1.3
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Other	2.5	2.9	2.0	1.8	0.0	1.4	1.6	1.6	1.6	1.6	1.6	1.5
		TOTAL	7.4	7.7	4.8	5.5	0.1	4.1	5.0	5.0	5.0	5.0	5.0	5.0

Table 7-63d. Summary of estimated southern California recreational ocean angler expenditures by region in 2005, 2006 and 2007 and projected expenditures under the alternatives (million $).

State	Region	Boat Type / Trip Target	2005	2006	2007	No Action	CA Rec Alt 0	CA Rec Alt 1	CA Rec Alt 2	CA Rec Alt 3	CA Rec Alt 4	CA Rec Alt 5	CA Rec Alt 6	Council Preferred Alt
CALIFORNIA														
	South-Central Coast: San Luis Obispo County through Santa Cruz County													
		Charter												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	0.3	0.0	0.3	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Bottomfish	3.5	4.2	5.1	4.2	0.0	3.9	3.9	3.9	3.9	3.9	4.2	4.0
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.1	0.1	1.4	0.5	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		TOTAL	3.9	4.3	6.7	4.8	0.0	4.5	4.5	4.5	4.5	4.5	4.8	4.7
		Private												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	2.2	1.3	1.7	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		Bottomfish	1.6	2.1	1.9	1.8	0.0	1.7	1.7	1.7	1.7	1.7	1.8	1.8
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Other	0.6	0.5	0.5	0.5	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		TOTAL	4.5	4.0	4.2	3.5	0.1	3.3	3.3	3.3	3.3	3.3	3.5	3.4
	South Coast: Ventura and Santa Barbara counties													
		Charter												
		Halibut	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	4.4	2.8	5.2	4.0	0.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.5	0.5	0.3	0.4	0.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		TOTAL	4.9	3.4	5.5	4.5	0.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5
		Private												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Bottomfish	1.3	1.0	1.0	1.1	0.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.7	0.8	1.0	0.8	0.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		TOTAL	2.1	1.9	2.2	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	South Coast: San Diego County through Los Angeles County													
		Charter												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Bottomfish	28.8	15.8	22.1	20.9	0.0	20.9	20.9	20.9	20.9	20.9	20.9	20.9
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Other	14.6	10.5	9.2	10.9	0.0	10.9	10.9	10.9	10.9	10.9	10.9	10.9
		TOTAL	43.7	26.3	31.4	32.0	0.1	32.0	32.0	32.0	32.0	32.0	32.0	32.0
		Private												
		Halibut	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	7.4	6.8	8.6	7.2	0.0	7.2	7.2	7.2	7.2	7.2	7.2	7.2
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.8	1.7	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Other	14.5	17.1	11.8	13.8	0.0	13.8	13.8	13.8	13.8	13.8	13.8	13.8
		TOTAL	22.8	25.6	21.5	22.2	1.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2
CALIFORNIA TOTALS														
		Charter	58	43	50	48	0	45	46	46	46	47	47	47
		Private	42	45	38	37	1	33	34	35	35	35	36	35
		TOTAL	100	88	88	85	1	78	81	81	81	82	83	82

Table 7-64a. Summary of estimated Washington recreational ocean angler income impacts by region in 2005, 2006 and 2007 and projected under the alternatives (million $). (Income impacts are a measure of total economic activity connected with Council-managed ocean area recreational angler trip expenditures.)

State	Region	Boat Type / Trip Target	2005	2006	2007	No Action	WA Rec Alt 0	WA Rec Alt 1	WA Rec Alt 2	WA Rec Alt 3	Council Preferred Alt
WASHINGTON											
	North Washington Coast										
		Charter									
		Halibut	0.2	0.2	0.2	0.2	0.0	0.2	0.2	0.2	0.2
		Salmon	0.4	0.2	0.2	0.3	0.0	0.3	0.3	0.3	0.3
		Bottomfish	0.1	0.1	0.1	0.2	0.0	0.2	0.2	0.2	0.2
		Salm/Hlbt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	0.7	0.5	0.5	0.7	0.0	0.7	0.7	0.7	0.7
		Private									
		Halibut	0.2	0.2	0.2	0.2	0.0	0.2	0.2	0.2	0.2
		Salmon	0.4	0.3	0.3	0.4	0.0	0.4	0.4	0.4	0.4
		Bottomfish	0.2	0.1	0.2	0.2	0.0	0.2	0.1	0.1	0.2
		Salm/Hlbt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	0.7	0.6	0.7	0.7	0.0	0.7	0.7	0.7	0.7
	South & Central WA Coast										
		Charter									
		Halibut	0.7	0.6	0.6	0.6	0.0	0.6	0.6	0.6	0.6
		Salmon	6.3	5.1	5.6	6.1	0.0	6.1	6.1	6.1	6.1
		Bottomfish	2.8	3.4	3.1	3.1	0.0	3.1	3.1	3.1	3.1
		Salm/Hlbt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	0.2	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL	10.1	9.4	9.6	10.0	0.3	10.0	10.0	10.0	10.0
		Private									
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	2.2	1.4	1.7	2.1	0.0	2.1	2.1	2.1	2.1
		Bottomfish	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1
		Salm/Hlbt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	2.3	1.5	1.8	2.2	0.0	2.2	2.2	2.2	2.2
WASHINGTON TOTALS											
		Charter	10.8	9.9	10.1	10.7	0.3	10.7	10.7	10.7	10.7
		Private	3.0	2.2	2.5	2.9	0.0	2.9	2.9	2.9	2.9
		TOTAL	13.8	12.1	12.6	13.6	0.3	13.6	13.6	13.6	13.6

Table 7-64b. Summary of estimated Oregon recreational ocean angler income impacts by region in 2005, 2006 and 2007 and projected under the alternatives (million $). (Income impacts are a measure of total economic activity connected with Council-managed ocean area recreational angler trip expenditures.)

State	Region	Boat Type / Trip Target	2005	2006	2007	No Action	OR Rec Alt 1	OR Rec Alt 2	OR Rec Alt 3	OR Rec Alt 3a	OR Rec Alt 4	OR Rec Alt 5	OR Rec Alt 5a	OR Rec Alt 6	Council Preferred Alt
OREGON															
	Astoria-Tillamook														
		Charter													
		Halibut	0.2	0.2	0.2	0.2	0.0	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.2
		Salmon	0.5	0.4	0.5	0.1	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		Bottomfish	0.8	0.8	0.7	0.8	0.0	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		Combo	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Tuna	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	1.7	1.5	1.6	1.2	0.0	1.5	1.7	1.6	1.7	1.7	1.6	1.7	1.7
		Private													
		Halibut	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1
		Salmon	0.9	0.9	1.1	0.2	0.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		Bottomfish	0.3	0.2	0.2	0.2	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		Combo	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Tuna	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	1.4	1.4	1.7	0.7	0.0	1.5	1.6	1.5	1.6	1.6	1.5	1.6	1.6
	Newport														
		Charter													
		Halibut	0.4	0.5	0.4	0.4	0.0	0.4	0.4	0.2	0.4	0.4	0.2	0.4	0.4
		Salmon	0.5	0.4	0.7	0.2	0.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		Bottomfish	3.6	3.6	3.5	3.4	0.0	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7
		Combo	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Tuna	0.1	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	4.7	4.7	5.2	4.3	0.2	4.5	5.2	5.0	5.2	5.2	5.0	5.2	5.2
		Private													
		Halibut	0.4	0.4	0.4	0.4	0.0	0.3	0.3	0.2	0.3	0.3	0.2	0.3	0.3
		Salmon	0.3	0.3	0.5	0.1	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		Bottomfish	0.3	0.3	0.2	0.2	0.0	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		Combo	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Tuna	0.0	0.0	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Other	0.1	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	1.2	1.1	1.5	0.9	0.1	1.3	1.3	1.2	1.3	1.3	1.2	1.3	1.3
	Coos Bay														
		Charter													
		Halibut	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1
		Salmon	0.4	0.3	0.3	0.1	0.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		Bottomfish	0.7	0.7	0.8	0.7	0.0	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	1.2	1.2	1.2	1.0	0.0	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3
		Private													
		Halibut	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1
		Salmon	0.9	0.6	0.8	0.2	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		Bottomfish	0.2	0.3	0.3	0.2	0.0	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		Combo	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Tuna	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.1	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	1.4	1.1	1.4	0.6	0.0	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4
	Brookings														
		Charter													
		Halibut	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	0.7	0.6	0.7	0.7	0.0	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	0.8	0.7	0.8	0.7	0.0	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		Private													
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	0.4	0.4	0.4	0.1	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		Bottomfish	0.7	0.7	0.7	0.7	0.0	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7
		Combo	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Tuna	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.1	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	1.3	1.3	1.2	0.9	0.0	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3
OREGON TOTALS															
		Charter	8.4	8.0	8.8	7.3	0.3	7.9	9.1	8.7	9.1	9.1	8.7	9.1	9.1
		Private	5.3	4.8	5.9	3.1	0.2	5.3	5.6	5.4	5.6	5.6	5.4	5.6	5.6
		TOTAL	13.6	12.9	14.7	10.4	0.4	13.2	14.7	14.1	14.7	14.7	14.1	14.7	14.7

Table 7-64c. Summary of estimated northern California recreational ocean angler income impacts by region in 2005, 2006 and 2007 and projected under the alternatives (million $). (Income impacts are a measure of total economic activity connected with Council-managed ocean area recreational angler trip expenditures.)

State	Region	Boat Type / Trip Target	2005	2006	2007	No Action	CA Rec Alt 0	CA Rec Alt 1	CA Rec Alt 2	CA Rec Alt 3	CA Rec Alt 4	CA Rec Alt 5	CA Rec Alt 6	Council Preferred Alt
CALIFORNIA														
	North Coast: Humboldt and Del Norte counties													
		Charter												
		Halibut	0.0	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	0.1	0.2	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
		Bottomfish	0.2	0.3	0.5	0.3	0.0	0.1	0.2	0.2	0.3	0.3	0.3	0.3
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	0.3	0.5	0.8	0.4	0.0	0.1	0.3	0.3	0.4	0.4	0.4	0.4
		Private												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	1.0	1.0	1.0	1.0	0.0	0.4	0.6	0.7	0.8	0.9	0.8	0.9
		Bottomfish	0.7	0.7	0.7	0.7	0.0	0.2	0.4	0.5	0.6	0.6	0.6	0.6
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.8	1.6	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	2.5	3.3	3.0	1.7	0.0	0.6	1.1	1.3	1.5	1.6	1.5	1.5
	North-Central Coast: Mendocino county													
		Charter												
		Halibut	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	0.1	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	0.1	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
		Private												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	1.4	0.8	0.6	0.7	0.0	0.2	0.2	0.4	0.4	0.5	0.7	0.7
		Bottomfish	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	1.7	1.2	1.1	1.1	0.0	0.2	0.2	0.4	0.4	0.6	1.0	0.9
	North-Central Coast: San Mateo County through Sonoma County													
		Charter												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	1.8	0.0	0.7	0.7	0.0	0.5	0.7	0.7	0.7	0.7	0.7	0.6
		Bottomfish	2.4	6.9	3.6	4.1	0.0	2.7	3.5	3.5	3.5	3.5	3.5	3.7
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.3	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		TOTAL	4.5	6.9	4.4	5.0	0.0	3.4	4.3	4.3	4.3	4.3	4.3	4.5
		Private												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	2.8	2.1	1.2	1.8	0.0	1.3	1.6	1.6	1.6	1.6	1.6	1.6
		Bottomfish	1.0	1.7	1.0	1.2	0.0	0.8	1.0	1.0	1.0	1.0	1.0	1.1
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
		Other	2.0	2.3	1.6	1.4	0.0	1.1	1.3	1.3	1.3	1.3	1.3	1.2
		TOTAL	5.9	6.1	3.8	4.4	0.0	3.3	4.0	4.0	4.0	4.0	4.0	3.9

Table 7-64d. Summary of estimated southern California recreational ocean angler income impacts by region in 2005, 2006 and 2007 and projected under the alternatives (million $). (Income impacts are a measure of total economic activity connected with Council-managed ocean area recreational angler trip expenditures.)

State	Region	Boat Type / Trip Target	2005	2006	2007	No Action	CA Rec Alt 0	CA Rec Alt 1	CA Rec Alt 2	CA Rec Alt 3	CA Rec Alt 4	CA Rec Alt 5	CA Rec Alt 6	Council Preferred Alt
CALIFORNIA														
	South-Central Coast: San Luis Obispo County through Santa Cruz County													
		Charter												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	0.2	0.0	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Bottomfish	2.7	3.2	3.9	3.2	0.0	3.0	3.0	3.0	3.0	3.0	3.2	3.1
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.1	0.1	1.1	0.4	0.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		TOTAL	3.0	3.3	5.2	3.7	0.0	3.5	3.5	3.5	3.5	3.5	3.7	3.6
		Private												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	1.7	1.0	1.3	0.8	0.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		Bottomfish	1.3	1.7	1.5	1.4	0.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Other	0.5	0.4	0.4	0.4	0.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		TOTAL	3.5	3.1	3.3	2.7	0.1	2.6	2.6	2.6	2.6	2.6	2.7	2.6
	South Coast: Ventura and Santa Barbara counties													
		Charter												
		Halibut	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	3.4	2.2	4.0	3.1	0.0	3.1	3.1	3.1	3.1	3.1	3.1	3.1
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.4	0.4	0.2	0.3	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL	3.8	2.6	4.2	3.5	0.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5
		Private												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Bottomfish	1.0	0.8	0.8	0.8	0.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	0.6	0.6	0.8	0.6	0.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		TOTAL	1.6	1.5	1.7	1.6	0.0	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	South Coast: San Diego County through Los Angeles County													
		Charter												
		Halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	22.2	12.2	17.1	16.2	0.0	16.2	16.2	16.2	16.2	16.2	16.2	16.2
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Other	11.3	8.1	7.1	8.4	0.0	8.4	8.4	8.4	8.4	8.4	8.4	8.4
		TOTAL	33.7	20.3	24.3	24.7	0.1	24.7	24.7	24.7	24.7	24.7	24.7	24.7
		Private												
		Halibut	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	5.8	5.3	6.7	5.6	0.0	5.6	5.6	5.6	5.6	5.6	5.6	5.6
		Combo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	0.6	1.3	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
		Other	11.3	13.3	9.2	10.7	0.0	10.7	10.7	10.7	10.7	10.7	10.7	10.7
		TOTAL	17.7	19.9	16.7	17.2	0.9	17.2	17.2	17.2	17.2	17.2	17.2	17.2
CALIFORNIA TOTALS														
		Charter	45.5	33.7	39.2	37.3	0.1	35.1	36.2	36.3	36.3	36.4	36.6	36.6
		Private	33.0	35.1	29.6	28.8	1.1	25.5	26.7	27.1	27.3	27.6	27.9	27.7
		TOTAL	78.4	68.8	68.8	66.1	1.1	60.7	62.9	63.3	63.6	64.0	64.5	64.4

Table 7-65a. Change in projected Washington recreational income impacts across action alternatives compared with No Action (million $). (Income impacts are a measure of total economic activity connected with Council-managed ocean area recreational angler trip expenditures.)

State	Region	Boat Type / Trip Target	*No Action*	WA Rec Alt 0	WA Rec Alt 1	WA Rec Alt 2	WA Rec Alt 3	Council Preferred Alt
WASHINGTON								
	North Washington Coast							
		Charter						
		Halibut	*0.2*	-0.2	0.0	0.0	0.0	0.0
		Salmon	*0.3*	-0.3	0.0	0.0	0.0	0.0
		Bottomfish	*0.2*	-0.2	0.0	0.0	0.0	0.0
		Salm/Hlbt	*0.0*	0.0	0.0	0.0	0.0	0.0
		Tuna	*0.0*	0.0	0.0	0.0	0.0	0.0
		TOTAL	*0.7*	-0.7	0.0	0.0	0.0	0.0
		Private						
		Halibut	*0.2*	-0.2	0.0	0.0	0.0	0.0
		Salmon	*0.4*	-0.4	0.0	0.0	0.0	0.0
		Bottomfish	*0.2*	-0.2	0.0	0.0	0.0	0.0
		Salm/Hlbt	*0.0*	0.0	0.0	0.0	0.0	0.0
		Tuna	*0.0*	0.0	0.0	0.0	0.0	0.0
		TOTAL	*0.7*	-0.7	0.0	0.0	0.0	0.0
	South & Central WA Coast							
		Charter						
		Halibut	*0.6*	-0.6	0.0	0.0	0.0	0.0
		Salmon	*6.1*	-6.1	0.0	0.0	0.0	0.0
		Bottomfish	*3.1*	-3.1	0.0	0.0	0.0	0.0
		Salm/Hlbt	*0.0*	0.0	0.0	0.0	0.0	0.0
		Tuna	*0.3*	0.0	0.0	0.0	0.0	0.0
		TOTAL	*10.0*	-9.7	0.0	0.0	0.0	0.0
		Private						
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0
		Salmon	*2.1*	-2.1	0.0	0.0	0.0	0.0
		Bottomfish	*0.1*	-0.1	0.0	0.0	0.0	0.0
		Salm/Hlbt	*0.0*	0.0	0.0	0.0	0.0	0.0
		Tuna	*0.0*	0.0	0.0	0.0	0.0	0.0
		TOTAL	*2.2*	-2.2	0.0	0.0	0.0	0.0
WASHINGTON TOTALS								
		Charter	*10.7*	-10.4	0.0	0.0	0.0	0.0
		Private	*2.9*	-2.9	0.0	0.0	0.0	0.0
		TOTAL	*13.6*	-13.3	0.0	0.0	0.0	0.0

Table 7-65b. Change in projected Oregon recreational income impacts across action alternatives compared with No Action (million $). (Income impacts are a measure of total economic activity connected with Council-managed ocean area recreational angler trip expenditures.)

State	Region	Boat Type / Trip Target	*No Action*	OR Rec Alt 1	OR Rec Alt 2	OR Rec Alt 3	OR Rec Alt 3a	OR Rec Alt 4	OR Rec Alt 5	OR Rec Alt 5a	OR Rec Alt 6	Council Preferred Alt
OREGON												
	Astoria-Tillamook											
		Charter										
		Halibut	*0.2*	-0.2	0.0	0.0	-0.1	0.0	0.0	-0.1	0.0	0.0
		Salmon	*0.1*	-0.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		Bottomfish	*0.8*	-0.8	-0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Combo	*0.1*	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*1.2*	-1.2	0.3	0.5	0.4	0.5	0.5	0.4	0.5	0.5
		Private										
		Halibut	*0.1*	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*0.2*	-0.2	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
		Bottomfish	*0.2*	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Combo	*0.1*	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*0.7*	-0.6	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	Newport											
		Charter										
		Halibut	*0.4*	-0.4	0.0	0.0	-0.2	0.0	0.0	-0.2	0.0	0.0
		Salmon	*0.2*	-0.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		Bottomfish	*3.4*	-3.4	-0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		Combo	*0.1*	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	*0.2*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*4.3*	-4.2	0.2	0.9	0.7	0.9	0.9	0.7	0.9	0.9
		Private										
		Halibut	*0.4*	-0.4	0.0	0.0	-0.2	0.0	0.0	-0.2	0.0	0.0
		Salmon	*0.1*	-0.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		Bottomfish	*0.2*	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Combo	*0.1*	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	*0.1*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*0.9*	-0.9	0.3	0.4	0.2	0.4	0.4	0.2	0.4	0.4
	Coos Bay											
		Charter										
		Halibut	*0.1*	-0.1	0.0	0.0	-0.1	0.0	0.0	-0.1	0.0	0.0
		Salmon	*0.1*	-0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		Bottomfish	*0.7*	-0.7	-0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Combo	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*1.0*	-0.9	0.2	0.4	0.3	0.4	0.4	0.3	0.4	0.4
		Private										
		Halibut	*0.1*	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*0.2*	-0.2	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		Bottomfish	*0.2*	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Combo	*0.1*	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*0.6*	-0.6	0.7	0.8	0.7	0.8	0.8	0.7	0.8	0.8
	Brookings											
		Charter										
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	*0.7*	-0.7	-0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Combo	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*0.7*	-0.7	-0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Private										
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*0.1*	-0.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		Bottomfish	*0.7*	-0.7	-0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Combo	*0.1*	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Tuna	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*0.9*	-0.9	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4
OREGON TOTALS												
		Charter	*7.3*	-7.0	0.6	1.8	1.5	1.8	1.8	1.5	1.8	1.8
		Private	*3.1*	-3.0	2.2	2.5	2.2	2.5	2.5	2.2	2.5	2.5
		TOTAL	*10.4*	-10.0	2.8	4.3	3.7	4.3	4.3	3.7	4.3	4.3

Table 7-65c. Change in projected northern California recreational income impacts across action alternatives compared with No Action (million $). (Income impacts are a measure of total economic activity connected with Council-managed ocean area recreational angler trip expenditures.)

