PROPOSED ACCEPTABLE BIOLOGICAL CATCH AND OPTIMUM YIELD SPECIFICATIONS AND MANAGEMENT MEASURES FOR THE 2007-2008 PACIFIC COAST GROUNDFISH FISHERY

AND

AMENDMENT 16-4: REBUILDING PLANS FOR SEVEN DEPLETED PACIFIC COAST GROUNDFISH SPECIES

FINAL ENVIRONMENTAL IMPACT STATEMENT

INCLUDING
REGULATORY IMPACT REVIEW AND INITIAL REGULATORY FLEXIBILITY ANALYSIS

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COVER SHEET
2007-2008 Groundfish Specifications and Management Measures
Amendment 16-4: Rebuilding Plans
Environmental Impact Statement

Proposed Action:	Specify harvest levels (acceptable biological catch and optimum yield values) for species and species complexes in the fishery management unit and establish management measures to constrain total fishing mortality to these specifications for the calendar years 2007-08. Revise rebuilding plans for seven depleted groundfish species.
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 management framework established in 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 establish targets for long-term recovery, are re-evaluated and revised as part of the action. The proposed action establishes harvest guidelines 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 guidelines, management measures for commercial and recreational fisheries are identified. Management measures considered for commercial fisheries include two-month cumulative landing limits for species, species groups, and geographic subunits for limited entry trawl and fixed gear sectors, and fisheries not license limited under the *Pacific Coast Groundfish Fishery Management Plan*, and gear restrictions to reduce bycatch of overfished species and reduce habitat impacts. Management measures considered for recreational fisheries include bag limits, size limits, and fishing seasons; which vary by state. In addition, area closures based on depth and intended to reduce bycatch of species apply to both commercial and recreational fisheries that are likely to catch these species. These closures vary by geographic area and time of year.

Comments due by: November 20, 2006.

EXECUTIVE SUMMARY

ES.1 The Actions Evaluated in this Environmental Impact Statement

This Environmental Impact Statement (EIS) evaluates two related actions which are being implemented by the National Marine Fisheries Service (NMFS) and the Pacific Fishery Management Council (Council) to manage the harvest of groundfish in Federal waters off of Washington, Oregon, and California within the framework of the Council's Pacific Coast Groundfish Fishery Management Plan (FMP). First, the Council re-evaluated and proposed revisions to rebuilding plans for seven depleted (overfished) groundfish species adopted pursuant to § 304(e)(3) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) in the groundfish FMP. Amendment 16-4 would amend the groundfish FMP, so that the rebuilding periods for the seven species are as short as possible, taking into account the status and biology of the depleted species, and the socioeconomic needs of West Coast fishing communities, and the interaction of the depleted stocks within the marine ecosystem. Second, the Council identified harvest limits (termed optimum yield values, or optimum yields [OYs]) for stocks and stock complexes comprising the fishery management unit species identified in the FMP and the management measures necessary to keep total catch (in all commercial and recreational fisheries) within these OYs. Optimum yield represents the acceptable biological catch (ABC) or a reduction from ABC for biological or socioeconomic reasons. These harvest specifications and management measures apply to the 2-year management cycle, 2007-08, consistent with the periodic management framework described in the groundfish FMP.

Seven stocks are currently managed under Council rebuilding plans: bocaccio (*Sebastes paucispinis*), canary rockfish (*S. pinniger*), cowcod (*S. levis*), darkblotched rockfish (*S. crameri*), Pacific ocean perch (POP) (*S. alutus*), widow rockfish (*S. entomelas*), and yelloweye rockfish (*S. ruberrimus*). According to National Standard Guideline 1 (50 CFR 600.310), rebuilding should bring stocks back to a population size that can support maximum sustainable yield (MSY), B_{MSY}. In order to do this, a rebuilding plan must specify a target year (T_{TARGET}) based on the time required for the stock to reach B_{MSY}. This target is bounded by a lower limit (T_{MIN}) defined as the time needed for rebuilding in the absence of fishing, which is the shortest possible rebuilding period given the stock's estimated productivity, usually calculated from the year after the stock was declared overfished. However, for the seven species managed under West Coast groundfish rebuilding plans, the shortest possible time to rebuild from this point forward is not T_{MIN}, since some harvest has been allowed under Council rebuilding plans. The shortest possible time to rebuild the stocks with rebuilding plans under consideration in Amendment 16-4 is $T_{F=0}$, which is the median time to rebuild the stock if all fishing-related mortality were eliminated beginning in 2007. A maximum allowable rebuilding time, T_{MAX}, must also be identified, which, in the case of these stocks, is the rebuilding time in the absence of fishing (T_{MIN}) plus "one mean generation time." Mean generation time is a measure of the time required for a female to produce a reproductively-active female offspring (Pielou 1977; Restrepo, *et al.* 1998) calculated as the mean age of the net maternity function (product of survivorship and fecundity at age).