State	Region	Boat Type / Trip Target	*No Action*	CA Rec Alt 0	CA Rec Alt 1	CA Rec Alt 2	CA Rec Alt 3	CA Rec Alt 4	CA Rec Alt 5	CA Rec Alt 6	Council Preferred Alt
CALIFORNIA											
	North Coast: Humboldt and Del Norte counties										
		Charter									
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*0.1*	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	*0.3*	-0.3	-0.2	-0.1	-0.1	0.0	0.0	0.0	0.0
		Combo	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*0.4*	-0.4	-0.3	-0.2	-0.1	-0.1	0.0	-0.1	-0.1
		Private									
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*1.0*	-1.0	-0.6	-0.4	-0.3	-0.2	-0.1	-0.2	-0.2
		Bottomfish	*0.7*	-0.7	-0.5	-0.3	-0.2	-0.1	-0.1	-0.1	-0.1
		Combo	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*1.7*	-1.7	-1.1	-0.7	-0.5	-0.3	-0.1	-0.3	-0.3
	North-Central Coast: Mendocino county										
		Charter									
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	*0.1*	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
		Combo	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*0.1*	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
		Private									
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*0.7*	-0.7	-0.5	-0.5	-0.4	-0.4	-0.2	0.0	-0.1
		Bottomfish	*0.4*	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3	-0.1	-0.2
		Combo	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*1.1*	-1.1	-0.9	-0.9	-0.7	-0.7	-0.5	-0.2	-0.3
	North-Central Coast: San Mateo County through Sonoma County										
		Charter									
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*0.7*	-0.7	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
		Bottomfish	*4.1*	-4.1	-1.4	-0.6	-0.6	-0.6	-0.6	-0.6	-0.4
		Combo	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.1*	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*5.0*	-5.0	-1.6	-0.7	-0.7	-0.7	-0.7	-0.7	-0.5
		Private									
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*1.8*	-1.8	-0.4	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2
		Bottomfish	*1.2*	-1.2	-0.4	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1
		Combo	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	*0.1*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*1.4*	-1.4	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2
		TOTAL	*4.4*	-4.3	-1.1	-0.4	-0.4	-0.4	-0.4	-0.4	-0.5

Table 7-65d. Change in projected southern California recreational income impacts across action alternatives compared with No Action (million $). (Income impacts are a measure of total economic activity connected with Council-managed ocean area recreational angler trip expenditures.)

State	Region	Boat Type / Trip Target	*No Action*	CA Rec Alt 0	CA Rec Alt 1	CA Rec Alt 2	CA Rec Alt 3	CA Rec Alt 4	CA Rec Alt 5	CA Rec Alt 6	Council Preferred Alt
CALIFORNIA											
	South-Central Coast: San Luis Obispo County through Santa Cruz County										
		Charter									
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*0.1*	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	*3.2*	-3.2	-0.2	-0.2	-0.2	-0.2	-0.2	0.0	-0.1
		Combo	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.4*	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*3.7*	-3.7	-0.2	-0.2	-0.2	-0.2	-0.2	0.0	-0.1
		Private									
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*0.8*	-0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	*1.4*	-1.4	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0
		Combo	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	*0.1*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.4*	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*2.7*	-2.6	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0
	South Coast: Ventura and Santa Barbara counties										
		Charter									
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	*3.1*	-3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Combo	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.3*	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*3.5*	-3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Private									
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*0.1*	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	*0.8*	-0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Combo	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*0.6*	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*1.6*	-1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	South Coast: San Diego County through Los Angeles County										
		Charter									
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	*16.2*	-16.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Combo	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	*0.1*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*8.4*	-8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*24.7*	-24.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Private									
		Halibut	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Salmon	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Bottomfish	*5.6*	-5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Combo	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		HMS	*0.9*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Other	*10.7*	-10.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		TOTAL	*17.2*	-16.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALIFORNIA TOTALS											
		Charter	*37*	-37	-2	-1	-1	-1	-1	-1	-1
		Private	*29*	-28	-3	-2	-2	-1	-1	-1	-1
		TOTAL	*66*	-65	-5	-3	-3	-2	-2	-2	-2

Table 7-66a. Summary of recreational angler effort by port area (angler trips).

Region	2005	2006	2007	No Action	"Zero Yelloweye" Alternative	Council Preferred Alt
North Washington Coast	22,924	19,263	20,085	22,427	168	22,427
South & Central WA Coast	108,604	86,099	94,597	105,927	2,145	105,927
Astoria-Tillamook	42,082	40,725	48,451	23,521	1,066	47,262
Newport	56,780	54,244	67,659	48,889	2,932	63,565
Coos Bay	39,604	33,603	40,518	20,171	990	40,357
Brookings	35,166	33,222	33,602	24,683	491	35,038
Crescent City-Eureka	57,832	78,124	73,557	42,174	1	36,062
Fort Bragg	39,927	26,756	26,633	26,705	0	19,912
Bodega Bay - San Francisco	162,383	184,336	115,451	131,790	919	118,207
Monterey - Morro Bay	110,162	102,428	122,532	95,796	1,820	93,969
Santa Barbara	71,410	57,980	76,902	66,493	451	66,493
Los Angeles - San Diego	708,173	652,322	606,012	622,647	23,249	622,647
TOTAL	1,455,047	1,369,102	1,325,999	1,231,224	34,233	1,271,867

Table 7-66b. Change in recreational angler effort by port area from No Action (angler trips).

Region	No Action	"Zero Yelloweye" Alternative	Council Preferred Alt
North Washington Coast	*22,427*	-22,259	-
South & Central WA Coast	*105,927*	-103,782	-
Astoria-Tillamook	*23,521*	-22,455	+23,741
Newport	*48,889*	-45,956	+14,677
Coos Bay	*20,171*	-19,181	+20,185
Brookings	*24,683*	-24,193	+10,355
Crescent City-Eureka	*42,174*	-42,173	-6,112
Fort Bragg	*26,705*	-26,705	-6,793
Bodega Bay - San Francisco	*131,790*	-130,871	-13,583
Monterey - Morro Bay	*95,796*	-93,976	-1,827
Santa Barbara	*66,493*	-66,042	-
Los Angeles - San Diego	*622,647*	-599,398	-
TOTAL	*1,231,224*	-1,196,991	+40,644

Table 7-67a. Summary of recreational angler expenditures by port area (million $).

Region	2005	2006	2007	No Action	"Zero Yelloweye" Alternative	Council Preferred Alt
North Washington Coast	1.8	1.4	1.5	1.8	0.0	1.8
South & Central WA Coast	14.6	12.9	13.4	14.4	0.4	14.4
Astoria-Tillamook	4.0	3.8	4.4	2.5	0.1	4.4
Newport	7.6	7.4	8.7	6.8	0.3	8.4
Coos Bay	3.4	3.1	3.5	2.1	0.1	3.6
Brookings	2.8	2.6	2.7	2.1	0.0	2.9
Crescent City-Eureka	3.5	4.8	4.7	2.7	0.0	2.3
Fort Bragg	2.3	1.5	1.7	1.6	0.0	1.2
Bodega Bay - San Francisco	12.7	15.9	10.0	11.4	0.1	10.2
Monterey - Morro Bay	8.4	8.3	11.0	8.2	0.1	8.1
Santa Barbara	7.1	5.3	7.7	6.5	0.0	6.5
Los Angeles - San Diego	66.5	51.9	52.9	54.1	1.3	54.1
TOTAL	135	119	122	114	2	118

Table 7-67b. Change in recreational angler expenditures by port area from No Action (million $).

Region	No Action	"Zero Yelloweye" alternative	Council Preferred Alt
North Washington Coast	*1.8*	-1.8	-
South & Central WA Coast	*14.4*	-14.0	-
Astoria-Tillamook	*2.5*	-2.4	+1.9
Newport	*6.8*	-6.4	+1.7
Coos Bay	*2.1*	-2.0	+1.5
Brookings	*2.1*	-2.1	+0.7
Crescent City-Eureka	*2.7*	-2.7	-0.4
Fort Bragg	*1.6*	-1.6	-0.4
Bodega Bay - San Francisco	*11.4*	-11.3	-1.1
Monterey - Morro Bay	*8.2*	-8.1	-0.2
Santa Barbara	*6.5*	-6.5	-
Los Angeles - San Diego	*54.1*	-52.8	-
TOTAL	*114*	-111.8	+3.6

Table 7-68a. Summary of income impacts generated by recreational angler expenditures by port area (million $). (Income impacts are a measure of total economic activity connected with Council-managed ocean area recreational angler trip expenditures.)

Region	2005	2006	2007	No Action	"Zero Yelloweye" Alternative	Council Preferred Alt
North Washington Coast	1.4	1.1	1.2	1.4	0.0	1.4
South & Central WA Coast	12.3	11.0	11.4	12.2	0.3	12.2
Astoria-Tillamook	3.0	2.9	3.3	1.9	0.1	3.3
Newport	5.9	5.8	6.7	5.3	0.3	6.6
Coos Bay	2.6	2.3	2.7	1.6	0.1	2.7
Brookings	2.1	1.9	2.0	1.6	0.0	2.1
Crescent City-Eureka	2.8	3.8	3.8	2.2	0.0	1.9
Fort Bragg	1.9	1.2	1.4	1.3	0.0	0.9
Bodega Bay - San Francisco	10.4	13.1	8.2	9.3	0.0	8.4
Monterey - Morro Bay	6.5	6.4	8.5	6.4	0.1	6.2
Santa Barbara	5.5	4.1	6.0	5.0	0.0	5.0
Los Angeles - San Diego	51.4	40.2	40.9	41.9	1.0	41.9
TOTAL	106	94	96	90	2	93

Table 7-68b. Change in recreational angler income impacts by port area from No Action (million $). (Income impacts are a measure of total economic activity connected with Council-managed ocean area recreational angler trip expenditures.)

Region	No Action	"Zero Yelloweye" Alternative	Council Preferred Alt
North Washington Coast	*1.4*	-1.4	-
South & Central WA Coast	*12.2*	-11.9	-
Astoria-Tillamook	*1.9*	-1.9	+1.4
Newport	*5.3*	-5.0	+1.3
Coos Bay	*1.6*	-1.5	+1.1
Brookings	*1.6*	-1.6	+0.5
Crescent City-Eureka	*2.2*	-2.2	-0.3
Fort Bragg	*1.3*	-1.3	-0.4
Bodega Bay - San Francisco	*9.3*	-9.3	-0.9
Monterey - Morro Bay	*6.4*	-6.3	-0.1
Santa Barbara	*5.0*	-5.0	-
Los Angeles - San Diego	*41.9*	-40.9	-
TOTAL	*90*	-88.2	+2.6

Table 7-69a. Summary of income impacts generated by recreational angler expenditures on groundfish trips by port area (million $). (Income impacts are a measure of total economic activity connected with Council-managed ocean area recreational angler trip expenditures.)

Region	2005	2006	2007	No Action	"Zero Yelloweye" alternative	Council Preferred Alt
North Washington Coast	0.3	0.2	0.3	0.4	0.0	0.4
South & Central WA Coast	2.9	3.5	3.1	3.1	0.0	3.1
Astoria-Tillamook	1.1	1.1	0.9	1.0	0.0	1.1
Newport	3.9	3.9	3.8	3.7	0.0	4.0
Coos Bay	0.9	1.0	1.0	0.9	0.0	1.0
Brookings	1.5	1.4	1.4	1.3	0.0	1.5
Crescent City-Eureka	0.8	1.0	1.2	1.0	0.0	0.9
Fort Bragg	0.5	0.4	0.7	0.5	0.0	0.2
Bodega Bay - San Francisco	3.5	8.6	4.6	5.3	0.0	4.8
Monterey - Morro Bay	4.0	4.9	5.4	4.7	0.0	4.5
Santa Barbara	4.4	3.0	4.8	4.0	0.0	4.0
Los Angeles - San Diego	28.0	17.5	23.8	21.7	0.0	21.7
TOTAL	52	46	51	48	0	47

Table 7-69b. Change in recreational angler income impacts from on groundfish trips by port area from No Action (million $). (Income impacts are a measure of total economic activity connected with Council-managed ocean area recreational angler trip expenditures.)

Region	No Action	"Zero Yelloweye" alternative	Council Preferred Alt
North Washington Coast	*0.4*	-0.4	-
South & Central WA Coast	*3.1*	-3.1	-
Astoria-Tillamook	*1.0*	-1.0	+0.1
Newport	*3.7*	-3.7	+0.3
Coos Bay	*0.9*	-0.9	+0.1
Brookings	*1.3*	-1.3	+0.1
Crescent City-Eureka	*1.0*	-1.0	-0.1
Fort Bragg	*0.5*	-0.5	-0.3
Bodega Bay - San Francisco	*5.3*	-5.3	-0.5
Monterey - Morro Bay	*4.7*	-4.7	-0.1
Santa Barbara	*4.0*	-4.0	-
Los Angeles - San Diego	*21.7*	-21.7	-
TOTAL	*48*	-47.6	-0.5

7.2.9.3 *Commercial Fisheries Impact Comparison*

Under the No Action Alternative, total west coast landings from all fisheries including groundfish would yield 539,000 mt of fish and shellfish landed shoreside or delivered at sea (Table 7-57b), generating about $318 million in exvessel revenue (Table 7-57a), which in turn would lead to $695 million in income impacts (Table 7-57c). Reb Alt 3 would lead to an estimated $667 million in personal income, a 4 percent reduction in income impacts, whereas Reb Alt 4 would yield income impacts of $739 million, an increase of 6 percent relative to No Action. For non-tribal groundfish income impacts, the No Action Alternative would yield an estimated personal income of about $162 million. Implementation of Reb Alt 3 would lead to a decline of $34 million in non-tribal groundfish fishery generated income, a 21 percent decline. Reb Alt 4 would increase estimated non-tribal groundfish fishery generated income by $38 million (23 percent).

Income from shoreside non-whiting limited entry trawl sector activities is lowest under Reb Alt 3 (-29 percent) and greatest under Reb. Alt 4 and the Council-preferred Alternative (+11 percent). Compared to the No Action Alternative, the final Council-preferred Alternative would yield increases in total landings, revenue and income impacts for all commercial fisheries sector groupings shown in Table 7-57c. Implementing this alternative would lead to an estimated increase in income impacts from commercial non-tribal groundfish landings of 12 percent, and an increase in income impacts from total west coast landings of 3 percent.

7.2.9.4 *Recreational Fisheries Impact Comparison*

Unfortunately, with the exception of the “No Action,” and Council-preferred alternatives, it is not possible to “stack” the states’ recreational fisheries management alternatives to facilitate comparison of impacts under the individual state recreational fisheries alternatives. The broad comparisons made below are therefore limited to the Council-preferred alternative against No Action.

It is estimated that under the No Action Alternative, 1.2 million angler trips would be taken (Table 7-66a) and the estimated $114 million that these anglers would spend on their trips (Table 7-67a) would generate $90 million in personal income (Table 7-68a). These estimates are lower than the ones generated for 2005, 2006 and 2007 mainly due to increasingly stringent measures imposed to protect yelloweye rockfish since 2005. Under the Council-preferred Alternative, an estimated 1.27 million trips would be taken leading to $118 million in expenditures, and $93 million in income impacts. This represents an increase of $2.6 million (+3 percent) compared with No Action.

With respect to groundfish-targeted trips only, the No Action Alternative leads to $48 million in personal income impacts (Table 7-69a). This is slightly down from 2005 and 2007, but slightly above the level in 2006. Under the final Council-preferred alternative, an estimated $47 million in income impacts would be associated with groundfish-targeted trips. Table 7-69b shows that communities along the Oregon coast would gain while gain for communities in Northern and Central California would be less well off than under No Action.

7.2.10 Other Analyses

7.2.10.1 *Economic Impacts of Zero Harvest Alternatives for Rebuilding Species*

The analysis of zero harvest alternatives examined the economic impacts of setting combinations of overfished species OYs to zero, where the combinations were determined based on the correlation of species across latitude and depths. Species that were combined under this definition are: canary and yelloweye rockfish; bocaccio and cowcod; and POP and darkblotched rockfish. Widow rockfish was analyzed independently since it tends to be caught in a more pelagic environment compared to other overfished species (Table 7-70).

Sectors were analyzed based on known associations with overfished species under management measures in place in 2006, including allocations between sectors and regions, area closures and patterns of fishery effort. The analysis in Table 7-70 shows two columns indicating sectors, where one column is titled "major sector" and another column "sub-sector or area-based stratification." If a sector is known to catch a particular overfished species at certain latitudes, then that portion or area of the sector that would need to be closed to keep the particular species catch at a zero harvest is identified. For example, in order to reduce yelloweye and canary rockfish catch to zero, the fixed gear sablefish sector would need to be severely restricted, however west coast groundfish observer data shows this sector encounters those species only north of Pt. Conception, so the affected sector is identified as "fixed gear sablefish north of Pt. Conception." The notion that an entire sector would need to be closed to protect an overfished species is based on the multi-species nature of the fishery. In many cases it is not possible to catch abundant stocks of target species without incidentally catching overfished species, and therefore, eliminating the catch of overfished species also requires eliminating the catch of target species that co-occur with those overfished species. In this analysis, figures represent the loss in revenue that occurs as a result of zero landings from overfished species and more importantly, zero landings from target species that co-occur with those overfished species as well.

In this analysis, 2005 revenues are used as an indicator of revenue that would be lost if a sector were to be closed or restricted to reach zero harvest of a particular overfished species. Table 7-70 shows the amount of exvessel revenue that would be lost for each sector within each overfished species grouping. The total revenue from 2005 for that entire sector is shown for comparison purposes to understand the magnitude of loss.

Based on this analysis, setting the OY of canary and yelloweye rockfish to zero would have the largest impact across recreational and commercial fisheries when compared to the other species groupings. The distribution of these impacts would be felt coastwide and across all sectors of the fishery. The second largest impact to commercial and recreational fisheries would result from setting the widow OY to zero. This species would impact most sectors along the coast, but some fisheries off the Washington coast, non-groundfish trawl fisheries, and CPS south of 40°10' N latitude would be unaffected. The species grouping with the third largest impact to commercial fisheries on an exvessel revenue basis is darkblotched rockfish and POP. The species grouping with the third largest impact to recreational fisheries would be bocaccio and cowcod. Each of these groupings has very different regional and distributional impacts. Darkblotched and POP would impact most commercial sectors that occur north of 40°10' N latitude, whereas bocaccio and cowcod would impact most commercial and recreational sectors that operate south of that latitude. Finally, if the OY for all overfished species were to be set to zero, all sectors listed in the analysis would be impacted, and the total economic impact would be greater than for any of the individual species groupings. Under the zero harvest alternative, multiple sectors are closed and fishing communities experience substantial losses of commercial fishing-related revenue and recreational fishing effort and expenditures. Compared to 2005 revenues, commercial fishery exvessel revenue would be decreased by over $177 million, and the number of recreational angler trips would decrease by over 1.1 million. These figures represent a closure of all groundfish-related commercial revenues, all groundfish-related recreational angler trips, and multiple non-groundfish sectors.

7.2.10.2 *Vulnerable Commercial Fishing Communities*

Table 7-71a shows the percentage change in total estimated commercial fishery income impacts by port group compared to the No Action Alternative. Table 7-71b shows the percentage change in estimated groundfish commercial fisheries income impacts by port group compared to the No Action Alternative. These tables are intended to help indicate how much communities engaged in commercial fishing activities along the coast are affected under the commercial fisheries management alternatives. Note that the results shown in these tables assume the Council-preferred alternative for nearshore open access sector (OA NS Alt 5).

Table 7-71a shows that under the Council-preferred alternative, the port groups with the greatest percentage increase in estimated income from all Council-managed commercial fisheries (compared to the No Action Alternative) are North Washington Coast (+21 percent), San Diego (+11.5 percent), Northern Puget Sound (+8.5 percent), and Brookings (+8.5 percent). Port areas along the Oregon coast may or may not benefit under the management alternatives. For example, the large groundfish ports of Astoria and Newport are negatively impacted under Reb. Alt 1_09b, Reb. Alt 2, Reb. Alt 3 and Reb. Alt 5a, but positively affected under the remaining alternatives. California port areas are generally positively impacted under the management alternatives, with the exception of alternatives Reb. Alt 1_09aCP, Reb. Alt 1_09b and two port areas under Reb. Alt 2.

Port areas along the Washington coast may be considerably better off under any of the management alternatives than they are under No Action North Washington Coast, in particular, is a region that has been identified as home to a number of vulnerable communities. Table 7-71b shows a much higher increase in percentage terms for this region when total groundfish fisheries income is used as the base (50+ percent). North Washington Coast is the home of the tribal groundfish fleet, and the increase in income is largely driven by increased proposed harvest levels for sablefish and Pacific whiting under the tribal fisheries alternative.

All port areas are estimated to be better off under the Council-preferred alternative than under No Action. The only entity in Table 7-71a or Table 7-71b showing a decrease in income under the Council-preferred alternative is “Tribal CV,” i.e., the treaty tribe mothership whiting sector. This is because the No Action alternative for this sector incorporated a somewhat higher catch estimate for Pacific whiting than was included under the final Council-preferred pacific whiting catch sharing plan.

7.2.10.3 *Vulnerable Recreational Fishing Communities*

Unfortunately, with the exception of the No Action, Council-preferred and “zero yelloweye” alternatives, it is not possible to “stack” the states’ recreational fisheries management alternatives to facilitate comparison of impacts under the recreational fisheries alternatives. Thus only recreational fisheries impacts under the Council-preferred alternative are compared against No Action in this section.

Table 7-68b shows the change in estimated recreational income impacts under the Council-preferred alternative compared with No Action. The table shows that although coastwide income impacts are projected to increase by $2.6 million, regions in Washington and Southern California are unaffected, regions in Oregon are somewhat better off, and regions in Northern and Central California are somewhat worse off under the management measure change. Regions predicted to have the greatest change in recreational income impacts occur in the portion of the west coast between San Francisco, CA and Astoria, OR. These regions also tend to have a fairly large share of angler effort consisting of groundfish-targeted trips (Table 7-72).

Table 7-70. Exvessel value and number of angler trips lost under zero harvest of rebuilding species alternatives.

		Darkblotched and POP	Canary and Yelloweye	Bocaccio and Cowcod	Widow	All Overfished Species	Total 2005
Major Sector	**Sub sector or area-based stratification**	**Lost Revenue**	**Lost Revenue**	**Lost Revenue**	**Lost Revenue**	**Lost Revenue**	**Lost Revenue**
Groundfish Bottom Trawl	Coastwide Groundfish Bottom trawl					22,297,476	22,297,476
	Slope bottom trawl coastwide						
	Slope bottom trawl N 38	14,315,600					
	Shelf bottom trawl coastwide				6,911,000		
	Shelf bottom trawl N 36		6,511,000				
	Shelf bottom trawl S 40 10			2,648,300			
Whiting non-tribal	Coastwide Non-tribal Whiting	27,116,070	27,116,070		27,116,070	27,116,070	27,116,070
Non-tribal Fixed Gear	Coastwide Non-tribal Fixed gear					19,475,005	19,475,005
	Sablefish N CP	11,656,796	11,656,796				
	Sable S 40 10			2,051,515			
	Non-Sablefish FG Offshore N CP		545,341				
	Non-Sablefish FG Offshore N 40 10	436,698			436,698		
	Non-Sablefish FG Offshore S 40 10			1,464,944			
	Nearshore Coastwide		2,706,502				
	Nearshore N 40 10				1,379,012		
	Nearshore S 40 10						
Non-Groundfish Trawl	Coastwide non-gfish trawl			3,299,717		3,299,717	3,299,717
	CA Halibut		2,839,900	2,839,900		2,839,900	
	Other bottom Trawl			459,817		459,817	
Coastal Pelagic S. of 40 10				36,474,379		36,474,379	36,474,379
Shrimp and Prawn Trawl	Shrimp and prawn trawl coastwide					10,745,489	10,745,489
	Pink Shrimp coastwide	10,410,400	10,410,400		10,410,400	10,410,400	
	Pink Shrimp S 40 10			227,300			
	Prawn Trawl			335,089		335,089	
Salmon Troll	Salmon Troll Coastwide		24,032,949		24,032,949	24,032,949	24,032,949
	Salmon Troll S 40 10			1,086,424			

Table 7-70. Exvessel value and number of angler trips lost under zero harvest of rebuilding species alternatives (continued).

		Darkblotched and POP	Canary and Yelloweye	Bocaccio and Cowcod	Widow	All Overfished Species	Total 2005
Major Sector	**Sub sector or area-based stratification**	**Lost Revenue**	**Lost Revenue**	**Lost Revenue**	**Lost Revenue**	**Lost Revenue**	**Lost Revenue**
Tribal Fisheries	Tribal groundfish and salmon		10,185,700			10,185,700	10,185,700
	Tribal bottom trawl	693,379	693,379			693,379	
	Tribal sablefish		3,340,263			3,340,263	
	Tribal midwater		662,488		662,488	662,488	
	Tribal salmon troll		1,400,000			1,400,000	
	Tribal whiting		4,089,570			4,089,570	
Recreational Fisheries (trips)	California ground/misc/samn		831,966	741,569	831,966	831,966	831,966
	recreational groundfish California		407,472		407,472	407,472	
	recreational south 40 10 only			349,046			
	recreational misc California		392,523		392,523	392,523	
	recreational south 40 10 only			392,523			
	recreational salmon California		31,971		31,971	31,971	
	recreational south 40 10 only			30,605			
	Oregon ground/hal/samn/misc		165,025		165,025	165,025	165,025
	recreational groundfish OR		75,337		75,337	75,337	
	recreational halibut OR		16,871		16,871	16,871	
	recreational salmon OR		61,853		61,853	61,853	
	recreational combined/misc OR		10,964		10,964	10,964	
	Washington ground/hal/samn/misc		152,527			152,527	152,527
	recreational groundfish WA		28,671			28,671	
	recreational halibut WA		15,383			15,383	
	recreational combined/misc WA		905			905	
	recreational salmon WA		107,568			107,568	
Total Commercial Fisheries Impacts	Exvessel value loss	64,628,943	106,190,358	50,887,385	70,948,617	177,857,691	
Total Recreational Fisheries Impacts	Angler trip loss		1,149,518	741,569	996,991	1,149,518	

Table 7-71a. Summary of percentage change in estimated income impacts from all ocean area commercial fisheries by port group compared to the No Action Alternative. (Note assumes OA NS Alt 5 nearshore open access alternative).

			% change in all ocean area commercial fisheries income impacts compared with No Action								
Port Area	***2007 ($million)***	***No Action ($million)***	**Reb. Alt 1_09aCP**	**Reb. Alt 1_09b**	**Reb. Alt 1_10CP**	**Reb. Alt 2**	**Reb. Alt 3**	**Reb. Alt 4**	**Reb. Alt 5a**	**Reb. Alt 5b**	**Council Preferred**
Washington											
Northern Puget Sound	*12.7*	*12.6*	+4.3%	+4.3%	+3.4%	+7.5%	+1.1%	+8.5%	+8.5%	+8.5%	+8.5%
Southern Puget Sound	*2.7*	*2.7*	+1.0%	+1.0%	+0.7%	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%
North Washington Coast	*14.2*	*14.2*	+20.9%	+20.9%	+18.2%	+19.9%	+19.8%	+21.0%	+21.0%	+21.0%	+21.0%
South and Central Washington Coast	*124.5*	*130.0*	+4.1%	+2.7%	+4.0%	-1.0%	-3.6%	+6.5%	-0.9%	+6.5%	+1.5%
Oregon											
Astoria	*84.4*	*87.5*	-0.7%	-1.7%	+1.1%	-2.5%	-9.2%	+5.4%	-0.6%	+5.2%	+2.8%
Tillamook	*3.0*	*3.0*	+0.1%	+0.1%	+0.0%	-0.2%	-0.2%	+0.2%	+0.2%	+0.2%	+0.5%
Newport	*30.8*	*33.9*	+2.7%	-0.1%	+5.5%	-3.1%	-13.7%	+12.9%	-2.5%	+12.6%	+6.0%
Coos Bay	*36.9*	*37.1*	-3.0%	-3.3%	+1.1%	+2.1%	-6.7%	+5.0%	+3.1%	+4.8%	+4.3%
Brookings	*7.3*	*7.3*	-2.8%	-2.8%	+2.5%	+5.7%	-5.3%	+8.6%	+7.7%	+7.7%	+8.5%
California											
Crescent City	*21.2*	*21.3*	-1.0%	-1.2%	+0.4%	-0.2%	-2.9%	+2.0%	+0.6%	+1.7%	+1.2%
Eureka	*20.8*	*21.1*	-5.5%	-6.1%	+0.9%	+1.6%	-11.0%	+6.5%	+2.8%	+5.8%	+4.9%
Fort Bragg	*12.1*	*12.5*	-8.7%	-8.7%	+1.9%	+0.7%	+9.6%	+3.4%	+2.5%	+2.5%	+5.0%
Bodega Bay	*10.6*	*10.6*	-0.1%	-0.1%	+0.0%	-0.1%	-0.1%	+0.1%	+0.1%	+0.1%	+0.1%
San Francisco	*16.7*	*16.8*	-3.2%	-3.2%	+0.5%	-0.0%	+1.2%	+1.1%	+0.8%	+0.8%	+1.4%
Monterey	*40.1*	*40.2*	-0.1%	-0.1%	+0.4%	+0.4%	+0.8%	+0.7%	+0.6%	+0.6%	+0.8%
Morro Bay	*4.2*	*4.2*	+2.4%	+2.4%	+1.8%	+2.7%	+3.5%	+2.9%	+2.9%	+2.9%	+5.7%
Santa Barbara	*83.5*	*83.5*	+0.3%	+0.3%	+0.3%	+0.3%	+0.3%	+0.3%	+0.3%	+0.3%	+0.3%
Los Angeles	*85.7*	*85.7*	+2.3%	+2.3%	+2.1%	+2.3%	+2.3%	+2.3%	+2.3%	+2.3%	+2.3%
San Diego	*8.9*	*8.9*	+11.5%	+11.5%	+10.4%	+11.5%	+11.5%	+11.5%	+11.5%	+11.5%	+11.5%
At-sea											
Catcher Vessel	*16.9*	*19.7*	+13.2%	+5.3%	+13.2%	-15.9%	-29.9%	+26.4%	-15.9%	+26.4%	+6.8%
Catcher-Processor	*25.8*	*27.9*	+13.2%	+5.3%	+13.2%	-15.9%	-29.9%	+26.4%	-15.9%	+26.4%	+6.8%
Tribal CV	*5.1*	*5.1*	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	-3.1%
TOTAL	*677.0*	*694.6*	+2.2%	+1.1%	+3.2%	-0.4%	-4.1%	+6.2%	+0.2%	+6.1%	+3.2%

Table 7-71b. Summary of percentage change in estimated income impacts from groundfish commercial fisheries by port group compared to the No Action Alternative. (Note assumes OA NS Alt 5 nearshore open access alternative).

Port Area	2007 ($million)	No Action ($million)	% change in groundfish commercial fisheries income impacts compared with No Action: Reb. Alt 1_09aCP	Reb. Alt 1_09b	Reb. Alt 1_10CP	Reb. Alt 2	Reb. Alt 3	Reb. Alt 4	Reb. Alt 5a	Reb. Alt 5b	Council Preferred
Washington											
Northern Puget Sound	4.4	4.4	+12.4%	+12.4%	+9.8%	+21.6%	+3.1%	+24.7%	+24.7%	+24.7%	+24.5%
Southern Puget Sound	0.1	0.1	+32.0%	+32.0%	+21.1%	+32.0%	+32.0%	+32.0%	+32.0%	+32.0%	+32.0%
North Washington Coast	5.3	5.3	+56.5%	+56.5%	+49.0%	+53.6%	+53.5%	+56.8%	+56.8%	+56.8%	+56.8%
South and Central Washington Coast	39.6	45.1	+11.7%	+7.8%	+11.5%	-3.0%	-10.4%	+18.6%	-2.5%	+18.6%	+4.4%
Oregon											
Astoria	21.1	24.1	-2.4%	-6.3%	+4.0%	-8.9%	-33.2%	+19.5%	-2.1%	+18.9%	+10.3%
Tillamook	0.2	0.2	+1.4%	+1.4%	+0.5%	-2.7%	-3.0%	+2.8%	+2.6%	+2.6%	+7.4%
Newport	15.5	18.6	+4.9%	-0.2%	+10.0%	-5.7%	-24.9%	+23.4%	-4.5%	+22.9%	+10.8%
Coos Bay	9.5	9.8	-11.3%	-12.4%	+4.1%	+8.2%	-25.6%	+19.1%	+11.9%	+18.2%	+16.3%
Brookings	3.8	3.7	-5.5%	-5.5%	+4.9%	+11.1%	-10.4%	+16.8%	+15.0%	+15.0%	+16.5%
California											
Crescent City	2.8	2.9	-6.9%	-8.4%	+2.9%	-1.3%	-21.2%	+14.5%	+4.4%	+12.6%	+8.4%
Eureka	8.2	8.5	-13.7%	-15.0%	+2.3%	+3.9%	-27.3%	+16.0%	+7.0%	+14.3%	+12.2%
Fort Bragg	4.9	5.2	-20.8%	-20.7%	+4.6%	+1.6%	+23.0%	+8.2%	+5.9%	+5.9%	+11.9%
Bodega Bay	0.2	0.2	-4.8%	-4.7%	+2.6%	-3.1%	-3.8%	+4.1%	+3.3%	+3.3%	+4.2%
San Francisco	3.3	3.4	-15.9%	-15.9%	+2.3%	-0.0%	+5.8%	+5.5%	+3.8%	+3.8%	+6.9%
Monterey	2.3	2.4	-1.8%	-1.8%	+6.7%	+6.1%	+14.4%	+11.2%	+10.5%	+10.5%	+13.2%
Morro Bay	2.0	2.0	+5.0%	+5.0%	+3.7%	+5.7%	+7.3%	+6.1%	+6.1%	+6.1%	+11.9%
Santa Barbara	0.8	0.8	+30.5%	+30.5%	+27.6%	+30.5%	+30.5%	+30.5%	+30.5%	+30.5%	+30.5%
Los Angeles	1.4	1.4	+139.5%	+139.5%	+126.2%	+139.5%	+139.5%	+139.5%	+139.5%	+139.5%	+139.5%
San Diego	0.6	0.6	+168.1%	+168.1%	+152.1%	+168.1%	+168.1%	+168.1%	+168.1%	+168.1%	+168.1%
At-sea											
Catcher Vessel	16.9	19.7	+13.2%	+5.3%	+13.2%	-15.9%	-29.9%	+26.4%	-15.9%	+26.4%	+6.8%
Catcher-Processor	25.8	27.9	+13.2%	+5.3%	+13.2%	-15.9%	-29.9%	+26.4%	-15.9%	+26.4%	+6.8%
Tribal CV	5.1	5.1	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	+6.9%	-3.1%
TOTAL	174.4	192.0	+7.8%	+3.8%	+11.5%	-1.4%	-14.9%	+22.5%	+0.6%	+22.1%	+11.5%

Table 7-72. Groundfish recreational income impacts as a share of total marine recreational income impacts by region historically and under selected management alternatives ($ million)

State	Region	Trip Type	2005	2006	2007	No Action	"Zero Yelloweye" Alternative	Council Preferred Alt
WASHINGTON								
	North Washington Coast							
		Groundfish	0.3	0.2	0.3	0.4	0.0	0.4
		TOTAL	1.4	1.1	1.2	1.4	0.0	1.4
		% Groundfish	20.0%	20.9%	24.0%	25.3%	0.0%	25.3%
	South & Central WA Coast							
		Groundfish	2.9	3.5	3.1	3.1	0.0	3.1
		TOTAL	12.3	11.0	11.4	12.2	0.3	12.2
		% Groundfish	23.1%	31.9%	27.5%	25.7%	0.0%	25.7%
	Washington TOTAL							
		Groundfish	3.1	3.7	3.4	3.5	0.0	3.5
		TOTAL	13.8	12.1	12.6	13.6	0.3	13.6
		% Groundfish	22.8%	30.9%	27.2%	25.7%	0.0%	25.7%
OREGON								
	Astoria-Tillamook							
		Groundfish	1.1	1.1	0.9	1.0	0.0	1.1
		TOTAL	3.0	2.9	3.3	1.9	0.1	3.3
		% Groundfish	36.1%	37.3%	27.1%	51.0%	0.0%	32.4%
	Newport							
		Groundfish	3.9	3.9	3.8	3.7	0.0	4.0
		TOTAL	5.9	5.8	6.7	5.3	0.3	6.6
		% Groundfish	66.1%	67.4%	55.8%	69.1%	0.0%	60.5%
	Coos Bay							
		Groundfish	0.9	1.0	1.0	0.9	0.0	1.0
		TOTAL	2.6	2.3	2.7	1.6	0.1	2.7
		% Groundfish	35.1%	43.9%	39.2%	60.4%	0.0%	38.0%
	Brookings							
		Groundfish	1.5	1.4	1.4	1.3	0.0	1.5
		TOTAL	2.1	1.9	2.0	1.6	0.0	2.1
		% Groundfish	69.0%	70.0%	69.2%	84.3%	0.0%	69.2%
	Oregon TOTAL							
		Groundfish	7.4	7.3	7.1	6.9	0.0	7.5
		TOTAL	13.6	12.9	14.7	10.4	0.4	14.7
		% Groundfish	54.0%	56.9%	48.2%	66.8%	0.0%	51.3%
CALIFORNIA								
	North Coast: Humboldt and Del Norte counties							
		Groundfish	0.8	1.0	1.2	1.0	0.0	0.9
		TOTAL	2.8	3.8	3.8	2.2	0.0	1.9
		% Groundfish	29.7%	26.8%	31.3%	46.7%	0.0%	46.8%
	North-Central Coast: Mendocino county							
		Groundfish	0.5	0.4	0.7	0.5	0.0	0.2
		TOTAL	1.9	1.2	1.4	1.3	0.0	0.9
		% Groundfish	25.3%	32.2%	50.2%	39.5%	0.0%	24.9%
	North-Central Coast: San Mateo County through Sonoma County							
		Groundfish	3.5	8.6	4.6	5.3	0.0	4.8
		TOTAL	10.4	13.1	8.2	9.3	0.0	8.4
		% Groundfish	33.4%	65.8%	55.6%	57.0%	0.0%	57.2%
	South-Central Coast: San Luis Obispo County through Santa Cruz County							
		Groundfish	4.0	4.9	5.4	4.7	0.0	4.5
		TOTAL	6.5	6.4	8.5	6.4	0.1	6.2
		% Groundfish	61.0%	76.4%	63.7%	73.0%	0.0%	72.4%
	South Coast: Ventura and Santa Barbara counties							
		Groundfish	4.4	3.0	4.8	4.0	0.0	4.0
		TOTAL	5.5	4.1	6.0	5.0	0.0	5.0
		% Groundfish	80.7%	72.7%	80.6%	79.0%	0.0%	79.0%
	South Coast: San Diego County through Los Angeles County							
		Groundfish	28.0	17.5	23.8	21.7	0.0	21.7
		TOTAL	51.4	40.2	40.9	41.9	1.0	41.9
		% Groundfish	54.4%	43.4%	58.1%	51.8%	0.0%	51.8%
	California TOTAL							
		Groundfish	41.1	35.3	40.5	37.2	0.0	36.1
		TOTAL	78.4	68.8	68.8	66.1	1.1	64.4
		% Groundfish	52.5%	51.4%	58.8%	56.3%	0.0%	56.1%
	W-O-C TOTAL							
		Groundfish	51.6	46.4	51.0	47.6	0.0	47.2
		TOTAL	105.8	93.8	96.1	90.1	1.9	92.7
		% Groundfish	48.8%	49.5%	53.0%	52.9%	0.0%	50.9%

7.2.10.4 *Cumulative Effects*

The CEQ regulations implementing the procedural provisions of NEPA define cumulative effects as:

> The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

Past actions affecting the socioeconomic environment have included catch restrictions and declining revenue for vessels participating in groundfish fisheries, increasing regulatory complexity, the requirement to carry VMS, the imposition of area closures to protect EFH, restrictions on fishing gear to protect EFH, a trawl vessel buyback, growth and change in the demographic and economic nature of coastal communities, and consolidation in the shore-based processing sector. Reasonably foreseeable future effects include continued restrictions on catch levels to protect overfished species, continued development of tools that reduce the bycatch of overfished species, and continued growth and change in the population of coastal communities.

While each alternative analyzed in this EIS results in rebuilding of overfished groundfish, the potential benefits of rebuilding west coast groundfish are generally long-term due to the long lived nature of Pacific groundfish. In general, rebuilding fish populations will theoretically result in increased harvest opportunities once those fish populations are rebuilt. However, in the short run this results in diminished fishing opportunity for the overfished species as well as species that co-occur with that stock. A fish stock that recovers quickly has economic benefits that are tangible in a relatively short amount of time, however, reducing fishing opportunities to rebuild a fish stock that takes years or decades to recover may have zero economic benefit once the value of foregone revenues is compared with the discounted value of future revenues once that stock recovers. Whether the net present value of rebuilding a fish stock is positive or negative ultimately depends on the time it takes to rebuild, the discount rate, and the degree to which ongoing fisheries must be constrained to protect that stock of fish.