Because of the uncertainty surrounding stock assessments and future population trends (due, for example, to variable recruitment), the rebuilding period limits and the target need to be expressed probabilistically. In past years, the Council's approach at the outset of the rebuilding period had been to set T_{TARGET} so there was at least a 50 percent probability of achieving B_{MSY} within the T_{MAX}. Although this approach gave some flexibility for the Council to choose a target rebuilding year falling anywhere between the T_{MIN} and T_{MAX} by considering tradeoffs between biological and socioeconomic impacts, a recent Ninth Circuit Court of Appeals decision requires a 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. The current action responds to this by reconsidering the targets and parameters in previously established rebuilding plans with more emphasis placed on swift rebuilding.

Revisions to rebuilding plans are related to harvest specifications because they determine the choice of OYs for depleted species for 2007 and 2008. The Council process for setting groundfish harvest specifications depends on periodic assessments of the status of groundfish stocks, rebuilding analyses of those stocks that are depleted and managed under rebuilding plans, and a report from an established assessment review body or a Stock Assessment Review (STAR) Panel. The Council's Scientific and Statistical Committee reviews new assessments, rebuilding analyses, and STAR Panel reports and recommends the data and analyses that should be used to set groundfish harvest levels and other specifications for the following biennial management period. A total of 23 groundfish stock assessments were conducted and approved in support of the process for setting 2007-08 groundfish harvest specifications and management measures. Pacific whiting is assessed annually with the results used to select the annual OY in March of each year. This separate, connected action (i.e., the choice of whiting OYs in March 2007 and March 2008) is evaluated in this EIS primarily to understand the bycatch implications of potential future fisheries targeting Pacific whiting. A range of potential whiting OY values are used in the analysis because the exact value will not be known until OYs are determined in each year of the biennial management period. A 2006 whiting assessment forms the basis for ranging these 2007-08 Pacific whiting ABC/OY alternatives.

Management measures are intended to constrain fishing mortality to or below harvest limits (the Council-preferred OY levels). The types of management measures included in the alternatives are substantially the same as those used during the 2005-06 biennium, consistent with 2007-08 harvest levels.

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 2007-08. For depleted species, the selection of these OYs also formed the basis for revisions to rebuilding plans. Over the long-term, the targets identified in rebuilding plans determine harvest rates and thus annual OYs. The Council chose to use OYs for the 2007-08 period for purposes of evaluating and determining long-term rebuilding targets. This allows consideration of short-term socioeconomic impacts, which can be more accurately forecast, along with their relationship to long-term rebuilding targets. The second set of alternatives is a range of management measures for the 2007-08 period, consistent with the range of OYs considered.

ES.2.1 Harvest Specification (OY) Alternatives

Decision-making on harvest specifications began at the September 2005 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 2005 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 2006. In November 2005, the Council requested that a new yelloweye rockfish assessment be completed over the winter for consideration at the April 2006 meeting. At that meeting, in addition to adopting the new yelloweye assessment, the Council adopted their preferred OYs for non-depleted stocks and, for analytical purposes, adopted a "preferred" range of OYs for depleted stocks. 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 in terms of revised rebuilding plans, decision-making focused on the OYs for these depleted stocks. The table below (adapted from Tables 2–2a and 2–5 in Chapter 2) shows the range of OYs considered by the Council for implementation in 2007-08 for the seven depleted stocks. The 2006 OYs represent the No Action Alternative.

Table ES-1. Range of 2007-08 OYs (mt) for depleted groundfish species decided at the November 2005 and April 2006 Council meetings and the preferred alternative chosen at the June 2006 Council meeting.