Recent management actions to reduce the catch of target, non-target, and rebuilding species have reduced fishing opportunities (commercial and recreational) in general, and this has had negative economic impacts. The commercial catch of groundfish (excluding Pacific whiting) has generally been declining for several years, and as a result revenues for many vessels, processors, and ports have also been declining. The implementation of the RCAs – combined with differential catch limits designed to minimize the mortality of rockfish – displaced revenues from areas that had historically been productive for much of the commercial fishing fleet. The result has been a decline in the number of vessels and processors engaged in Pacific Coast groundfish, and a loss of fishing-related infrastructure needed to support fishing and processing activity (such as ice plants and mechanical services). According to public testimony, keystone pieces of infrastructure that are necessary for the continued operation of groundfish fisheries have been disappearing, or are at risk of disappearing, in many ports, including: Coos Bay and Brookings in Oregon; and Fort Bragg, Eureka and Crescent City in California.

Recreational fisheries have also been subjected to increasing constraints. In recent years, area-based management and reduced bag limits have been imposed on recreational bottomfish fishers. In addition, historic target opportunities for species such as lingcod have been curtailed and the lengths of seasons have decreased, particularly off the California coast. According to public testimony, many charter operators have lost their business or have downsized dramatically since the year 2000, and remaining businesses are liquidating many of their assets.

In addition to impacts resulting from changes in groundfish regulations, other items have affected the socioeconomic status of commercial and recreational fishers and dependant communities. Fuel prices, for example, have increased dramatically in recent years, and while some portions of the commercial fishery have experienced increases in exvessel revenue per vessel since 2003, rising fuel prices have largely eroded any increases in revenues, and have likely decreased net revenues for some sectors. Associated with these recent trends is also the obligation to pay back the industry buyback loan. Starting in September 2005 and continuing for the next 30 years, various sectors of the industry such as the Dungeness crab fishery, pink shrimp fishery, and shore-based and mothership groundfish fishery have had to pay fees of up to 5 percent of the exvessel revenue of their landings so as to pay back the $36 million industry loan that underpinned the Buyback Program.

California Recreational Bottomfish Fishery

In 1998 the recreational fishery for rockfish, lingcod and associated species was much less regulated than it is under the No Action Alternative. California anglers had a 15 fish rockfish bag limit within a 20 fish bag and a year round season. Fishing depths were unconstrained and anglers routinely fished as deep as 100 fm north of Pt. Conception to the Oregon border and to 120 fm south of Pt. Conception. This represented an effective area of 29,970 square km available for fishing, assuming all areas available were fished for these species. Beginning in 1999, stricter regulations were adopted following the completion of the bocaccio stock assessment and an overfished status determination to minimize impacts on this species.

Between 1998 and 2005, progressively restrictive season and depth changes and area closures were adopted to reduce impacts on overfished shelf species as they were identified, primarily bocaccio, canary rockfish, yelloweye rockfish, cowcod and lingcod. These changes moved anglers further inshore for more months and away from encounters with overfished shelf species. To recognize the regional differences on individual overfished stocks and maximize fishing opportunities, the Rockfish and Lingcod Management Areas (RLMAs) were designated so that regulations could be more region-specific. During the same period, additional areas were closed to recreational and commercial groundfish fishing when new MPAs were adopted in state waters around the Channel Islands and in the CCA - also in southern California. The momentum behind establishing MPAs is also increasing, with processes underway to identify additional areas for potential designation on the west coast.

As an example of the effects of management in response to resource declines, California charter boat logbook data show the following for the California North-Central region (Cape Mendocino - Pigeon Point [37°11' N latitude]) and South-Central Monterey region (Pigeon Point - Lopez Point [36° N latitude]) areas combined:

There was a drop in rockfish and lingcod CPFV effort between 1998 and 2005 as follows:

A 15 percent decrease in the number of CPFVs participating in the rockfish and lingcod fishery

A 34 percent decrease in the number of trips taken by the CPFVs during the year

A 31 percent decrease in the number of total anglers (angler days) reported during the year (a decrease of about 14,600 angler days)

In addition, a comparison was made between the number of total angler days reported by month in 1998 with the corresponding months from 2005. The months that were open in 1998 but closed in 2005 (season closures) accounted for about 13,700 angler days or about 94 percent of the decrease between 1998 and 2005 (14,600 angler days). Anglers could fish 12 months in this area in 1998; they could only fish 6 months in 2005. The other 6 percent of the decrease in angler days occurred during months that were open in 1998 and in 2005. This decrease is likely to be partially due to the reduction in fishing depths available for rockfish and lingcod fishing. Anglers typically fished out to 100 fm in 1998; they could only fish out to 20 fm in 2005.

In the reasonably foreseeable future, the California recreational fishery is expected to continue operating under depth-based management areas to constrain the catch of rebuilding species. In addition, more refined area management is expected to occur. For example, research is underway to evaluate areas with relatively high abundance of yelloweye rockfish, which may result in area closures that are more specific to protecting yelloweye rockfish and more refined than current depth-based management.

<u>Oregon Recreational Bottomfish Fishery</u>

Since 2004 the Oregon recreational groundfish fishery has been closed seaward of 40 fm during the June through September period. Though the Oregon recreational groundfish fishery has not been surveyed to determine how far offshore the fishery historically had extended, interviews with charter captains and other fishers suggest that the fishery extended to approximately 125 fm. The closure seaward of 40 fm represents 83 percent (5,682 square mi) of the total 6,884 square mi of historical fishing area off Oregon. In the ports of Winchester Bay and Florence, where there are no nearshore reefs, the closure seaward of 40 fm totally eliminated groundfish opportunity.

Based on at-sea observations starting in 2001, effort seaward of 40 fm has been reduced by approximately 50 percent. Offshore angler effort represented 11 percent of trips observed in 2001 versus 5 percent in 2004 and 6 percent in 2005. This is believed to underestimate total effort reductions in the offshore fishery, as anglers had already reduced offshore effort starting in the late 1990's due to bag limit restrictions for canary rockfish. Canary rockfish was among several species historically targeted offshore. Once the bag limit was reduced to 3 canary rockfish, anglers tended to avoid them by moving nearshore were they are less prevalent.

Though the implementation of the closure seaward of 40 fm may not have reduced temporal effort, it likely contributed to early closures of the recreational groundfish fishery in 2004 and 2005. It is believed that most anglers who would have fished offshore during the closure periods relocated their activities inside the open area, except in Winchester Bay and Florence where nearshore reefs do not exist. This resulted in an effort shift onto nearshore species and contributed to the early attainment of the black rockfish harvest cap in 2004 and 2005. In those years the nearshore fishery was closed on September 3 in 2004, and on October 16 in 2005.

Early closures to the nearshore fishery in 2004 and 2005 had a substantial although not quantified effect on coastal communities, including lost income to charters, marinas, sporting good stores, motels, restaurants and other coastal businesses.

In the reasonably foreseeable future, the Oregon recreational fishery is expected to continue operating under depth-based management areas to constrain the catch of rebuilding species. In addition, more refined area management is expected to occur. For example, research is underway to evaluate areas with relatively high abundance of yelloweye rockfish, which may result in area closures that are more specific to protecting yelloweye rockfish and more refined than current depth-based management.

<u>Washington Recreational Bottomfish Fishery</u>

There were no depth restrictions in Washington recreational fisheries until August of 2005, when recreational groundfish fisheries were restricted to depths less than 30 fm. Constraining the fishery with depth restrictions to avoid overfished species may force anglers to fish in unfamiliar areas, which could affect their ability to prosecute successful fishing strategies and subtract from the overall quality of the fishing experience. Part of the recreational port sampling protocol in Washington is to query anglers regarding the depth at which they caught most of their fish. In 2005, 34,500 angler interviews were collected with associated fishing depth information. An analysis of this information demonstrated that only 27 percent of the anglers reported catching most of their fish within 10 fm (one of the proposed closure lines) while 52 percent of anglers reported catching most of their fish inside of 20 fm (another proposed boundary). Target species vary by depth, with some species being distributed shallower (e.g., black rockfish and greenling) while others occur in deeper water (e.g., halibut and lingcod).

Reported fishing depth information suggests that most fishing (88 percent) occurs within 60 fm. A spatial analysis of Washington coastal waters indicates that a 10 fm closure would reduce the area available to the recreational fishery inside 60 fm by 84 percent, and a 20 fm closure would reduce the area inside 60 fm by 74 percent. Allowing fishing only in these smaller areas could reduce the ability of anglers to target healthy fish stocks in traditional fishing areas, and could also generate competition and crowding in a more limited amount of prime fishing areas. Additionally, fishing pressure that may have previously been spread over a broad area could become more concentrated, increasing the potential for localized depletion of some species.

In the reasonably foreseeable future, the Washington recreational fishery is expected to continue operating under depth-based management areas to constrain the catch of rebuilding species. In addition, more refined area management is expected to occur. For example, research is underway to evaluate areas with relatively high abundance of yelloweye rockfish, which may be expected to result in area closures that are more specific to protecting yelloweye rockfish and more refined than current depth-based management.

<u>Commercial Groundfish Fisheries</u>

Commercial groundfish fisheries have been subject to increasing regulation since the late 1990s. Area-based management closed off large areas of historically productive fishing grounds, and cumulative limits for target species have been reduced in order to protect depleted rockfish that co-occur with more abundant species. In the California Bight area, the CCAs closed much of the historically productive grounds for many fixed gear vessels, and according to public testimony, many operators ceased fishing after the CCA closures were enacted. In central and northern California, the RCAs eliminated much of the shelf fishing opportunities for limited entry trawl and fixed gear vessels, and pushed nearshore vessels closer to shore. In addition, target opportunities for species that were historically important components of the fishery (such as chilipepper rockfish) were eliminated. Off Oregon and Washington, the RCAs closed off historically productive fishing grounds to limited entry trawl and fixed gear vessels and pushed nearshore groundfish vessels closer to shore (there are no commercial nearshore fisheries off Washington). In addition, cumulative limits for target species were reduced for trawlers operating along the continental shelf in order to protect rebuilding species that are found in those same areas, and target opportunities for species that were historically important components of the fishery (such as slope rockfish and yellowtail rockfish) were dramatically curtailed or eliminated.

Several actions have worked to counter the decline in commercial revenues that have been occurring since the late 1990s. In late 2003, the limited entry trawl fleet participated in a vessel buyback program that reduced the number of groundfish vessels on the west coast by approximately 35 percent. Analysis before the buyback program showed that net revenues per vessel should increase post-buyback as a result of lower aggregate fixed cost. While at this time no post-buyback analysis has been done to verify this result, exvessel revenue per vessel has increased somewhat. Unfortunately, the buyback had negative consequences on some communities and processors as certain ports lost a disproportionate share of their trawl fleet and associated landings. In 2001, NMFS implemented a permit stacking program for the limited entry fixed gear vessels, reducing the number of vessels participating in the primary sablefish fishery. As part of this permit stacking program, the Council recommended lengthening the primary sablefish season from 5-10 days to 7 months. Season participants may now choose their time and pace of fishing, affording them improved safety and product marketing flexibility. The Council is also in the process of considering a dedicated access privilege program (e.g., individual quotas) for the limited entry trawl fishery. Vessel owners with dedicated access privileges are better able to plan for and invest in their future, including optimizing their product marketing opportunities. Implementing a dedicated access privilege program in the trawl fishery would likely improve the financial standing of the fishery's participants, making monitoring devices and personnel costs more affordable by vessels.

In response to the need to enforce and verify compliance with RCA boundaries, and all commercial vessels (including those in the open access sector) that take and retain, possess, or land Federally-managed groundfish species in Federal waters will be required to carry VMS. Beginning in 2005, trawlers fishing shoreward of the RCA in areas north of 40° 10' N latitude were required to fish with a selective flatfish trawl–a gear designed to avoid rockfish while retaining more abundant flatfish. This required vessels to incur costs of modifying their current trawl gear, but allowed those vessels to fish bimonthly cumulative limits that were larger than limits specified for the 2004 season.

In the reasonably foreseeable future, the west coast commercial fisheries are expected to continue operating under depth-based management areas to constrain the catch of rebuilding species. In addition, more refined area management is expected to occur. For example, research is underway to evaluate areas with relatively high abundance of yelloweye rockfish, which may result in area closures that are more specific to protecting yelloweye rockfish and more refined than current depth-based management.

<u>Fishing Communities</u>

As indicated above, the Council has received much testimony to the effect that many fishing related businesses are at their "tipping point"—meaning that that they are unlikely to survive any additional dramatic negative changes. The counties classified as vulnerable and most vulnerable to change may also be near their "tipping" point. While these counties may have survived the cutbacks associated with the Secretary of Commerce's declaration of a west coast groundfish disaster in 2000 and cutbacks to rebuild overfished species, there has been a continuing decline in fishing infrastructure with associated negative economic impacts borne by groundfish fishery-dependent communities.

Finally, it should be noted that in addition to the steady decline of groundfish fishing opportunities, communities in Oregon and California have been experiencing severe cutbacks in their salmon-related fishing activities since 2006. The 2006 salmon management decisions yielded a reduction of about $30 million in salmon-related personal income impacts in northern California and Oregon communities compared to the 2005 season. Both states declared disasters and developed salmon disaster aid programs. Congress provided Federal disaster relief funding in 2006 and, based on the failure of the Sacramento River Chinook stock to return in 2008, is considering authorizing disaster relief again for the 2008 season. The current level of combined economic stress on coastal communities looks set to continue or worsen in the near future.

CHAPTER 8 SUMMARY OF OTHER ENVIRONMENTAL MANAGEMENT ISSUES

Federal regulations at 40 CFR 1502.16 require an EIS to compare the environmental impact of the alternatives considered in the analysis. Based on the environmental impacts of the 2009-10 groundfish harvest specifications and management measures disclosed in Chapters 3 through 7, this chapter summarizes these consequences to address the particular concerns of 40 CFR 1502.16. These concerns are an implicit part of the analyses in Chapters 3–7; thus, further detail on impacts can be found in those chapters.

Short-term uses versus long-term productivity. This relationship is central to the management framework, which is intended to allow harvests in 2009–10 (short-term use) at a level that maintains stocks at or returns them to their maximum level of surplus production, MSY (long-term productivity). For the proposed action evaluated in this EIS, the Council's preferred alternative is intended to allow harvest levels that prevent short-term socio-economic disaster in fishing communities, while rebuilding depleted stocks to the B_{MSY} level as quickly as possible.

Irreversible 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. For all species, ABCs are set at the MSY level, meaning that ABC harvest levels are estimated to be sustainable over time. This action sets OY levels for most species below their ABC levels, although some of the healthier stocks may have ABC equal to OY. These healthy stocks, however, are likely to be harvested well below their MSY levels, since the Council's preferred alternative curtails fishing on healthy stocks to protect co-occurring depleted stocks. Therefore, the alternatives do not represent an irreversible commitment, because harvest levels and management measures are periodically adjusted in response to new information in order to sustain fishery resources.

Irretrievable resource commitments. A resource is irretrievably committed if its use is lost for time, but is not actually or practically lost permanently. The fish that are harvested represent an irretrievable resource commitment but the OY and management measure alternatives in this EIS are intended to rebuild and sustain the fishery resources.

Energy requirements and conservation potential of the alternatives. The principal effect of the alternatives on energy use is indirect and related to the level of fishing and surveillance activity. Fishing vessels and surveillance assets (ships and airplanes) consume fossil fuels. Fuel consumption is likely to correlate with levels of harvest ultimately permitted under the management regulations. However, there are a variety of other factors that could affect overall energy use and efficient utilization. Changes in fuel prices, for example, could affect the level of fishing vessel operations independent of the constraining effect of management measures under the alternatives.

Urban quality, historic resources, and the design of the built environment. The alternatives have no direct effect on these resources. Over the long term, reductions in personal income as a consequence of more restrictive harvest policies could cumulatively affect private and public investment in coastal communities, including marine-related businesses and port-related infrastructure. 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.

Possible conflicts between the proposed action and other plans and policies for the affected area. Overfished groundfish species are caught incidentally in fisheries managed under other Council FMPs (salmon, CPS, and HMS). More restrictive measures are likely to affect these fisheries and thus conflict with some of the objectives of these FMPs. (FMPs try to strike a balance between conservation and utilization, so they include objectives related to resource use.)

The following three sections describe unavoidable adverse impacts (as required by 40 CFR 1502.16), mitigation measures (as required by 40 CFR 1502.16(h)), a discussion of the environmentally preferable alternative (as required by 40 CFR 1505.2(b)) and the rationale for the preferred alternative.

8.1 Unavoidable Adverse Impacts

Impacts of the alternatives on the human environment are identified and evaluated in Chapters 3–7 of this EIS. Previous EISs covering groundfish harvest specifications and the adoption of rebuilding plans (PFMC 2004b;PFMC 2004c;PFMC 2006) did not identify significant adverse effects to biological components of the environment; instead, they described the potential risk for such impacts if the proposed actions failed to meet their objectives. The main risk is that, because of scientific uncertainty, stocks may not be managed at or to target biomasses (stock sizes) and fishing mortality rates identified in the management framework. As discussed elsewhere in this document, the need to rebuild depleted species stocks constrains harvests of healthier stocks; in general, the risk of exceeding the OY is greatest for these stocks because the OYs are set at low values. This risk is mitigated by the regular reassessment of depleted species and the periodic re-specification of OYs in accordance with the management framework. Regular stock assessments, which for depleted species are planned as part of each biennial management cycle, reduce uncertainty about the status of the stock while providing new information needed to establish OYs consistent with rebuilding plans. Table 8–1 compares the current targets for these species and those proposed modified under the current proposed action. Targets for other alternatives are discussed in Chapter 4. Four of the seven species—bocaccio, canary rockfish, Pacific ocean perch, and widow rockfish—show an increase in P_{MAX}, an indicator of the likelihood of achieving the target, while the target year is the same or earlier, indicating a lowered risk.[17] The OYs for these species also have been increased, which can ease constraints on accessing target species, improving economic performance of the fisheries. The target year for yelloweye rockfish, one of the most constraining stocks, remains the same while the rebuilding probability is reduced from 80 to 69 percent. The OY for this stock is also reduced substantially, reflecting a more pessimistic outlook from

[17]The EA for Amendment 16-1 (PFMC 2003a) includes a discussion of how the P_{MAX} statistic is derived.

the stock assessment. Overall, the risk has increased slightly while both managers and harvesters must adapt to the reduced harvest limit. This part of a longer term effort to apply a constant harvest rate strategy while allowing time for fisheries to adapt to the required lower OYs. Cowcod shows a substantial change in P_{MAX} and an increase in the target year. This change results from a technical correction in the stock assessment and the rebuilding trajectory is similar to that as in the original rebuilding plan adopted as part of Amendment 16-3 (P_{MAX} = 60 percent and T_{TARGET} = 2090). The OY has remained essentially unchanged at 4 mt. The most recent stock assessment for darkblotched rockfish reflects a substantially changed view of the productivity of this stock, resulting in a more pessimistic rebuilding trajectory. The OY was reduced somewhat while avoiding disastrous impacts to fishing communities. The rebuilding probability is reduced, although still at 80 percent, while the target year is further out. Overall, the OYs chosen for the 2009-10 biennium are consistent with long-term rebuilding strategies: they show a high likelihood of rebuilding the stocks within the target period.

Table 8–1. Comparison of current and proposed OYs and rebuilding targets for depleted species.

Species	OY		P_{MAX}		T_{TARGET}	
	2008	Proposed (2009)	Current	Proposed	Current	Proposed
Bocaccio	218	288	78%	89%	2026	2026 [a/]
Canary	47	105	55%	75%	2063	2021
Cowcod	4.2	4	91%	66%	2039	2072
Darkblotched	330	285	100%	80%	2011	2028
POP	150	189	93%	94%	2017	2017 [a/]
Widow	368	522	95%	100%	2015	2015 [a/]
Yelloweye	27	17 [b/]	80%	69%	2084	2084

[a /] Although T_{TARGET} for these stocks remains at current values, the estimate of the median time to rebuild is lower. For bocaccio it is 2023, canary rockfish 2020, POP 2011, and widow rockfish 2009.
[b/] The yelloweye OY is based on a strategy to ramp down the harvest rate from the 2006 (status quo) harvest rate to a new constant harvest rate strategy in 2011.