Stock	Association	2006 OY (projected 2006 catch)	Initial Range of OYs Considered (Alternatives 1–6)	"Preferred" Low-High Range	Council-Preferred OYs (2007–08)
Yelloweye	Northern Shelf	27 (20.3)	0 – 12 (17) – (21) – (24) – (27) [a/]	12.6–23 (2007) [b/]	23 (2007) – 20 mt (2008) under ramp-down [b/]
Canary		47 (44)	0 – 24 – 44 – 68	32–44	44
Cowcod [c/]	Southern Shelf	4.2 (3.4)	0 – 8 – 14 – 18 – 22	4–8	4
Bocaccio		309 (135)	0 – 149 – 218 – 315 – 424	40–218	218
Darkblotched	Northern Slope	200 (182)	0 – 130 – 229 – 330 – 472	130–229	290 (2007) – 330 (2008)
POP		447 (74)	0 – 87 – 405 – 514 – 749	44–100	150
Widow	Midwater	289 (257)	0 – 329 – 456 – 917 – 1,369	120–368	368

a/ The range of alternatives of 17 mt and above is based on the 2005 stock assessment. The range of 0–12 mt is based on the 2006 stock assessment. Based on the new stock assessment, if a 2007–08 OY above 15 mt was used as the basis for establishing long-term rebuilding targets, the resulting strategy would not be legally viable (see Section 2.1.5 in Chapter 2 for further discussion). Therefore, only strategies consistent with $T_{MAX} \geq 50$ percent over the long-term were considered.
b/ 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. Under this strategy OYs are 23 mt (2007), 20 mt (2008), 17 mt (2009), and 14 mt (2010).
c/ OY alternatives for Conception and Monterey areas combined.

In order to aid decision-making about the overall choice of OYs (and thus rebuilding targets) for depleted species, a suite of five rebuilding alternatives is also evaluated in the EIS. These are combinations of OYs for depleted species 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 range of OYs presented in the rebuilding alternatives fall within the range encompassed by the OY alternatives shown above. These rebuilding alternatives allowed the Council to consider the differential effects of a suite of depleted species OYs when choosing their preferred 2007-08 OY alternatives.

ES.2.2 Management Measure Alternatives

Three management measure alternatives were developed based on the narrowed range of depleted species' OYs the Council identified at their April 2006 meeting, their preferred low-high OY alternatives. Alternative 1 is intended to conform most closely to the preferred low OY values; catches under Alternative 2 are midrange in the high-low range; Alternative 3 is most consistent with the preferred high OY values. Table ES-2 provides a ready comparison of the management measure alternatives in terms of projected catch of depleted species. As previously noted, the Council also chose preferred OYs for non-depleted species at this meeting, allowing the management measure alternatives to be developed to also conform to those OYs. Management measures are also consistent with the range of Pacific whiting OYs included in the EIS to explore bycatch implications, although the choice of a preferred whiting OY is a separate action occurring in March of each year. The No Action alternative is the management measures used in 2005 and 2006.

Table ES-2. Comparison of expected total fishing mortality under the management measure alternatives and the low-high range of depleted species OYs identified by the Council at their April 2006 meeting.

	Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
2007 OY	**218**	**44**	**4.0**	**290**	**150**	**368**	**23**
Low-High Preferred Range	**40–218**	**32–44**	**4–8**	**130–229**	**44–100**	**120–368**	**12–27[b]**
Alt. 1	39	25	0.5	81	44	116	11
Alt. 2	111	33	3.3	197	99	144	14
Alt. 3	186	41	3.5	203	100	191	18
Preferred Alternative	150	43	3.5	264	115	264	20
No Action[a]	135	44	3.4	182	74	257	20

[a] No Action is projected total catch in 2006 (from Table 2–5).
[b] The 27 mt high range OY value is part of the ramp down strategy, which reduces OYs each year to a new, lower constant harvest rate strategy in 2011.

When formulating management measures, certain set asides are used to reserve a portion of relevant OYs for specified activities. Thus, expected 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 expected research and EFP 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 fisheries are also established, based on existing catch-sharing formulas.

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, 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.

A fourth commercial sector comprises tribal fisheries prosecuted by Washington coastal tribes (Makah, Quileute, Hoh, and Quinault) subject to treaty arrangements with the Federal government, identifying tribal usual and accustomed fishing areas. 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 within periods. 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 a side 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. The Council-preferred management measure alternative would change the configuration of the larger of these two areas by allowing commercial fixed gear vessels to fish in depths greater than 175 fm, where available information indicates cowcod rarely occur. These vessels will be subject to increased monitoring and enforcement requirements. 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 on a voluntary basis. Two new YRCAs are proposed under the preferred alternative, one subject to voluntary compliance, the other mandatory compliance. Bycatch of Chinook salmon listed under the Endangered Species Act has been a concern in Pacific whiting fisheries. In response, NMFS has proposed 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, currently under MSA review. 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 is proposed for this fishery in the 2007-08 period under the Council-preferred alternative. 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. 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 nongroundfish species, such as Pacific halibut and sanddabs. The main recreational management measures are listed below.