There is a potential risk that management measures will fail to constrain total catch of depleted species below their rebuilding-target-associated OYs. Stock characteristics are a factor in the likelihood that such overages would result in significant adverse biological impacts as illustrated by Figure 2-2. For cowcod and yelloweye rockfish in particular the relationship between short-term (2009-10) OYs and estimated target year is flat. Thus, a small incremental increase in total catch (represented by the OY) results in a relatively large delay in the target rebuilding year. The figure for darkblotched rockfish also shows that relatively small changes in current harvest levels lead to a large change in the predicted rebuilding year, especially for harvests above 200 mt. To address the potential risk, the Council-preferred management measure alternative includes a variety of measures to constrain harvests to OYs. These include non-retention of these species in almost all fisheries, implementation of additional YRCAs for recreational fisheries, region-specific recreational harvest guidelines for yelloweye rockfish, bycatch caps for canary rockfish in the whiting fishery, and the requirement of selective flatfish trawl gear north of 40° 10' N. latitude and small footrope gear south of this management line to reduce bycatch of canary rockfish in the bottom trawl sector. Furthermore, additional measures could be applied inseason if available information indicates a likelihood of catches exceeding the OY for these species.

The previously-prepared EISs referenced above also identify potentially significant cumulative socioeconomic impacts because exvessel revenue and related personal income declined dramatically in the period from the mid-1990s to the early 2000s. Fishing opportunity has stabilized at a more modest level in the past few years, and the Council preferred alternative shows increased revenues in comparison to status quo.

8.2 Mitigation

An EIS must discuss "means to mitigate the adverse environmental impacts" stemming from the proposed action (40 CFR 1502.16(h)), even if the adverse impacts are not by themselves significant. No mitigation is proposed, although the preferred alternative is mitigative to the degree that management measures constrain fishing mortality to levels below the OYs. In addition, the management framework itself mitigates impacts because it is adaptive through the application of inseason management measures, which may be automatic actions for regulatory purposes. Most broadly, during the management cycle, the Council responds to new information on actual catch. The GMT uses this information to project total catch for the year for depleted species and, if necessary, propose adjustments to management measures to reduce fishing mortality.

8.3 Rationale for Preferred Alternative

Setting harvest specifications and associated management measures is largely driven by the legal requirement to rebuild depleted species. Because of the resulting constraints imposed on fisheries the risk that other stocks will be subjected to overfishing is minimal. For depleted stocks, the basic approach that guides the adoption of a rebuilding strategy comes from the MSA as reiterated by *Natural Resources Defense Council, Inc., and Oceana, Inc. vs. National Marine Fisheries Service, et al.*, 421 F.3d 872 (9th Cir. 2005): "…a time period for … rebuilding … as short as possible, taking into account… the needs of fishing communities…" (MSA §304(e)(4)(A)). As in the 2007-08 groundfish harvest specifications EIS (PFMC 2006), the evaluation of the alternatives considered rebuilding in as short a time as possible, while also taking into account the needs of fishing communities. From a strictly biological perspective, rebuilding in a time period as short as possible equates to rebuilding in the absence of fishing. Considering the OY alternatives, Alternative 1 lists OYs of 0 mt for all depleted species, which equates to the as-short-as-possible/absence-of-fishing standard. This is the alternative that causes the least adverse impacts to the biological and physical environment. However, it would have disastrous economic consequences, because it would result in complete closure of a range of groundfish and nongroundfish fisheries. As a result, it would have significant adverse impacts to fisheries and fishing-dependent communities. In contrast, the Council-preferred alternative was developed to address fully the requirements of MSA §304(e)(4)(A). The strategies and measures adopted under this alternative seek the appropriate balance between stock rebuilding and the needs of fishing communities, based on the Ninth Circuit District Court's direction and the requirements of National Standard 8 of the MSA. This puts conservation and rebuilding overfished stocks before the needs of fishing communities, but avoids disastrous short-term consequences to those communities:

> Conservation and management measures shall, consistent with the conservation requirements of [the MSA] (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.

As discussed above, depleted species OYs were set consistent with rebuilding plans and four of the seven species show substantial improvement in rebuilding trajectories. Cowcod and yelloweye rockfish show continued slow rebuilding while the new assessment shows darkblotched rockfish is a less productive stock then previously thought with rebuilding taking longer, although the Council has reduced the OY in line with this more pessimistic outlook. Table 7–57c shows estimated income impacts under the different management measure alternatives by fishery. The Council-preferred alternative shows a 22 percent increase in personal income impacts compared to No Action. The Council-preferred alternative, in comparison to No Action, continues current rebuilding strategies for most depleted species with an increase in positive short-term socioeconomic impacts (assuming that the whiting fishery is prosecuted at levels similar to past years). Although, as discussed above, lower OYs and associated management measures bring about less adverse impacts, the Council also considered the needs of fishing communities in selecting its preferred alternative. The cumulative decline in revenue and income over the past decade has been significant. Additional substantial reductions in revenue due to management restrictions would likely have additional significant short-term socioeconomic impacts. The rationale for adopting the preferred alternative is therefore consistent with the requirements of the MSA at §304(e)(4)(A).

CHAPTER 9 CONSISTENCY WITH THE GROUNDFISH FMP AND MSA NATIONAL STANDARDS

9.1 FMP Goals and Objectives

The Groundfish FMP contains three broad goals and 17 objectives intended to achieve those goals. Past EISs for rebuilding plans and harvest specifications, describe how the actions address each objective. The proposed actions evaluated in the current EIS address the goals and objectives in a similar fashion as described in the previous documents. The discussion from the 2007-08 harvest specifications and Amendment 16-4 EIS is incorporated by reference.

9.2 National Standards

An FMP or plan amendment and any pursuant regulations must be consistent with ten national standards contained in the MSA (§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 harvest specification action alternatives 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. Rebuilding plans for depleted species achieve rebuilding as soon as practicable while taking into account impacts to fishing communities. The No Action Alternative is not based on the best available science for all stocks.

National Standard 2 states that conservation and management measures shall be based on the best scientific information available.

OY values in the harvest specification action alternatives, including the Council-preferred 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 in 2006 for management in 2007-08, the years to which the No Action Alternative management measures apply. Given that more recent stock assessments are available, the No Action 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, landings of many species in groundfish fisheries were not recorded individually. Nongroundfish fisheries also may not report incidental groundfish catches at the species level. This limits the amount of time-series data available for individual species stock assessments. However, whenever possible individual stocks are assessed. For example, for the current biennial cycle longnose skate has been assessed and will be managed to its own OY, separate from the Other Fish complex. 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 by the U.S.-Canada Pacific Hake/Whiting Commission.

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. In response, the Council and NMFS implemented a fixed gear permit stacking program through Amendment 14 to the FMP. NMFS has also completed a trawl vessel buyback program to reduce the size of the limited entry fleet. Additionally, the Council is developing Amendment 20 to the groundfish FMP containing measures to economically rationalize the groundfish trawl fishery, as a means of providing regulatory flexibility and economically viable fishing communities.

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 Chapter 2 and Chapter 4.) This allows comparison between the proposed OY and a judgment 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 VMS, 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 Chapter 7), and these effects were taken into account in choosing the preferred harvest specification and management measure alternatives. The preferred alternatives represent the Council's judgment of the best way to conserve and rebuild fish stocks as soon as possible while taking into account fishing communities and the economic impacts of management measures on communities. The management measures were developed to allow communities to access healthy, harvestable stocks while rebuilding overfished stocks. 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. Selective flatfish trawl gear has demonstrated reduced bycatch rates for several overfished rockfish species and is required north of 40º10' N latitude shoreward of the RCA.

National Standard 10 states that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

RCAs could affect safety if more vessels elect to fish seaward of the closed areas and are more exposed to bad weather conditions. Use of selective flatfish trawl gear north of 40º10' N latitude has not only provided increased trip limits for target species, but has also decreased the size of the trawl RCAs thereby providing additional opportunity shoreward of the RCA and decreased incentive for smaller *vessels to fish seaward of the RCA. For vessels electing to increase the amount of time fishing seaward of RCAs, implementing a VMS capable of sending distress calls could provide some mitigation. Although units with this capability have been approved for use, vessel owners are not required to purchase a unit with this capability. Also, by providing near real-time vessel position data, VMS could aid in search and rescue operations.*

9.3 Other Applicable MSA Provisions

Harvest specifications are set based on targets established in overfished species rebuilding plans, which conform to Section 304(e)–Rebuild Overfished Fisheries. Rebuilding plans contain the elements required by Section 304(e)(4) and discussed in the NSGs (50 CFR 600.310).

Chapter 3 in this EIS constitutes an EFH assessment of the proposed action's impacts, as required by 50 CFR 600.920 (e)(3). NMFS prepared an EIS evaluating programmatic measures designed to identify and describe west coast groundfish EFH, and minimize potential fishing impacts on west coast groundfish EFH. The Council took final action amending the groundfish FMP to incorporate new EFH provisions in November 2005. NMFS partially approved the amendment in March 2006. Implementing regulations became effective in June 2006. The effects of the proposed actions on groundfish EFH are within the scope of effects evaluated in the programmatic groundfish EFH EIS.

CHAPTER 10 CROSS-CUTTING MANDATES

10.1 Other Federal Laws

10.1.1 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-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. Harvest specifications and management measures for 2009–10 are not expected to affect any state's coastal management program.

10.1.2 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, December 15, 1999, and a supplemental BO on March, 11, 2006, 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. The whiting fishery again exceeded the incidental take statement level of 11,000 fish in 2005 when almost 12,000 Chinook salmon were caught. In addition, new information became available about the bycatch of salmon in the groundfish bottom trawl sector. The March 11, 2006, supplemental BO evaluated this information and proposes measures to mitigate this bycatch. 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. Chapter 5 in this EIS evaluates the impacts of the proposed action on protected species.

10.1.3 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. 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.

West coast groundfish fisheries are considered Category III fisheries, 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. However, recent west coast fixed gear fisheries, including sablefish pot fisheries, have demonstrated a take of humpback whales, which may result in a re-categorization of these fisheries to Category II. Consultation under the MMPA would then be needed to implement Category II fisheries in the next biennium. The proposed action will affect the intensity, duration, and location of groundfish fisheries through implemented management measures. But these changes would not otherwise change the effects of the groundfish fisheries on marine mammals.

10.1.4 Migratory Bird Treaty Act

The MBTA 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 the populations of many native bird species. The MBTA 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 MBTA prohibits the directed take of seabirds, but the incidental take of seabirds does occur. The proposed action is unlikely to affect the incidental take of seabirds protected by the MBTA.

10.1.5 Paperwork Reduction Act

The proposed action, as implemented by any of the alternatives considered in this EIS, does not require collection-of-information subject to the Paperwork Reduction Act.

10.1.6 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 10.3 (below) summarizes the analytical conclusions specific to the RFA and EO 12866.

10.2 Executive Orders

10.2.1 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 10.3 of this document.

10.2.2 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.

Section 8.5 in Appendix A to the 2005–06 groundfish harvest specifications EIS describes a methodology, using 2000 U.S. Census data, to identify potential "communities of concern" because their populations have a lower income or a higher proportion of minorities than comparable communities in their region. Based on this information, but focusing on more isolated, rural coastal communities, Section 7.5.7 of this document discusses the potential effects of the proposed action on minority and low income populations. It should be noted that fishery participants make up a small proportion of the total population in these communities, and their demographic characteristics may be different from the community as a whole. However, information specific to fishery participants is not available. Furthermore, different segments of the fishery-involved population may differ demographically. For example, workers in fish processing plants may be more often from a minority population while deckhands may be more frequently low income in comparison to vessel owners.

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.

10.2.3 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.

10.2.4 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 MSA 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 percent 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, harvest specifications and management measures for 2009-10 have been developed in consultation with the affected tribe(s) and, insofar as possible, with tribal consensus.

10.2.5 EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds)

EO 13186 supplements the MBTA (above) by requiring Federal agencies to work with the USFWS to develop memoranda of agreement to conserve migratory birds. NMFS is in the process of implementing a memorandum of understanding. 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.

The FEIS for the 2005-06 groundfish harvest specifications and management measures evaluated impacts to seabirds and concluded that the proposed action will not significantly impact seabirds. There is no new information to indicate that the current proposed action would result in greater impacts to seabirds and the previous evaluation is incorporated by reference.

10.3 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.

10.3.1 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 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 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, the 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; implementation of rebuilding plans includes the publication of strategic rebuilding parameters in federal regulations. 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	Chapter 1
Description of the fishery	Chapter 4
Statement of the problem	Chapter 1
Description of each alternative considered in the analysis	Chapter 2
An analysis of the expected economic effects of each alternative	Chapter 7

10.3.1.1 *Responses to EO 12866 Requirements for "significant regulatory actions"*

The RIR is designed to determine whether the proposed actions could be considered "significant regulatory actions" according to EO 12866. The EO 12866 test requirements used to assess whether or not an action would be a "significant regulatory action" and the expected outcomes of the proposed management alternative are discussed below. A regulatory program is "economically significant" if it is likely to result in the following effects:

1.a. Have an 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.

1.b. Present a risk to long term productivity.

2. Create a serious inconsistency or otherwise interfere with action taken or planned by another agency.

3. Materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of recipients thereof.

4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this EO.

10.3.1.2 *Social Net Benefit Analysis*

EO 12866 (Regulatory Impact Review) addresses the regulatory philosophy and principles that guide agency development of regulations. It stresses that in deciding whether and how to regulate, agencies should assess the costs and benefits across all regulatory alternatives, and based on this analysis, choose approaches that maximize net benefits to society (unless a statute requires another regulatory approach).

The following net benefit analysis is provided in support of this requirement. Net benefit analysis takes costs and benefits into account from a national perspective. 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 indicators of the scale of the impacts and, if possible, to assign a monetary value to those changes.

Analytical Approach

Cost-benefit analysis is conducted to evaluate net social benefits attributed to taking a particular action as opposed to not taking the action. With respect to regulatory actions, changes in net benefits are measured as the difference in the present value of the discounted stream of costs and benefits that would accrue with the regulatory action compared with the stream that would have accrued without the action. The alternatives are compared with respect to how the relative differences will affect commercial and tribal fishers, buyers and processors, recreational fishers, non-consumptive users, nonusers and public sector expenditures for enforcement and monitoring.

Cost-benefit analysis conducted for public decisions, such as fishery management, generally assess net social benefits. Social costs and benefits differ from private costs and benefits in that social costs and benefits include total economic costs and benefits, while private costs and benefits measure only those effects that show up on the balance sheet of a firm or agency, or as a financial or consumption effect to the consumer. The following examples are intended to illustrate the difference between private and social costs.

Example 1: When a vessel hires crew, it incurs an accounting cost in the form of the additional wages. However there may be little or no social cost if that individual would have otherwise been unemployed. From a social perspective, if the individual was otherwise unemployed, no productive output was forgone, so there was no opportunity cost. On the other hand, if a worker is taken away from some other productive employment in order to work on the vessel, then the lost production from the worker's prior role is considered a cost to society, an opportunity cost.

Example 2: A wetland provides environmental benefits to a lakeside community by filtering pollutants from waste and runoff water before it reaches the lake. While these environmental benefits positively affect property values and quality of life in the community, there is not likely to be a private cost incurred for environmental services by those living in the community.

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 indicators of the scale of the impacts and, if possible, assign a monetary value to those changes. Unfortunately there is not sufficient information on west coast groundfish fisheries for a complete enumeration of net economic benefits from the fishery. However by examining the individual elements that go into a net benefits analysis, it is possible to show qualitatively how net social benefits may be affected under different policy options. Impacts can also be compared by examining quantitative information on certain components (e.g., variable amounts of fish available for harvest over time), and for some elements it may be possible to associate a dollar value with some of the changes. However, the dollar measure most widely available is exvessel revenue from sales to seafood handlers and processors. While exvessel revenue is an important component in the calculation of producer surplus, it is only one of the elements necessary for a full determination of costs and benefits.

Factors Considered in Assessing Net Social Benefits

Social net benefit analysis uses measures of costs and benefits to all entities affected by an action in order to assess the net effect on the nation. Net benefits from groundfish fisheries consist of producer surplus and consumer surplus accrued over time. If there are no market distortions and all goods are traded in markets, consumer surplus and producer surplus can, at least theoretically, be measured by estimating market supply and demand curves. Producer surplus can also be calculated from revenue and cost data using opportunity costs rather than accounting costs.

Benefits and costs may accrue to consumers or producers not only through their own activity, but also through changes in public expenditures. For example, government expenditure to new program is ultimately financed by a transfer payment from consumers or producers to the government in the form of taxes. In some cases, the cost of a new government activity is not met through taxes, but rather by reprogramming existing governmental funds. For example, a new regulation requires increased enforcement effort, but agency budgets are not increased sufficiently to cover the new effort, then the opportunity cost of the new regulation may result in the loss of existing activities.

<u>Producer Surplus</u>

Total producer surplus is the difference between the amounts producers actually receive for providing goods and services and the economic costs producers incur to do so. Economic costs are measured by the opportunity cost of all resources including the raw materials, physical capital, and human capital used in producing these goods and services.

In a fishery, the main capital investments are expenditures for vessels, gear and associated fishing permits. For an individual fishing business, producer surplus is the difference between gross revenues and all costs, including payments to labor and owners of the business. At the industry or fishery level, producer surplus is the sum of net economic rent accruing to owners who control the relatively fixed factors of production (e.g., vessels, permits, fishing rights, specific knowledge, entrepreneurial capacity). Producer surplus in the fishing sector can increase through a reduction in unit harvesting costs (improved economic efficiency) or an increase in exvessel prices received.

Vessels and the Fishing Firm

Because information on the businesses that own fishing vessels is not readily available, we generally use the fishing vessel as a proxy for the fishing business. For analytical purposes, the vessel is viewed as a profit center owned by the fishing business that must cover all fishing costs, including materials and equipment, payments to captain and crew, and a return to the vessel owners.

Other Affected Producers

In addition to commercial fishing vessels, other fishery-dependent businesses that may be affected include suppliers, buyers who act as intermediaries between vessels and consumers, processors who purchase raw materials from commercial vessels to produce seafood products, and charter or party vessels that provide recreational fishing experience for paying customers, among others. A thorough accounting of net benefits would include measurement of producer surpluses accruing to these business sectors as well as to fishing vessels.

Consumer Surplus

Consumer surplus is the net value of products consumed, or the difference between what the consumer actually pays and what they would be willing to pay (i.e., the value to the consumer over and above the actual purchase price). Consumer surplus can increase through a reduction in prices paid, an increase in quantities consumed, or improvement in product quality. Consumer surplus exists because, while some consumers are willing to pay more than the going price, the forces of supply and demand in competitive markets determine a single price for a good at a given time and place. Consumer surplus can, therefore, be loosely interpreted as the extra income available for spending on other items because some consumers pay less than they would be willing to pay. However, not all goods and services are exchanged in markets with market prices.

Market Consumer Goods

For goods sold in markets where a consumer price can be determined, for example seafood, available price and quantity information may be used to estimate consumer surplus. However, if, due to the availability of imports or other protein substitutes, a change in the quantity of fish available is not expected to affect prices, then a given regulatory action may have little or no impact on consumers.

Individuals pay fees to participate in recreational fishing trips on charter vessels. Price and quantity information may be used to estimate consumer surplus. However, charter trips are often purchased as part of a bundle of goods and services that include other nonfishing recreational activities. Therefore, the difficulty in estimating consumer surplus from charter fishing trips may be comparable to that described below for private recreational trips.

Non-Market Consumer Goods - Consumptive (Use Values)

For recreational fishing trips taken on private vessels, the prices and quantities associated with each transaction are very difficult to quantify. The term "private" is used to describe a recreational angler fishing from a private vessel, shore, bank, or a public pier. This term is used to distinguish private anglers from those who take part in trips on charter vessels. For the private recreational angler, the amount spent on fishing gear, licenses and other goods and services necessary to carry out a particular fishing trip is difficult to separate from total annual expenditures. Additionally, depending on the value an individual places on alternatives to fishing, the consumer surplus associated with a trip may far exceed actual trip expenditures.

Non-Market Goods - Nonconsumptive and Nonuse

Nonconsumptive users may experience benefits from the use or nonuse values provided by the resource. Examples of nonconsumptive use values include wildlife viewing and the derivation of secondary benefits from ecosystem services (e.g., sewage treatment services provided by wetlands). Non-users may also value resources for their own sake. Several types of non-use benefits have been identified, including (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 is available for use, regardless of whether the resource is actually used; and (3) bequeathal value placed on knowing a fish population, habitat, or ecosystem is protected for the benefit of future generations. These benefits may accrue to individuals as a result of the preservation of healthier, more abundant fish stocks, and may be closely related and overlap with values the general public places on wildlife and natural parks.