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

- Depth-based area closures 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.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. For most depleted species the preferred alternative OYs fall in the middle of the range of OY alternatives displayed in Table 2–2a in Chapter 2; associated rebuilding targets are not linearly related, but alternatives with higher OYs would have a longer rebuilding time (and/or higher assumed risk) than those with lower OYs. 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. For the preferred alternative, for all the species except yelloweye, the year by which the stock is estimated to rebuild to target biomass is earlier than the previous estimate. P_{MAX}, an indicator of the likelihood of achieving the target, is estimated to remain the same or be more favorable under the proposed changes, with the exception of canary rockfish, which shows a modest increase in risk. Furthermore, depleted species OYs in 2007-08 are consistent with adopted rebuilding strategies, and, with the exception of darkblotched rockfish, are lower than the 2006 values. Thus, the rebuilding strategies associated with the Council-preferred OY alternative are likely to result less adverse impacts to fish species populations in comparison to the no action alternative.

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

Species	OY		P_{MAX}		T_{TARGET}		
	2006	Proposed (2007)	Current	Proposed	Current	Proposed	F = 0
Bocaccio	309	218	70%	78%	2027[a/]	2026	2021
Canary	47	44	60%	55%	2074	2063	2053
Cowcod	4.2	4	60%	91%	2090	2039	2035
Darkblotched	200	330[b/]	80%	100%	2030	2011	2010
POP	447	150	70%	93%	2026	2017	2015
Widow	368	289	60%	95%	2038	2015	2013
Yelloweye	27	23[c/]	80%	80%	2058	2084	2083

[a/] Corrected value for target adopted by the Council, see footnote a to Table 2–3 in Chapter 2.
[b/] 2008 OY; 2007 OY is 290 mt. The 2008 OY is used to determine rebuilding targets.
[c/] 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. Under this strategy the 2007-10 OYs are 23 mt, 20 mt, 17 mt, and 14 mt, respectively.

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 2007-08 OYs. Cowcod, yelloweye rockfish, and canary rockfish impose the greatest constraints in terms of developing management measures. This is because the 2007-08 OYs consistent with proposed rebuilding strategies are comparatively low and because they are caught in a range of fisheries on the continental shelf. 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 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. As shown in Table ES-2, all of the management measure alternatives are projected to result in catches below the preferred OY alternative.

Under management measure Alternative 1 many of the target species OYs are not attained, and fishing area is decreased for all sectors as the size of groundfish conservation areas is expanded to encompass more area where rebuilding species are found. The depleted species projected catches under Action Alternative 2 are below status quo (2006) projections, except for darkblotched rockfish. While catches of rebuilding species are near status quo, negative economic impacts are greater than Alternative 1, but less than Action Alternative 3. A larger portion of the OY remains unattributed to any particular sector and the distribution of projected catches (and thus exvessel revenue) are different for certain sectors and regions of the fishery when compared to 2005 and 2006 revenues. The difference in the distribution of projected catches is directly attributed to changes in target species abundance and OYs. For example, the increase in the 2007 OY for Dover sole results in larger exvessel catch (and revenue) for the bottom trawl sector as a whole, while the decrease in the 2007 OY for sablefish results in lower coastwide exvessel catch and revenues for the fixed gear sablefish sectors. Projected catches of depleted species under management measure Alternative 3 are closest to the preferred alternative.

ES.3.3 Protected Species

This EIS focuses its evaluation of impacts to protected species on listed 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 impacts of changed. However, an established consultation threshold for ESA-listed Chinook salmon, take of 11,000 or more fish in the whiting fishery, was breached in 2005, resulting in the preparation of a supplemental biological opinion to re-examine the effects of take in the whiting fishery on the continued existence of the listed species and propose mitigation measures to reduce take in the future. In addition, new data available from the West Coast Groundfish Fishery Observer Program indicates high levels of Chinook take in that fishery relative to previous estimates. However, a relatively short time series of data is available and because of the highly skewed nature of Chinook salmon take, expansion from observer records may not be accurate. The biological opinion proposes further monitoring with the possibility of imposing mitigation measures in the future if higher than anticipated take levels are validated.