The very existence of coastal fishing communities may have intrinsic social value. For example, the Newport Beach, California, dory fishing fleet, founded in 1891, has been designated a historical landmark by the Newport Beach Historical Society. The city grants the dory fleet use of the public beach in return for the business and tourism generated by this unique fishery.

Comparison of the Alternatives

The economic effects evaluated in the social net benefit analysis below arise from two effects: (1) impacts on current and future stock biomass, and (2) the impacts on current and future harvests. Table 10-1 summarizes the following analysis of social net benefits under the 2009-2010 management alternatives.

Producer Surplus

Commercial Vessels: Harvest costs will be lower, and producer surplus greater, with increasing CPUE. While there is no direct difference between the alternatives in this regard, there may be higher near-term adjustment costs associated with the lower harvest alternatives, although the lower harvest alternatives also carry a somewhat higher probability that CPUE will increase in the future. While benefits are distributed unevenly along the coast, all port areas are potentially better off than No Action under the Council preferred alternative.

Buyers and Processors: Benefits are distributed unevenly along the coast although all port areas are potentially better off than No Action under the Council preferred alternative.

Recreational Charter Vessels: Demand for recreational charter trips depends on consumer income and the perceived quality of the available experience. While the supply of recreational angler trips is somewhat lower under the Council preferred alternative than under No Action, benefits are distributed unevenly along the coast. Oregon ports may see an increase while northern California will likely see a reduction, and Washington and southern California ports will see little or no change.

Consumer Surplus

Seafood Consumers: Since locally-caught products generally have close substitutes available from elsewhere in the global supply chain, in general for most consumers of fresh and frozen seafood products, there is probably little difference between the alternatives.

Recreational Anglers: While there will likely be little difference in the quality of recreational fishing experience available overall due to the projected level of angler effort under the alternatives, the quality of the experience may vary by community. Ports in northern California in particular may see a reduction in quality as well as quantity of groundfish fishing trips.

Nonconsumptive Users: Protection for sensitive fish stocks may enhance the value of wildlife viewing experience for nonconsumptive users. All alternatives provide similar levels of protection for overfished species, and the proposed 2009-2010 management alternatives are all designed to rebuild overfished stocks within the allowable time period, and there are not expected to be differential impacts on the size of fish stocks over the long run.

Nonusers: Enhanced protection for sensitive fish stocks may also enhance nonuse values. All alternatives provide similar levels of protection for overfished species, and the proposed 2009-2010 management alternatives are all designed to rebuild overfished stocks within the allowable time period, and there are not expected to be differential impacts on the size of fish stocks over the long run.

Public Expenditures Affecting Either Consumer or Producer Surplus

Enforcement Issues: Under the Council-preferred Alternative, somewhat higher costs may be required in order to enforce relatively more extensive Conservation Areas than under No Action.

Table 10-1. Summary of net social benefits under the 2009-2010 management alternatives.

	No Action	*Council Preferred Alternative*
PRODUCER SURPLUS		
Seafood Harvesters		
Adjustment costs (rankings based on projected revenue in 2009: 1 = highest adjustment cost (lowest revenue), 2 = lowest adjustment cost (highest revenue))	1	2
Seafood Processors and Handlers		
Adjustment costs (rankings based on projected value of fish deliveries in 2009: 1 = highest adjustment cost (lowest revenue), 2 = lowest adjustment cost (highest revenue))	1	2
Recreational Charter Vessels		
Ability to supply recreational experience (rankings based on projected angler trips: 1 = fewest angler trips, 2 = most angler trips)	2	1
CONSUMER SURPLUS		
Seafood Consumers		
Availability of fresh and frozen products (rankings based on projected 2009 commercial harvests: 1 = lowest harvest (lowest supply), 2 = highest harvest (highest supply))	1	2
Recreational Fishers		
Availability of higher quality experience (rankings based on projected angler trips: 1 = fewest angler trips, 2 = most angler trips)	2	1
Nonconsumptive Users		
Value of wildlife viewing experience (rankings based on degree of protection for overfished species: 1 = lower value (smallest RCA), 2 =higher value (largest RCA))	2	2
Nonusers		
Option, existence and bequeathal values (rankings based on degree of protection for overfished species: 1 = lower value (smallest RCA), 2 =higher value (largest RCA))	2	2
PUBLIC EXPENDITURES (May affect either consumer or producer surpluses.)		
Monitoring and Enforcement costs (1 = relatively higher costs, 2 = relatively lower costs)	2	1

10.3.2 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. A fish-harvesting business is considered a "small" business by the Small Business Administration (SBA) if it has annual receipts not in excess of $4.0 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 $6.5 million.

The data available for this analysis are based on data sets that have vessel and buyer/processor identifiers. The commercial data are from the PacFIN data system, and the recreational data were 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 a buyer/processing facility may include more than one profit center. Therefore, the counts should be considered upper bound estimates. Additionally, businesses owning vessels and/or buyers and processors may have revenue from fisheries in other geographic areas, such as Alaska, or from nonfishing activities. Therefore, it is likely that when all operations of a firm are aggregated, some of the small entities identified here are actually larger than indicated.

10.3.2.1 *Effects of Council-Preferred Alternative-Summary*

The final Council-preferred alternative constrains fisheries to the final Council-preferred OYs decided by the Council at their April and June 2008 meetings.

The overall economic impact of the Council-preferred alternative is that many sectors are expected to achieve social and economic benefits that are similar to status quo levels. However, there are differences in the distribution of exvessel revenue and angler trips on a regional basis and on a sector-by-sector basis. These changes are driven by changes in the abundance and OYs for target species and rebuilding species. The change in the yelloweye harvest guidelines may negatively impact recreational fisheries in certain regions compared with prior regulations. In the case of commercial fisheries, all nontribal sectors are expected to attain higher levels of exvessel revenues when compared to previous years; the limited entry fixed gear sector shows the highest projected increase as a result of the increase in the sablefish OY. The Pacific whiting fishery is able to attain revenues that are similar to past years, but the impact to this fishery is primarily dependant on results of the 2009 and 2010 stock assessments for Pacific whiting.

On a coastwide basis, commercial exvessel revenues for the non-tribal directed groundfish sectors are estimated to be approximately $90 million per year under the preferred alternative, and the number of recreational bottomfish trips is estimated to be 1,272,000. These figures represent slight increases from the estimated No Action scenario.

A variety of time/area closures applicable to commercial vessels have been implemented in recent years. The most extensive of these are the RCAs, which have been in place since 2002 to prohibit vessels from fishing in depths where depleted groundfish species are more abundant. Different RCA configurations apply to the limited entry trawl sector and the limited entry fixed gear and open access sectors. In addition, the depth ranges covered can vary by latitudinal zone and 2-month cumulative limit period. The alternatives vary in terms of the extent of RCAs. In the Southern California Bight, two CCAs have been in place since 1999 to reduce bycatch of the depleted cowcod stock.

<u>Seafood Harvesters</u>

The final Council-preferred alternative for the limited entry non-whiting trawl fleet generates higher exvessel revenue on a coastwide basis when compared to revenues under previous years' (2007-08) regulations. This is primarily driven by an increase in the abundance of sablefish as opposed to changes in rebuilding species OYs. Area-based management for this sector is in many ways more restrictive than what was intended in 2007 and 2008. Namely, the area north of Cape Alava and shoreward of the trawl RCA will be closed. This change represents a decrease in the amount of fishable area and a potential increase in the cost of fishing because more fuel is required to travel to, and fish at, those deeper depths.

The limited entry whiting fishery is expected to be able to attain revenues similar to those generated in the previous biennial period. Rebuilding species that largely constrain the whiting fishery include widow and canary rockfish. While the 2009-10 widow rockfish OYs are higher than what was originally predicted to be caught in 2006, the past few years have witnessed an increase in the incidental take of widow in the whiting fisheries despite bycatch avoidance behavior. This trend is expected to continue. Setting the widow OY higher than recent catch levels is therefore not expected to result in more liberal fishing opportunity since it is expected that the fishery will continue to encounter more widow rockfish as that stock rebuilds. It is important to note that the potential amount of exvessel revenue ultimately depends on the Pacific whiting stock assessment, which is adopted annually by the Council during the March meeting. The potential whiting vessel exvessel revenue described here only refers to the potential given the OY levels of constraining, incidentally caught rebuilding species.

The fixed gear sablefish sector will generate more revenue under the Council-preferred alternative than 2007-08 because the sablefish OY is increased. However, the fixed gear fleet will have somewhat less area open relative to status quo because the fleet will be restricted to depths greater than 125 fm between Cape Blanco and Cascade Head (except on days when the Pacific halibut fishery is open). Transiting to open fishing grounds may take longer and expend more fuel due to this seaward extension of the non-trawl RCA. This change, coupled with rising fuel prices, will increase expenses and reduce profits in this fishery.

Fixed gear fisheries south of 36° N latitude will benefit from a greatly increased sablefish OY relative to status quo. There are also no recommended area management changes relative to status quo, which should lessen the negative impacts of rising fuel costs.

Under the final Council-preferred alternative, the nearshore groundfish fishery is able to attain exvessel revenues that are equivalent to status quo. However, like the limited entry fleets, there will be less fishing area open to the nearshore fleets relative to status quo since the fishery will be restricted to depths less than 20 fm from 40°10' N latitude to Cape Blanco (these areas were open in depths less than 30 fm in 2007-08). Fishing opportunity and economic impacts to the nearshore groundfish sector are largely driven by the need to protect canary and especially yelloweye rockfish.

Buyers/Processors

The final Council-preferred alternative is projected to provide the west coast economy with a similar level of ex-vessel revenues as was generated by the fishery during the years 2007-08. Therefore, it is expected that effects of this alternative upon buyers and processors should be similar to those generated by the 2007-08 fishery. In addition, the preferred alternative takes into account the desires by buyers and processors to have a year round groundfish fishery and to prolong the petrale sole season in order to avoid an early season market glut. According to public testimony, a year round bottom trawl fishery is an important component of the economic impact to commercial fishers and processors. In particular, a petrale sole fishery in the January-March months and the November-December months is necessary to maintain a skilled labor force on bottom trawl vessels and in processing plants as this fosters year-round employment for those workers. In 2004 and 2005 the November-December petrale fishery was closed and, according to public testimony, processors and trawl vessels lost crewmembers and processing laborers that had to be replaced and re-trained. The final Council-preferred alternative sets rebuilding species OYs at levels designed to accommodate a winter petrale season. In particular the darkblotched and Pacific Ocean perch OYs were set at levels that could accommodate this fishery since these two species are often caught during the winter petrale season.

Recreational Fishery

In terms of recreational angler effort, the number of angler trips is higher under the final Council-preferred alternative when compared to No Action, but somewhat less than in 2007. However, Table 7-51 shows the increase in angler effort under the final Council preferred alternative is occurring exclusively in Oregon, while Washington shows no change and California is worse off than under No Action.

Tribal Fisheries

It is expected that under the proposed 2009-10 management measures, tribal groundfish fisheries should generate at least the same level of ex-vessel revenue and personal income as generated under the No Action Alternative.

10.3.1.2 Responses to the Key Elements of an Initial Regulatory Flexibility Act

In addition to an economic impact analysis, Section 603 (b) of the RFA identifies the elements that should be included in the IRFA. These are bulleted below, followed by information that addresses each element.

- A description of the reasons why action by the agency is being considered.

The purpose and need for the proposed action are discussed in Section 1.2. As indicated in the Executive Summary:

Specify acceptable biological catch (ABC) and OY values for species and species' complexes in the fishery management unit and establish management measures to constrain total fishing mortality to these specifications. These specifications and management measures will be established for calendar years 2009 and 2010. A related regulatory action revises the target rebuilding year and/or harvest control rule for four of seven groundfish species that are currently declared overfished pursuant to §304(e) in the MSA and the stock rebuilding described in the groundfish FMP (section 4.5), as amended by Amendment 16-4. These changes in rebuilding parameters affect the OY values for these species for the 2-year period.

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

- A succinct statement of the objectives of, and legal basis for, the proposed rule.

The description of purpose and need in section 1.2 also outlines the objectives of the proposed action. The introductory paragraph in Chapter 1 and section 1.3, background to the purpose and need, provide information on the legal basis for the proposed action (proposed rule). The objectives are to rebuild depleted groundfish stocks to a size and structure capable of supporting MSY according to the requirement of the MSA and to ensure Pacific Coast groundfish subject to federal management are harvested at OY during 2009 and 2010 in a manner consistent with the Groundfish FMP and National Standards Guidelines using routine management tools available to the specifications and management measures process established by the FMP.

- A description and, where feasible, an estimate of the number of small entities to which the proposed rule will apply.

It is estimated that implementation of the Council's preferred alternative will affect about 2,600 small entities. These small entities are those that are directly regulated by the proposed rule that will be promulgated to support implementation of the Council's preferred alternative. These entities are associated with those vessels that either target groundfish or harvest groundfish as bycatch. Consequently, these are the vessels, other than catcher-processors, that participate in the limited entry portion of the fishery, the open access fishery, the charterboat fleet, and the tribal fleets. Catcher-processors also operate in the Alaska Pollock fishery, and all are entities associated with larger companies such as Trident and American Seafoods. Therefore, it is assumed that all catcher-processors are "large" entities.

Best estimates of the limited entry groundfish fleet are taken from the NMFS Limited Entry Permits Office. As of July 2006, there are 403 limited entry permits including 179 endorsed for trawl (174 trawl only, 4 trawl and longline, and 1 trawl and trap-pot); 198 endorsed for longline (193 longline only, 4 longline and trap-pot, and 4 trawl and longline); 32 endorsed for trap-pot (27 trap-pot only, 4 longline and trap-pot, and 1 trawl and trap-pot). Of the longline and trap-pot permits, 164 are sablefish endorsed. Of these endorsements 126 are "stacked" on 50 vessels. Eight of these permits are used or owned by Catcher-processor companies associated with the whiting fishery. The remaining 395 entities are assumed to be small businesses based on a review of sector revenues and average revenues per entity. The open access or nearshore fleet, depending on the year and level of participation, is estimated to be about 1,300 to 1,600 vessels. Again these are assumed to be "small entities". The tribal fleet includes abot 53 vessels, and the charterboat fleet includes 525 vessels that are also assumed to be "small entities".

- 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 requirements of the report or record.

NMFS will be placing cameras on board mothership catcher vessels as part of the proposed action. Also, there will be a new federal logbook requirement for limited entry and open access fixed gear vessels that target groundfish. While mothership catcher vessels are not deemed "small businesses" because many of them also operate in Alaska fisheries, it is uncertain how many of the fixed gear vessels are "small businesses".

- An identification, to the extent practicable, of all relevant federal rules, which may duplicate, overlap, or conflict with the proposed rule.

No federal rules have been identified that duplicate, overlap, or conflict with the alternatives. Public comment is hereby solicited, identifying such rules.

- 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.

The final Council-preferred alternative represents the Council's efforts to address the directions provided by the Ninth Circuit Court of Appeals which require a revised approach and emphasizes the need to rebuild stocks in as short a time as possible, taking into account: (1) the status and biology of the stocks, (2) the needs of fishing communities, and (3) interactions of depleted stocks within the marine ecosystem. When the Council was taking into account the "needs of fishing communities" it was also simultaneously taking into account the "needs of small businesses" as fishing communities rely on small businesses as a source of economic income and activity. Therefore it may be useful to review whether the Council's three-meeting process for selecting the preferred alternative, as well as the Council's consideration of a yelloweye rockfish "ramp down" strategy and creation of additional Yelloweye Rockfish Conservation Areas can be seen as means of trying to mitigate impacts of the proposed rule on small entities.

General Process for Selection of Preferred Alternative

This EIS includes a range of alternatives that were considered by the Council, including analysis of the effects of setting OYs necessary to rebuild the seven depleted groundfish species. These rebuilding analyses explore the time to rebuild under various levels of harvest (i.e., alternative optimum yields (OYs)), including a "no fishing" scenario (F=0); and the corresponding economic implications to groundfish sectors, ports, and fishing communities; and the interaction of depleted species within the marine ecosystem.

Alternative 2009-10 groundfish management measures are designed to provide fishing opportunities to harvest healthy, target species within the constraints of alternative depleted species' OYs. The action alternatives decided by the Council in April 2008 follow a gradient of conservatism, from most conservative in order to constrain fishing opportunities the most, thereby result in faster rebuilding, to more liberal measures designed to provide more fishing opportunity at a potential cost of longer rebuilding times.

The Council decided preliminary preferred 2009-10 OYs for all non-depleted species for detailed analysis at their April 2008 meeting. Alternative management measures are designed to stay within the preferred OYs for depleted, precautionary, and healthy target species.

The Council reviewed these analyses and read and heard testimony from Council advisors, fishing industry representatives, representatives from non-governmental organizations, and the general public before deciding the final Council-preferred alternative in June 2008. The final Council-preferred alternative includes recommended harvest specifications and rebuilding plans for the seven depleted groundfish species and management measures for 2009 and 2010 west coast fisheries. The final Council-preferred management measures are intended to stay within all the final recommended OYs for groundfish species. The final Council-preferred alternative constrains fisheries to the final Council-preferred OYs decided by the Council at their April and June 2008 meetings. Relative to $T_{F=0}$ (zero harvest), rebuilding is extended by five years or less for bocaccio, canary, Pacific ocean perch, and widow rockfish. Relative to $T_{F=0}$ (zero harvest), rebuilding is extended for darkblotched, cowcod, and yelloweye rockfish by an estimated 10 years, 11 years, and 33 years, respectively, under the final Council-preferred alternative.

The overall economic impact of the Council-preferred alternative is similar to status quo (No Action) levels. However, there may be differences in the distribution of exvessel revenue and recreational angler trips on a regional basis and on a sector-by-sector basis. Change in the yelloweye OY or harvest guideline affects recreational fisheries in the northern areas, but not recreational fisheries in the southern-most areas. In the case of commercial fisheries, the bottom trawl sector is able to attain higher exvessel revenues compared to recent history and No Action levels primarily as a result of an increase in the sablefish OY. The Pacific whiting fishery should be able to attain revenues that are roughly equal to recent past and No Action levels pending the new stock assessments for Pacific whiting. Fixed gear sablefish sectors are expected to achieve higher revenues than in the recent past and No action because of an increase in the sablefish OY. Other groundfish fisheries generate exvessel revenues that are similar to No Action.

Yelloweye Ramp-Down Alternatives

The Council adopted for analysis an OY alternative of 13 mt and 14 mt for 2009 and 2010, respectively, and consideration of two yelloweye harvest rate ramp-down strategies, which are explained in more detail below. Therefore, the full range of viable yelloweye OY alternatives analyzed for 2009-10 are 0 mt, 13 mt, 14 mt, and the harvest rate ramp-down strategies, which specify OYs of 17 mt and 14 mt for 2009 and

2010, respectively or 17 mt in each year. This compares to the status quo OYs of 23 mt in 2007 and 20 mt in 2008.

Under the zero harvest alternative ($T_{F=0}$), the cost to the fishing industry is expected to be substantial. The $T_{F=0}$ harvest alternative is estimated to result in a loss of over $100 million in exvessel revenues and approximately 1,150,000 recreational angler trips (Table 7-70). These figures represent a complete closure of multiple sectors including, but not limited to, all bottom-tending commercial fishing gears (outside of selective gears like dive gear) for groundfish species, shrimp species, and other bottom dwelling species such as Pacific halibut, California halibut, and sea urchins; the complete closure of Chinook salmon troll fisheries; the complete closure of tribal groundfish fisheries; and the complete closure of recreational fisheries for groundfish, Pacific halibut, and Chinook salmon. This alternative is expected to have substantial negative economic consequences to communities, and these closures would be in place until 2048 – the year yelloweye is estimated to be rebuilt under zero harvest.

Under the alternative which would put in place a 13 mt yelloweye OY in 2009 and a 14 mt OY in 2010, multiple sectors and communities are estimated to be negatively impacted. Analysis of commercial management measures designed to achieve a suite of OYs for all overfished species which included this yelloweye OY alternative showed that non-whiting trawl sector exvessel revenues would be reduced by one third. However, this is may be an overestimate of what would occur if only yelloweye were to be reduced to 13 or 14 mt and other overfished species were to remain at status quo levels. In terms of recreational fisheries it is likely that multiple recreational fisheries would necessarily be closed under a 2009-10 OY for yelloweye of less than 14 mt. Fishing seasons would be shortened, which would have additional implications as fewer tourists would be drawn to communities during times when fishing closures are in place. This means that economic impacts will be larger than indicated by just examining changes in angler trips.

Under the 13 mt 2009 yelloweye OY alternative, it is believed that commercial fixed gear vessels that homeport along the northern Washington coast and Puget Sound would experience a complete closure of traditional fishing grounds for sablefish. Some of these vessels may choose to move further south along the coast and homeport in different locations in order to access other fishing grounds, however, this would have repercussions to those communities where fixed gear vessels currently homeport, and many of these communities are described as being resource-dependent. This means those communities would be negatively impacted to a larger degree than communities that are not as dependent on resource-based industries. It is estimated that under this alternative these impacts would be in place until 2078, or 30 years longer than T_{MIN}. It is important to note that state managers of recreational fisheries have stated that multiple recreational fisheries cannot operate if the 2009-10 OY for yelloweye is less than 14 mt. In order to achieve the necessary reductions in yelloweye mortality, managers would need to completely close multiple sectors of recreational fisheries off Washington, Oregon, and northern California, meaning that for many recreational sectors, the economic impact of an OY less than 14 mt is functionally equivalent to zero harvest. (The analysis of the 14 ton OY is same as that for the 13 ton OY.)

The yelloweye ramp-down strategy ramps the harvest rate down from the status quo harvest rate and resumes a constant harvest rate strategy in 2011. The 2007-2010 OYs are 23 mt, 20 mt, 17 mt, and 14 mt, respectively under the ramp-down strategy. This alternative adds one Yelloweye Rockfish Conservation Areas off of the Washington coast that would be closed to commercial limited entry fixed gear groundfish fishing, as well as adds/maintains two others that would be voluntary "areas to be avoided." These additional yelloweye RCAs would require a change to the Pacific Halibut Catch Sharing Plan. For Oregon, it is proposed that the current YRCA be expanded (see Figure 2.5). The area closures would be expected to assist in the conservation and rebuilding of yelloweye rockfish and, while the primary purpose for these closures is yelloweye protection, they may also provide additional conservation benefits for canary rockfish and other depleted species.

The yelloweye ramp-down OY results in economic impacts to recreational fisheries that range from near status quo, to substantial reductions in angler effort compared to recent levels. Commercial exvessel revenues for alternatives corresponding to the yelloweye ramp-down strategy show that revenues would range from near status quo, to substantial reductions compared to recent levels.

Through adopting the ramp-down approach which includes expanded Yelloweye Rockfish Conservation areas off Oregon and Washington, the Council was able to consider the trade off between rebuilding periods (need to rebuild as fast as possible) and effects on communities (taking into account the needs of fishing communities) and small businesses, supported by additional management measures to assure that the OY is not exceeded (which in turn would affect the majority of communities and small businesses because of the wide geographic range of yelloweye). While the preferred ramp down approach extends the rebuilding period somewhat, it allows the current fisheries sectors to continue, and prevents major closures of fisheries and the associated harm to communities and small businesses.

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CHAPTER 12 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
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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

CHAPTER 13 ACRONYMS AND GLOSSARY

Acronym	Definition
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).
AFSC	National Marine Fisheries Service Alaska Fisheries Science Center
APA	Administrative Procedures Act
B_{MSY}	The biomass that allows maximum sustainable yield to be taken.
BO	Biological opinion
BRD	Bycatch reduction device.
CBP	(Zip)code business patterns
CCA	Cowcod Conservation Area(s)
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CFGC	California Fish and Game Commission
CFR	Code of Federal Regulations.
Council	Pacific Fishery Management Council
CPFV	Commercial passenger fishing vessel (charter boat)
CPS	Coastal pelagic species.
CPUE	Catch per unit of effort.
CRCA	California Rockfish Conservation Area.
CRFS	California Recreational Fisheries Survey
CV	Coefficient of variation

Acronym	Definition
DEIS	Draft Environmental Impact Statement
DRCA	Darkblotched Rockfish Conservation Area
DTL	Daily-trip-limit
DTS	Dover sole, thornyhead, and trawl-caught sablefish complex
EA	Environmental assessment
EEZ	Exclusive Economic Zone.
EFH	Essential fish habitat.
EFP	Exempted fishing permit.
EIS	Environmental impact statement.
ENSO	*El Niño* Southern Oscillation.
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act.
ESU	Evolutionarily significant unit
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."
F=0	Fishing mortality equals zero (no fishing).
FEAM	Fishery economic assessment model.
FEIS	Final Environmental Impact Statement
FMP	Fishery management plan.
F_{MSY}	The fishing mortality rate that maximizes catch biomass in the long term.
FMU	Fishery management unit
FONSI	Finding of no significant impact.
FR	Federal Register.
GAP	Groundfish Advisory Subpanel.
GDP	Gross Domestic Product
GFA	Groundfish Fishery Area
GIS	Geographic Information System
GFA	Groundfish fishing areas
GMT	Groundfish Management Team.
GPS	Global Positioning System

Acronym	Definition
HAPC	Habitat areas of particular concern.
HG	Harvest guideline(s).
HMS	Highly migratory species.
IFQ	Individual fishing quota.
IMPLAN	IMpact Analysis for PLANning - a regional economic impact model
INPFC	International North Pacific Fishery Commission.
IPHC	International Pacific Halibut Commission.
IRFA	Initial regulatory flexibility analysis.
LE	Limited entry fishery.
M	Instantaneous rate of natural mortality (as opposed to F, fishing mortality)
MBTA	Migratory Bird Treaty Act
MFMT	Maximum fishing mortality threshold.
MMPA	Marine Mammal Protection Act.
MPA	Marine protected areas
MRFSS	Marine Recreational Fisheries Statistics Survey.
MSA	Magnuson-Stevens Fishery Conservation and Management Act.
MSST	Minimum stock size threshold.
MSY	Maximum sustainable yield.
NAICS	North American Industry Classification System
NEPA	National Environmental Policy Act.
NERR	National Estuarine Research Reserves
NGO	Non-government organization
NMFS	National Marine Fisheries Service.
NOAA	National Oceanic & Atmospheric Administration. The parent agency of National Marine Fisheries Service.
NOI	Notice of intent
NRDC	Natural Resource Defense Council
NSG	National Standards Guidelines.
NWR	National Marine Fisheries Service, Northwest Region
ODFW	Oregon Department of Fish and Wildlife
OFWC	Oregon Fish and Wildlife Commission
ORBS	Oregon Recreational Boat Survey
OY	Optimum yield

Acronym	Definition
PacFIN	Pacific Coast Fisheries Information Network. Provides commercial fishery information for Washington, Oregon, and California. Maintained by the Pacific States Marine Fisheries Commission.
PDO	Pacific decadal oscillation.
P_{MAX}	The estimated probability of reaching $T_{MAX.}$ May not be less than 50%.
POP	Pacific ocean perch. A rockfish species that was declared overfished in 1999.
PRA	Paperwork Reduction Act
PSMFC	Pacific States Marine Fisheries Commission.
QSM	Quota species monitoring.
RCA	Rockfish Conservation Area
RCG	Rockfish, cabezon, and greenlings. A species grouping used in the management of California recreational fisheries.
RecFIN	Recreational Fishery Information Network. A database managed by the Pacific States Marine Fisheries Commission that provides recreational fishery information for Washington, Oregon, and California.
RFA	Regulatory Flexibility Analysis, or Regulatory Flexibility Act.
RIR	Regulatory Impact Review.
RLMA	Rockfish/lingcod Management Area
ROD	Record of Decision
SAFE	Stock assessment and fishery evaluation.
SCTA	Southern California Trawlers Association
SFA	Sustainable Fisheries Act of 1996. Amended the MSFCMA.
SHOP	Shoreside Hake Observation Program
SPR	Spawning biomass per recruit
SSC	Scientific and Statistical Committee.
STAR Panel	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.
SWOP	Shoreside Whiting Observer Program
TAC	total allowable catch
TIQ	Trawl Individual Quota
$T_{F=0}$	The median time to rebuild a stock if all fishery-related mortality were eliminated beginning in 2007.
T_{MAX}	The maximum time period to rebuild an overfished stock, according to National Standard Guidelines. Depends on biological, environmental, and legal/policy factors.

Acronym	Definition
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).
TNC	The Nature Conservancy
T_{TARGET}	The target year, set by policy, for a fish stock to be completely rebuilt.
U/A	Usual and accustomed (usually used when referring to tribal fishing, hunting or gathering areas)
UASC	United Anglers of Southern California
USFWS	U.S. Fish and Wildlife Service. A representative of USFWS is a non-voting member of the Council.
VMS	Vessel monitoring system.
WCGOP	west coast Groundfish Observer Program
WDFW	Washington Department of Fish and Wildlife. A representative of WDFW sits on the Council.
WDNR	Washington Department of Natural Resources
WSPRC	Washington State Parks and Recreation Commission
WOC	Washington, Oregon and California
YRCA	Yelloweye Rockfish Conservation Area

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CHAPTER 15 RESPONSES TO PUBLIC COMMENT

During the comment period on the draft Environmental Impact Statement (DEIS) for the Proposed Acceptable Biological Catch (ABC) and Optimum Yield (OY) Specifications and Management Measures for the 2009-2010 Pacific Coast Groundfish Fishery, NMFS received two letters of comment. One letter was sent jointly by four environmental advocacy organizations (Natural Resources Defense Council, Pacific Marine Conservation Council, Ocean Conservancy, and Marine Fish Conservation Network; hereinafter, "The Four Organizations.") The second comment letter was sent by Oceana, another environmental advocacy organization.

The Four Organizations

Comment 1: The Four Organizations urged NMFS to manage blue rockfish separately from the minor nearshore complex and set a precautionary OY which reduces catch below the 2007 level given scientific suspicion that this species may be experiencing overfishing.

Response: The preferred alternative is to continue to manage blue rockfish under the minor nearshore rockfish complexes and to establish a 220 mt harvest guideline (HG) for all California fisheries. The 220 mt HG is below the assessment ABC of 241 mt in 2009 (223 mt north of Pt. Conception from base model in the assessment plus 18 mt for south of Pt. Conception) and 239 mt in 2010 (221 mt north of Pt. Conception from base model in the assessment plus 18 mt for south of Pt. Conception) and is therefore a prescribed harvest level below the overfishing threshold. California Department of Fish and Game (CDFG) has committed to maintaining harvests below this HG and has the authority to enact more precautionary management measures if necessary (see section 4.3.2.1 in the DEIS for more details). Blue rockfish are harvested primarily inside state waters off California, so California has the greater ability to control the harvest of blue rockfish. In addition, blue rockfish are covered in the California nearshore fishery management plan.

Comment 2: The Four Organizations urged NMFS to schedule greenspotted rockfish for assessment in the 2009-2010 cycle per the SSC recommendation.

Response: Deciding which groundfish stocks to assess in 2009 is not part of the proposed action and not a subject of analyses and discussions in the DEIS. NMFS notes that the assessment schedule is based on a variety of factors, including data availability and workload issues. NMFS agrees that a full assessment should be undertaken soon.

Comment 3: The Four Organizations urged NMFS to conduct an assessment of and design specific protection measures for bronzespotted rockfish as scientific data indicates it is vulnerable to fishing and that landings have declined dramatically; they also urged NMFS to keep the preferred alternative choice of a no-retention policy.

Response: As per the response on greenspotted rockfish, deciding on whether or not an assessment of bronzespotted rockfish is done is not a part of the proposed action. Given the scientific information on bronzespotted rockfish, which is summarized in the DEIS, NMFS believes the Council's preferred alternative of prohibiting retention of bronzespotted rockfish in all west coast fisheries is a prudent course of action that will greatly reduce fishing mortality, since historical data indicates that the stock was targeted when it was encountered. The available scientific information also suggests that bronzespotted rockfish are distributed in the same habitats as cowcod and continuing the Cowcod Conservation Areas should contribute to conservation of the stock.

Comment 4: The Four Organizations urged NMFS to analyze impacts to spiny dogfish under a broader range of alternatives and reinstate a full stock assessment of this slow-growing species which is experiencing crashes and red listings within its range.

Response: NMFS is assuming that the commenter is referring to the "red list" that is published by the International Union for Conservation of Natural Resources (IUCN) and indicates species that the IUCN has identified as having a threatened risk of extinction. On January 12, 2009, the IUCN red list does not appear to contain Pacific spiny dogfish.

NMFS agrees, and as discussed in section 4.3.4.4 of the DEIS, that the general life history characteristics of spiny dogfish make the species generally vulnerable to overexploitation. For this reason, the Council and NMFS took action in 2006 to implement cumulative landing limits for spiny dogfish in all commercial fishing sectors. The trip limits for spiny dogfish remain in the alternatives considered in the DEIS for 2009-2010 and are based on the best available information. Several tables in the DEIS present the direct and incidental catch of dogfish by different fisheries, gears and depths, including Tables 4-1 through 4-3, 4-23 through 4-25, 4-30 through 4-32, and 4-56. Biological information presented in the FEIS for the 2007-2008 specifications and management measures indicate that dogfish are most abundant between 0 and 109 fm. Therefore, trip limits in combination with Rockfish Conservation Areas (RCAs), are believed to reduce the total catch of dogfish over historical catch levels. Changes in RCA boundaries under the different alternatives change the total mortality of dogfish that is being considered.

Tribal measures which include a directed longline fishery for dogfish and which will also be restricted by the limited entry trip limits are considered in the DEIS. It should also be noted that there does not appear to be the same potential threats to spiny dogfish populations in the northeast Pacific compared to other regions where they occur.

NMFS notes that the assessment schedule is based on a variety of factors, including data availability and workload issues. NMFS agrees that a full assessment should be undertaken soon.

Comment 5: The Four Organizations urged NMFS to rebuild darkblotched rockfish within 10 years, which they assert is required under the Magnuson-Stevens Act; in the event that NMFS does not follow this course of action, at a minimum implement an OY no higher than the 2006 OY level of 200 mt to reflect the new biological understanding that the stock is rebuilding more slowly than previously thought.

Response: The Four Organizations misinterpret the ten-year rebuilding mandate in the Magnuson-Stevens Act for overfished species. The Act requires rebuilding within ten years from the time when the species is declared overfished, if that is biologically possible. The minimum time to rebuild a stock from the year the stock is declared overfished is referred to as TMIN in the FMP and west coast groundfish rebuilding plans, and is the predicted time to rebuild a stock in the absence of fishing from the onset of rebuilding. This is differentiated from the predicted time to rebuild an overfished stock under a zero-harvest strategy at any subsequent point in time which is referred to in the DEIS as T0 or T at F=0. Both terms are estimated in groundfish rebuilding analyses and these estimates are provided in Tables 2-3 and 2-5 in the DEIS. From Table 2-5, the current estimate of TMIN for darkblotched is 2015 and, from Table 2-3, the current estimate of T0 for darkblotched is 2018. What this means, given our current understanding of darkblotched status and productivity, is that the stock could be rebuilt by 2015 if a zero-harvest strategy had been adopted from the onset of rebuilding in 2002 (the stock was declared overfished in 2001) or the stock could be rebuilt by 2018 if a zero-harvest strategy is adopted beginning in 2009, which is the most aggressive rebuilding strategy that can be currently considered for rebuilding darkblotched, based on the best information available now. The commenters imply that a zero-harvest strategy is a Magnuson-Stevens Act mandate since the stock can now be rebuilt within ten years under a zero-harvest strategy. This does not make sense, since that reasoning would require a zero-harvest strategy whenever a stock is potentially within ten years of being rebuilt at any point in the rebuilding period.

The darkblotched rebuilding plan, as well as all west coast groundfish rebuilding plans, relies on a strategy to rebuild in as short a time as possible while taking into account the status and biology of the depleted stock, the needs of fishing communities, and the interaction of the depleted stock within the marine ecosystem. As described in section 2.1.1 of the DEIS, this rebuilding objective was underscored in an August 2005 ruling in the Ninth Circuit Court of Appeals, which resulted in reconsideration of all west coast groundfish rebuilding plans under FMP Amendment 16-4 in 2006. The resulting darkblotched OYs in 2007 and 2008 were specified in accordance with the Amendment 16-4 rebuilding plan considering the time to rebuild, the needs of west coast fishing communities, and other appropriate factors. Setting the 2009 and 2010 darkblotched OY no higher than the 2006 OY of 200 mt would cause significant negative impacts to west coast fishing communities as evidenced by the analyses in the Amendment 16-4 EIS and the analyses used to decide the preferred OYs for 2009 and 2010 presented in the DEIS.

We cannot look at darkblotched rockfish in isolation when considering community impacts, and therefore the commenters have taken a limited perspective on the darkblotched rebuilding plan. Consistent with Amendment 16-4, NMFS took a programmatic perspective for 2009 and 2010 and examined all rebuilding plans, and their impacts on communities, simultaneously. In doing so, NMFS and the Council considered both time to rebuild and needs of communities in adopting their final preferred alternative.

Darkblotched rockfish is one of the most important overfished species in relation to the overall health of commercial fisheries and their communities, because its protection limits access to some of the most valuable target stocks (dover sole, thornyheads, sablefish, petrale sole, and to some degree, Pacific whiting). Therefore, a relatively small reduction in darkblotched harvest in one year will result in a relatively large reduction in the amount of the target species that can be harvested. Because marginal changes in the darkblotched harvest rate have a relatively large effect on economic benefits from the groundfish commercial fisheries, a darkblotched OY that is less conservative than those for some other overfished stocks is justified.

Comment 6: The Four Organizations urged NMFS to choose an OY of 44 mt or 85 mt for canary rockfish in light of the fact that the 2007 OY of 44 mt was manageable and that the new, more optimistic stock assessment has considerable uncertainty.

Response: Considerable analysis of the new canary rockfish stock assessment, new canary rockfish rebuilding analysis, and the alternative 2009 and 2010 OYs resulting from the new assessment and rebuilding analysis was done in the process leading to the Council's decision of a preferred canary rockfish OY. The Stock Assessment Review (STAR) panel and the Council Scientific and Statistical Committee (SSC) that critically evaluated the new canary rockfish assessment in 2007 recommended the new, more optimistic assessment as the best available science. While there is uncertainty in the new canary rockfish assessment, it is considered superior to previous canary rockfish assessments by the STAR panel and the SSC.

NMFS disagrees with the commenters' claim that the preferred OY alternative for canary rockfish "prioritizes economic gain over rebuilding within the statutorily required timeframe". The canary rockfish rebuilding plan has created significant economic impacts on all sectors of the west coast groundfish fishery. Many of the most economically vulnerable ports are losing their infrastructure and seeing many fishing-related business losses.

Following the adoption of 2007-2008 groundfish harvest specifications and management measures, the Council received updated observer data that indicated canary rockfish bycatch was higher than previously thought. As a result, at the April, 2007 Council meeting where this was received, the Council recommended inseason adjustments to management measures in order to stay within the canary rockfish OY. As a result, NMFS expanded the size of the RCAs, closing off several important grounds for fishing communities off the Washington and Oregon coasts. See 72 Federal Register 19390, April 18, 2007. This resulted in adverse community impacts in 2007 and 2008 that were worse than we had anticipated. The regulations and management measures initially established for 2007 were much less restrictive than what we have in place now as a result of the more recent observer data. In the remote fishing community of Neah Bay, all areas actively fished by the non-tribal trawl fleet were closed, eliminating much of the fishing activity occurring in that port and community. Other communities may not have been harmed to the same degree, but were certainly impacted more than anticipated when the 2007-2008 groundfish harvest specifications and management measures were developed and analyzed. Astoria, for example, lost much of their shoreward-of-the-trawl RCA access, an area relied upon heavily in the past. The 44 mt OY was, and would continue to be, extremely restrictive in the trawl fishery, as well as for other sectors.

The Council's SSC and National Standard 1 guidelines generally recommend a constant harvest rate strategy for rebuilding plans. The preferred 2009-2010 canary rockfish OY of 105 mt actually lowers the status quo harvest rate in the current rebuilding plan (maintaining the status quo SPR harvest rate of F88.7% would equate to a 2009-2010 OY of 155 mt). Further, the preferred alternative changes the target rebuilding year from 2063 to 2021. Table 2-3 and Figure 2-2 in the DEIS show the tradeoff in rebuilding duration under the alternative harvest rates analyzed to decide 2009-2010 OYs. One additional year of rebuilding is the "cost" of increasing the OY from 44 mt to 105 mt. Another way to look at it is that the preferred alternative results in two additional years of rebuilding relative to the zero-harvest of canary rockfish beginning in 2009. Because canary rockfish is found along most of the coast, out to approximately 150 fathoms, zero-harvest would result in nearly total closure of the recreational fisheries along the coast and large closures for both trawl and longline fisheries. Therefore, the preferred alternative for canary rockfish responsibly uses the information in the most recent assessment to continue conservation for the stock while taking into account the needs of the fishing communities.

Comment 7: The Four Organizations urged NMFS to adhere to the rebuilding plan adopted in 16-4 for yelloweye rockfish and not modify it to allow higher take in 2010. Additionally, they assert that the modified rebuilding plan has a lower probability of rebuilding than under the original ramp-down plan. They quoted a statement in the DEIS on page 548 that said, "the rebuilding probability is reduced from 80% to 69%."