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. Over the available time series, 1991-2005, annual Chinook take in the whiting fishery has averaged 7,281 fish 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 2006-07. More information is needed to better understand the impacts of the groundfish trawl fishery on Chinook salmon before action can be taken. As a mitigation measure for the whiting fishery, the Council-preferred alternative includes NMFS automatic action authority for 2007 that would 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.

ES.3.4 Fishery Sectors and Fishing Communities

The key decision evaluated in this EIS is the adoption of rebuilding plans for depleted species and adoption of associated OYs and management measures for the 2007–08 management period. 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)). 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); it is also consistent with the Ninth Circuit Court's direction and the requirements of National Standard 8 of the MSA, prioritizing conservation and rebuilding of overfished stocks, but avoiding disastrous short-term consequences to those communities.

The evaluation of socioeconomic impacts is thus an important consideration in trying to find the proper balance between resource conservation (specifically, rapid rebuilding of depleted species) and benefits to society (with special attention to effects on fishing communities). Tables ES-4 and ES-5 provide a bottom-line snapshot of the relative socioeconomic effects of the alternatives, expressed in terms of personal income and employment compared to the No Action alternative. As noted above, determination of the OY for Pacific whiting is a separate, connected action that will occur in the future. For this reason, the estimation of impacts is made under three scenarios representing the range of likely whiting OYs used elsewhere in the EIS to evaluate biological impacts (e.g., through depleted species bycatch implications). The high whiting OY scenario is closest to current whiting OY, and thus may reflect the most likely socioeconomic effects in 2007-08. These bottom-line impacts are based on the management measure alternatives, although as discussed above, the management measure alternatives are intended to be consistent with the narrowed range of "preferred" OYs the Council chose at their April 2006 meeting for analytical purposes. Thus, they provide information on the implications of different OY choices. Long-term economic impacts resulting from the choice of rebuilding strategies are not forecast, but impact estimates for the alternatives in 2007-08 allow comparison of the relative impacts over the long-term. These tables also break out impacts by region, providing an indication of relative effects on different fishing communities. Chapter 7 in this EIS also contains an analysis of vulnerable fishing communities. The identification of vulnerable communities provides context for evaluating the relative regional impact of the alternatives.

Table ES-4. Change (from No Action) in estimated income impacts resulting from combined recreational angler expenditures and commercial fisheries landings by region under the management alternatives (million $). (Also Table 7-68g.)

					Council Preferred Alternative		
Region	***No Action***	**Alt 1**	**Alt 2**	**Alt 3**	**Low whiting OY**	**Medium whiting OY**	**High whiting OY**
Puget Sound	*15.4*	-2.0	-0.5	-0.4	-0.5	-0.5	-0.5
North Washington Coast	*16.6*	-1.6	-1.2	-0.8	-0.8	-0.8	-0.8
South & Central WA Coast	*121.1*	-11.0	-6.5	-1.0	-10.6	-6.5	-1.0
Astoria-Tillamook	*97.2*	-8.1	-1.0	+0.7	-2.1	-0.8	+0.8
Newport	*49.7*	-10.4	-4.3	-0.8	-7.2	-4.1	-0.7
Coos Bay	*32.4*	-3.1	-0.3	+0.0	-0.3	-0.1	+0.2
Brookings	*17.7*	-1.5	-0.2	-0.2	-0.0	-0.0	-0.0
Crescent City-Eureka	*19.4*	-3.1	-0.1	+0.3	-0.1	+0.2	+0.5
Fort Bragg	*11.0*	-2.1	-0.1	+0.7	+0.8	+0.8	+0.8
Bodega Bay - San Francisco	*41.1*	-1.6	-0.8	+3.1	+0.7	+0.7	+0.7
Monterey - Morro Bay	*38.0*	-5.6	-4.3	+1.6	+2.0	+2.0	+2.1
Santa Barbara	*62.9*	-1.6	-1.0	+0.0	+0.0	+0.0	+0.0
Los Angeles - San Diego	*145.1*	-4.6	-2.9	-0.0	-0.0	-0.0	-0.0
At Sea (including Tribal)	*43.4*	-18.9	-11.1	-1.4	-18.9	-11.1	-1.4
TOTAL	*711.1*	-75.2	-34.1	+1.8	-37.2	-20.2	+0.6

Table ES-5. Change (from No Action) in estimated employment impacts resulting from combined recreational angler expenditures and commercial fisheries landings by region under the management alternatives (number of jobs). (Also Table 7-68i.)