Response: The preferred alternative for rebuilding yelloweye rockfish essentially maintains the status quo rebuilding plan adopted under FMP Amendment 16-4 by maintaining the target rebuilding year and maintaining the SPR harvest rate once the constant harvest rate strategy begins in 2011. The harvest is ramping down from the OY levels in 2007 and 2008 (23 mt and 20 mt respectively) to 17 mt in 2009 as specified in 16-4. The small change is that in 2010, the OY will remain at 17 mt rather than be reduced to 14 mt, as specified in the Amendment 16-4 rebuilding plan. The harvest of yelloweye rockfish under the status quo rebuilding plan in 2010 would take 1.29% of the spawning biomass in that year. Under the revised rebuilding plan, 1.56% would be taken. This will only occur in one year of the rebuilding. Therefore, this change in the 2010 harvest provides no appreciable difference in the time or probability to rebuild between this alternative and the status quo ramp-down strategy. See Table 4-10 in the EIS that shows the rebuilding probability for yelloweye rockfish under both the preliminary and final preferred alternative are essentially the same, as calculated to one tenth of one percent.

The statement cited by the Four Organizations on page 548 of the DEIS uses information from Table 8-1. Table 8-1 is misleading, because the "current Pmax" in the table is based on the 2006 stock assessment, whereas the "proposed Pmax" is based on the 2007 stock assessment. Therefore, these two numbers cannot be directly compared. Table 4-10 in the DEIS contains the proper comparison in that it uses, for all alternatives, the most updated information from the 2007 stock assessment update.

Avoiding yelloweye rockfish in line gear fisheries has proven extremely difficult. The Council and NMFS have been progressively specifying more conservative management measures to achieve the target yelloweye rockfish harvest rate in the rebuilding plan. It is anticipated that new recommended management measures for 2009 and 2010, such as expanding the size of the non-trawl RCA by extending it seaward and shoreward in areas north of 40°10' N latitude, will maintain yelloweye rockfish impacts below the target harvest prescribed in the rebuilding plan. As noted in the DEIS (see sections 2.1.1.7 and 4.3.1.1), the slightly higher yelloweye rockfish harvest rate in 2010 under the preferred alternative is recommended to allow one more year to explore management measures, including potential new Yelloweye RCAs (YRCAs) needed to minimize bycatch of yelloweye rockfish and mitigate the adverse economic impacts during the constant harvest rate period that begins in 2011.

Comment 8: The Four Organizations urged NMFS to analyze and determine a threshold of economic activity below which a disaster would occur and structure the rebuilding alternatives to analyze incremental increases of overfished species OY.

Response: Declaration of a "disaster threshhold" is not a requirement under MSA or any other applicable laws. The appropriate standard is set out in the MSA. The analysis of socioeconomic impacts associated with overfished species OYs uses the same framework adopted to consider Amendment 16-4 rebuilding plans and 2007-2008 harvest specifications. Under this framework, impacts to west coast fishing communities associated with rebuilding alternatives are analyzed based on each community's dependence on the groundfish fishery and the general economic resilience of that community to changes in fishing opportunities. Communities that are highly dependent on the groundfish fishery and with very low resilience to changes in economic activities associated with groundfish fishing are considered more vulnerable to negative socioeconomic impacts under more conservative rebuilding alternatives. Each community is differentially affected by an individual species rebuilding plan based on that species distribution and the way that species rebuilding plan affects the fisheries that contribute to the community's economic infrastructure. This is a more realistic approach for assessing impacts on communities since different communities suffer such different impacts.

However, to put the "disaster threshold" question in its proper context, one must consider that the current non-whiting groundfish fishery is much more constrained today under the full range of overfished species OYs analyzed for the 2009-2010 management period than those that were specified prior to and during the year 2000 when the west coast groundfish fishery was declared a federal disaster. That is, there are far fewer groundfish fishing opportunities available today under the more conservative management regime than there were during the late 1990s and 2000. This is driven by the groundfish rebuilding plans that today dictate the amount of fishing opportunity that can be considered.

Comment 9: The Four Organizations urged NMFS to adopt Alternative 3 instead of the current preferred alternative as Alternative 3 rebuilds overfished species more quickly and the DEIS analysis fails to demonstrate it would cause disastrous consequences.

Response: A wider range of alternative OYs were analyzed for the seven overfished species managed under the groundfish FMP than for the other, healthier stocks due to the need to periodically evaluate the effectiveness of management measures to rebuild these stocks and to fully evaluate new stock status information available through assessment. These OY alternatives ranged from a 2009-2010 OY of 0 mt to higher OYs chosen for the DEIS analysis by the Council. The range of analyzed OYs was reasonable and in no case were the highest OYs available from new rebuilding analyses used in these analyses (i.e., OYs under harvest rates that would extend rebuilding to the maximum times recommended under National Standard 1 guidelines).

The DEIS analyses approach the harvest specifications decision by first considering the implications to stock rebuilding by evaluating alternative OYs using the criteria of catch monitoring uncertainty, stock assessment uncertainty, the level of stock depletion, rebuilding probabilities, and the extended duration of rebuilding (see DEIS section 4.2). These evaluations are used to rank the risk of alternative OYs in achieving rebuilding objectives at the individual stock level. This evaluation specifically looks at the tradeoff of potential fishing opportunities provided by progressively higher OYs versus extending rebuilding periods for these species. The next step is to systematically range OY alternatives for all seven species in concert (termed rebuilding alternatives in the DEIS) to generally gauge how these OYs may affect fishing opportunities on the west coast shelf and slope. This analysis recognizes that available yields for each overfished species differentially affect fisheries spatially in both latitudinal and distance from the shore dimensions as well as by the selectivity of the various fishing gears deployed on the west coast to catch that species. For instance, yelloweye rockfish OY alternatives have a greater effect on fisheries deploying line gears on the northern shelf while widow OY alternatives are more likely to affect the ability of whiting-directed trawl fisheries to successfully harvest their whiting allocations. Finally, the analysis projects the socioeconomic impacts to west coast fishing communities by ranking communities based on their dependence on groundfish fisheries constrained by rebuilding OYs and their resilience to changes in economic activity affected by fishing opportunities. This multi-tiered analytical approach is designed to appropriately address the Magnuson-Stevens Act mandate to rebuild in as short a time as possible while taking into account the status and biology of the depleted stock, the needs of fishing communities, and the interaction of the depleted stock within the marine ecosystem.

Alternative 3 OYs are in some cases more conservative than status quo rebuilding plans and in other cases more liberal. This is because all rebuilding plans, except the yelloweye rockfish plan during the harvest rate ramp-down period, specify a constant harvest rate strategy as recommended by the Council's SSC and National Standard 1 guidelines. As discussed in a previous comment, the higher Alternative 6 OY for canary rockfish comports to the status quo rebuilding plan since that OY is determined using the specified F88.7% harvest rate. The Alternative 3 OY, which maintains the 2007-2008 canary rockfish OY of 44 mt, is much more conservative than an OY calculated under the status quo rebuilding plan. Alternative rebuilding OYs need to be considered on a case by case basis and need to consider much more than how the OY changes from one management period to the next.

In the proposed rule to implement Amendment 16-4 to the Pacific Coast Groundfish Fishery Management Plan and to set the 2007-2008 harvests specifications and management measures for groundfish (September 29, 2006), environmental organizations stated that the rebuilding plan "gives priority to economic interests over rebuilding." A similar argument is made here in their comments on the Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for The 2009-2010 Pacific Coast Groundfish Fishery DEIS. NMFS disagrees that the rebuilding plan gives priority to economic interests over rebuilding. This DEIS focuses on rebuilding overfished species in as short a time as possible, while taking into account the status and biology of those species and the needs of fishing communities. In taking into account the needs of fishing communities, the DEIS recognizes that fishing communities have, for a number of years, already seen their economic activities curtailed in order to rebuild overfished species. The analysis in the DEIS provides information and analyses on individual community impacts and broader coastwide fishery impacts of groundfish fishery management focused on rebuilding overfished species. The analysis within the DEIS identifies classes of communities according to attributes of fishery dependence, resilience, and vulnerability. In comparing these community attributes to amounts of overfished species, target groundfish species and other target species (crab, shrimp, etc.) associated with these communities, NMFS found that there were few regions on the West Coast without a highly dependent or vulnerable groundfish fishing community.

In addition to severely reduced groundfish fishing opportunities, in May, 2008, a commercial fishery failure was declared for the West Coast salmon fishery. The unprecedented collapse of Sacramento River Fall Chinook, combined with the exceptionally poor status of coho salmon from Oregon and Washington, led officials to close all commercial and sport Chinook ocean fishing off California and most of Oregon this year. This year's salmon closure left thousands of fishermen and dependent businesses struggling to make ends meet. Given the lack of opportunity for fishermen to harvest salmon in 2008, the Council and NMFS recognized that there might be and increased economic incentive to harvest West Coast groundfish stocks. Because of this, the Council and NMFS took actions to reduce cumulative trip limits for some species in open access fisheries as a conservation measure to ensure that specific OYs were not exceeded. See 73 Federal Register 21057, April 18, 2008.

The DEIS provides a rationale for the preferred alternative. Setting harvest specifications and associated management measures is largely driven by the legal requirement to rebuild depleted species. Because of the resulting constraints that this imposes on fisheries, the risk that other stocks will be subjected to overfishing is minimal. For overfished stocks, the basic approach that guides the adoption of a rebuilding strategy comes from the MSA. As in the 2007-2008 groundfish harvest specifications EIS (PFMC 2006), the evaluation of the alternatives considered rebuilding in as short a time as possible, while also taking into account the needs of fishing communities. From a strictly biological perspective, rebuilding in a time period as short as possible equates to rebuilding in the absence of fishing. Considering the OY alternatives, Alternative 1 lists OYs of 0 mt for all overfished species, which equates to the as-short-as-possible/absence-of-fishing standard. This is the alternative that causes the least adverse impacts to the biological and physical environment. However, it would have disastrous economic consequences, because it would result in complete closure of nearly all groundfish and many non-groundfish fisheries. As a result, it would have significant adverse impacts to fisheries and fishing-dependent communities. In contrast, the Council-preferred alternative was developed to address fully the requirements of MSA §304(e)(4)(A). The strategies and measures adopted under this alternative demonstrate the appropriate consideration of stock rebuilding and the needs of fishing communities, based on the Ninth Circuit Court's direction and the requirements of Section 304(e)(4)(A) and National Standard 8 of the MSA.

Table 7–57c shows estimated income impacts under the different management measure alternatives by fishery. The Council-preferred alternative shows a 22 percent increase in personal income impacts compared to No Action. The Council-preferred alternative, in comparison to No Action, continues current rebuilding strategies for most overfished species with an increase in positive short-term socioeconomic impacts (assuming that the whiting fishery is prosecuted at levels similar to past years). Although, as discussed above, lower OYs and associated management measures bring about less adverse impacts to overfished species, the Council also considered the needs of fishing communities in selecting its preferred alternative. The cumulative decline in revenue and income over the past decade has been significant. Additional substantial reductions in revenue due to management restrictions would likely have additional significant short-term socioeconomic impacts. The rationale for adopting the preferred alternative is therefore consistent with the requirements of the MSA at §304(e)(4)(A).

Comment 10: The Four Organizations urged NMFS to implement management changes recommended by scientists to address the challenges and uncertainties that climate change and ocean acidification bring.

Response: NMFS agrees there are great challenges and uncertainties associated with climate change and ocean acidification. Potential long term changes to marine ecosystems brought about by climate change and ocean acidification need to be considered as part of any management decision, and are considered in the DEIS.

Relevant observations on climate change are included in Chapter 5 of the Supplemental Comprehensive Analysis to the Federal Columbia River Power System Biological Opinion, 2008 (http://www.nwr.noaa.gov/Salmon-Hydropower/Columbia-Snake-Basin/Final-BOs.cfm). Inter-annual climatic variations (e.g. El Niño and La Niña), longer term cycles in ocean conditions (e.g. Pacific Decadal Oscillation), and ongoing global climate change have implications for marine habitats and groundfish species. These phenomena are an area of substantial scientific investigation. Scientific evidence strongly suggests that global climate change is already altering marine ecosystems from the tropics to polar seas. Physical changes associated with warming include increases in ocean temperature, increased stratification of the water column, and changes in the intensity and timing of coastal upwelling. These changes will alter primary and secondary productivity, and the structure of marine communities. NMFS believes that the west coast groundfish fishery is conservatively managed and we will continue to pursue the necessary research and adaptive management strategies to best address a changing marine ecosystem.

Comment 11: The Four Organizations urged NMFS to analyze an option to increase intersector allocation to the fixed gear fleet by 25-30%, as fixed gear generally causes orders of magnitude less bycatch and habitat destruction than trawl gear.

Response: Intersector allocations are being considered in a separate ongoing process under FMP Amendment 21. We anticipate an alternative will be analyzed that will address an increase in allocation to fixed gear. Such considerations as habitat impacts and effects of long term sector allocations on west coast fishing communities will be considered in that process.

Oceana

Comment 1: Oceana urged NMFS to account for the protection of the ecosystem in setting catch levels. They encourage NMFS to build on the foundation set by other management regions and by scientists focusing on the California Current, and evaluate ecosystem needs in setting catch levels. Such analyses should consider fishing impacts on biodiversity, direct and indirect impacts on predators, impacts to local population and age structure, and habitat. They identified that in April 2007 the PFMC voted to move forward with an Ecosystem Fishery Management Plan for its Fishery Management Plans, yet no progress has been made since the Council decision to commence this project.

Response: Development of an Ecosystem Fishery Management Plan is outside the scope of the current action. However, in Chapter 3 of the DEIS, the effects of the alternatives on the West Coast marine ecosystem are considered to the extent practicable.

Comment 2: Oceana states that it appears that NMFS is managing Pacific whiting with great risk and uncertainty regarding the effects on the stock and the ecosystem. They say opposing scientific views of the stock assessment and effects of harvesting hundreds of thousands of metric tons of this important forage species are not adequately addressed in the DEIS.

Response: The most recent stock assessment will not be available until the spring of 2009, and therefore the DEIS evaluates a range of harvest specifications. The Pacific whiting ABCs and OYs for 2009 and 2010 will be established in the spring of 2009 and 2010, respectively. The most recent stock assessments will be evaluated by the STAR panel and reviewed and endorsed by the SSC prior to final consideration by the Council.

Comment 3: Oceana states that the Pacific Coast Groundfish fishery is plagued by bycatch of overfished rockfish and ESA listed salmon, as well as compliance, monitoring, and enforcement issues, suggesting that NMFS must implement hard caps and other management measures to control bycatch, as well as improved monitoring and enforcement.

Response: The Pacific Coast groundfish fishery is a multispecies fishery in which several species, other than the intended target species, are taken in mixed catches. Because the proportion of non-target species incidentally taken can range greatly between gear types and species, the management solutions for reducing the catch of unintended species, particular overfished species and ESA listed species, varies. The primary management measures for reducing the incidental catch of overfished species in the nonwhiting fisheries are RCAs, catch limits, and season restrictions.

Since 2005 bycatch limits have been used in the Pacific whiting fishery to manage incidental catch of some overfished species. In recent years, bycatch limits have been used for the most constraining overfished species in this fishery; darkblotched, canary and widow rockfish. In order to allow the Pacific whiting industry to have the opportunity to harvest higher Pacific whiting OYs, the Council has used bycatch limits to restrict the catch of certain overfished species. With bycatch limits, the industry has the opportunity to harvest a larger proportion of the whiting OY, if they can do so while keeping the incidental catch of overfished species within adopted bycatch limits. This type of regulation creates incentives for the industry to reduce the catch on bycatch limit species to allow greater target species catch. Unlike hard caps, bycatch limits can be adjusted inseason. Because the whiting fisheries do not operate in isolation from the other fisheries, management flexibility is needed to increase or decrease the bycatch limits, depending on the projected catch in the whiting and non-whiting groundfish fisheries.

To insure the integrity of bycatch limits, management must include adequate and effective monitoring. Similarly, hard caps need adequate monitoring. Without adequate monitoring, hard caps could result in greater amounts of undocumented catch, as individuals discard catch to avoid reaching the caps. As described in the preamble of the proposed rule, the Council recommended and NMFS is proposing sector-specific bycatch limits for all commercial sectors of the Pacific whiting fishery. At its June 2007 meeting, the Council recommended that NMFS implement Federal regulations for a maximized retention and monitoring program in the Pacific whiting shoreside fishery. This would require vessels participating in the Pacific whiting shoreside fishery to procure and pay for video-based electronic monitor system (EMS) services, and for Pacific whiting shoreside first receivers to procure and pay for the services of one independent catch monitor. Catch monitors are individuals who are primarily responsible for collecting catch data that is used for fish ticket verification. Although it was expected that a regulatory program would be in place before the start of the 2009 fishing season, it will not be possible, given the complexity of the rulemaking and unanticipated issues that arose during the 2008 whiting season. As was done in 2008, NMFS is proposing to manage the 2009 Pacific whiting shoreside fishery under Exempted Fishing Permits (EFPs), in order to further refine our knowledge before codifying the shoreside monitoring program in regulations. To insure the integrity of sector-specific bycatch limits, the Council recommended that NMFS increase the catch monitor coverage requirements from what had been recommended in June 2007 (one catch monitor per facility) to full coverage in which all Pacific whiting deliveries are monitored by catch monitors (the number of individual catch monitors per facility would vary depending on the hours of operation and the number of Pacific whiting deliveries received each day). The increased monitoring of first receivers will also be a requirement of the 2009 EFPs. In addition, NMFS is preparing a subsequent rulemaking to require all catcher vessels in the mothership sector of the whiting fishery to have EMS.

NMFS has also adopted the Ocean Salmon Conservation Zone (OSCZ), an area shoreward of a boundary line approximating the 100 fm (183 m) depth contour, as an inseason management tool for the whiting fishery. This gives NMFS the authority to implement a nearshore closure for all sectors of the Pacific Coast whiting fishery if Chinook take is anticipated to exceed acceptable levels. This flexible approach of applying this mitigation measure in response to conditions in the fishery, rather than having the OSCZ in effect throughout the whiting season, allows NMFS flexibility to consider the possible effort shift offshore which could increase catch rates of canary and darkblotched rockfish. This flexibility allows industry and NMFS to monitor whiting fishing activities and modify fishery restrictions inseason to appropriately respond to environmental factors that influence varying bycatch rates for salmon and depleted rockfish species.

More generally, for salmon, biological opinions have 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 incidental take level for Chinook salmon may be changed through the Endangered Species Act consultation process, if needed.

NMFS has not implemented hard bycatch caps on the non-whiting sector of the ground fish fishery because the required monitoring is too complex and difficult. This was addressed in Amendment 18 to the FMP, and the practicability analysis that accompanied that amendment. The fishery is, however, managed to take into account total mortality, and to stay within OYs.

Comment 4: Oceana states that rebuilding analyses for overfished stocks must account for age structure, not biomass alone. They feel the rebuilding plans must consider management measures and OYs designed to preserve mega-spawners and natural extended age structures, rather than focusing solely on achieving a target biomass.

Response: NMFS continues to use the best biological and scientific information available to keep harvest levels on overfished species within specified OYs. Fecundity relationships are not well understood for all of the rebuilding species. Assuming that older, larger females produce greater numbers of and/or more successful offspring (per unit of weight), we still don’t know where they reside. If the older fish tend to be sedentary with a preference for rocky habitats, the requirement for small-footrope gear usage, as well as existing area closures (RCA, Cowcod Conservation Area, various marine reserves and protected areas) should afford them considerable protection. If the older fish tend to be mobile, we have little or no understanding of the range or timing of those movements, so it is not clear what management actions could be taken.

Comment 5: Oceana states that NMFS must account for uncertainty in management decisions and rebuild as quickly as possible, for canary rockfish, blue rockfish, and bronzespotted rockfish.

Response: For canary rockfish, refer to comment 6 from the Four Organizations and the NMFS response. For blue rockfish, refer to comment 1 from the Four Organizations and the NMFS response. For bronzespotted rockfish, Oceana concurred with the preferred alternative selected for 2009 and 2010.

Comment 6: Oceana states that NMFS and the Pacific Fishery Management Council have not responded to requests to protect sensitive coral and sponge habitats that have been identified and not protected under current EFH measures:

Response: Specific habitat protection measures are not within the scope of the proposed action. The DEIS refers to the 2008 groundfish SAFE document and Amendment 19, the EFH rulemaking, in considering the effects of fishing on marine habitats and the ecosystem. The Council established an EFH review committee, designed to, among other things, provide an opportunity for consideration of these proposals earlier than the five-year review process, as well as during the five-year process.