					Council Preferred Alternative		
Region	***No Action***	**Alt 1**	**Alt 2**	**Alt 3**	**Low whiting OY**	**Medium whiting OY**	**High whiting OY**
Puget Sound	*692*	-91	-23	-20	-23	-23	-23
North Washington Coast	*747*	-72	-53	-36	-36	-36	-36
South & Central WA Coast	*5,442*	-494	-292	-47	-478	-291	-46
Astoria-Tillamook	*4,365*	-365	-46	+30	-96	-34	+34
Newport	*2,231*	-465	-191	-37	-322	-184	-33
Coos Bay	*1,454*	-139	-12	+2	-15	-4	+9
Brookings	*796*	-68	-10	-7	-2	-2	-2
Crescent City-Eureka	*770*	-122	-3	+13	-5	+8	+21
Fort Bragg	*437*	-84	-3	+26	+30	+30	+30
Bodega Bay - San Francisco	*1,633*	-65	-30	+124	+29	+29	+29
Monterey - Morro Bay	*1,441*	-198	-150	+55	+70	+71	+72
Santa Barbara	*2,182*	-54	-34	+0	+0	+0	+0
Los Angeles - San Diego	*5,032*	-160	-99	-1	-1	-1	-1
At Sea (including Tribal)	*1,951*	-851	-499	-62	-851	-499	-62
TOTAL	*29,172*	-3,226	-1,446	+41	-1,699	-936	-7

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1.0 INTRODUCTION

1.1 How This Document is Organized

This document provides background information about, and analyses for two related actions. The first action is to establish 2007–08 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). The second action is to consider revising rebuilding plans for seven depleted (overfished) groundfish species. This action requires a potential amendment to the groundfish FMP, which contains the current overfished species rebuilding plans. The two actions are related because the rebuilding plans determine the range of harvest levels that may be considered for depleted species. These actions must conform to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the principal legal basis for fishery management within the Exclusive Economic Zone (EEZ), which extends from the outer boundary of the territorial sea to a distance of 200 nautical miles from shore. These actions must also conform to a recent court ruling in the Ninth Circuit Court of Appeals, which held that, among other things, the purpose of the MSA is to give conservation of fisheries priority over short-term economic interests. The Court interpreted the MSA as requiring that rebuilding periods must be as short as possible, but may take into account the needs of fishing communities. The Court noted, in order to avoid disastrous short-term consequences, NMFS may set limited quotas that allow for some fishing of plentiful species, despite the inevitability of bycatch of depleted species.

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, the Regulatory Flexibility Act (RFA), and Executive Order (EO) 12866. For brevity, this document is referred to as an EIS, although it contains required elements of an Initial Regulatory Flexibility Analysis (IRFA) pursuant to the RFA and a Regulatory Impact Review (RIR) pursuant to EO 12866.

Federal regulations (40 CFR 1502.9) require agencies to prepare and circulate a draft EIS (DEIS), which “must fulfill and satisfy to the fullest extent possible the requirements established for final statements in Section 102(2)(C) of the Act” (i.e., NEPA). Federal regulations (40 CFR 1506.10(c)) and agency guidelines (National Oceanic and Atmospheric Administration (NOAA) Administrative Order 216-6, Section 5.01.b.1(i)) stipulate a minimum 45-day public comment period on the DEIS. At the end of this period, a final EIS (FEIS) is prepared, responding to comments and revising the document accordingly. After the EIS is completed, a 30-day waiting period ensues before the responsible official may sign a record of decision (ROD) and implement the proposed action.

Environmental impact analyses have four essential components: a description of the purpose and need for the proposed action; a range of alternatives, including the proposed action, that represent different ways of accomplishing the purpose and need; a description of the human environment affected by the proposed action; and an evaluation of the predicted direct, indirect, and cumulative impacts of the alternatives.[1] The human environment is interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment (40 CFR 1508.14). These elements allow the decision maker to look at different approaches to accomplishing a stated goal and understand the likely consequences of each choice or alternative. 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 2007–08 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 preferred alternatives from among these alternatives. The preferred alternative covering revisions to the seven rebuilding plans was submitted to NMFS as an FMP amendment. The preferred alternative for harvest specifications and management measures provides the basis for establishing the regulations governing groundfish fisheries in 2007–08.

- 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.

[1] Federal regulations at 40 CFR 1502 detail the requirements for an EIS. Although there are several additional components, this list is of the core elements.

- 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. Note that Chapter 13, Response to Comments, is a required component of this Final EIS; agencies must respond by modifying the EIS or explaining why the comments do not warrant further response (40 CFR 1503.4). The original comment letters are included in this EIS as Appendix D.

1.2 Purpose and Need for the Proposed Actions

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

1.2.1 The Proposed Actions

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

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

2. Specify acceptable biological catch (ABC) and OY values for species and species' complexes in the fishery management unit and establish management measures to constrain total fishing mortality to these specifications. These specifications and management measures will be established for calendar years 2007 and 2008.

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

1.2.2 Need (Problems for Resolution)

The proposed actions are needed because:

1. The Council approach to rebuilding depleted groundfish species, as described in rebuilding plans, must be re-evaluated and potentially adjusted so they are consistent with a recent 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 (9^{th} Cir. 2005), and with National Standard 1 of the MSA.

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

1.2.3 Purposes of the Proposed Actions

The purposes of the actions are:

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

2. Ensure Pacific Coast groundfish subject to Federal management are harvested at OY during 2007 and 2008 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.

1.3 Background

1.3.1 Revising Groundfish Rebuilding Plans

National Standard 1 guidelines (NSG 1) establish criteria for rebuilding depleted or overfished[2] stocks that the Council used when it adopted rebuilding plans for the eight groundfish stocks[3] the Secretary of Commerce had formally declared as overfished. One of these stocks, lingcod (*Ophiodon elongatus*), has been subsequently rebuilt to its maximum sustainable yield (MSY) stock size; the remaining seven stocks still managed under Council rebuilding plans are: bocaccio (*Sebastes paucispinis*), canary rockfish (*S. pinniger*), cowcod (*S. levis*), darkblotched rockfish (*S. crameri*), Pacific ocean perch (*S. alutus*), widow rockfish (*S. entomelas*), and yelloweye rockfish (*S. ruberrimus*). According to NSG 1, rebuilding should bring stocks back to a population size that can support MSY (B_{MSY}). In order to do

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

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

this, a rebuilding plan must specify a target year (T_{TARGET}) based on the time required for the stock to reach B_{MSY}. This target is bounded by a lower limit (T_{MIN}) defined as the time needed for rebuilding in the absence of fishing (i.e., a zero fishing mortality rate, F = 0). T_{MIN} is the shortest possible rebuilding period given the stock's estimated productivity. According to NSG 1, rebuilding plans for stocks with a T_{MIN} less than 10 years must have a target less than or equal to 10 years. If, as is the case with all of the groundfish stocks currently managed under Council rebuilding plans, the biology of a particular species dictates a T_{MIN} of 10 years or greater, then, again according to NSG 1, the maximum allowable rebuilding time, T_{MAX}, is the rebuilding time in the absence of fishing (T_{MIN}) plus "one mean generation time." Mean generation time is a measure of the time required for a female to produce a reproductively-active female offspring (Pielou 1977; Restrepo, *et al.* 1998) calculated as the mean age of the net maternity function (product of survivorship and fecundity at age). An important distinction is the difference between T_{MIN} and the shortest time to rebuild stocks currently managed under Council rebuilding plans. 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. T_{MIN} is therefore the median time predicted to attain the target spawning biomass (for West Coast groundfish stocks, this value is 40 percent of initial, unexploited biomass) with no fishing-related mortality from the first year of a rebuilding strategy. Over time, estimated T_{MIN} can vary based on assessment results that better inform our understanding of the stock's growth rate and relative productivity. However, for the seven species managed under West Coast groundfish rebuilding plans, the shortest possible time to rebuild from this point forward is not T_{MIN}, since some harvest has been allowed under Council rebuilding plans. The shortest possible time to rebuild the stocks with rebuilding plans under consideration in Amendment 16-4 is $T_{F=0}$, which is the median time to rebuild the stock if all fishing-related mortality were eliminated beginning in 2007.

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

Although this approach gave some flexibility for the Council to choose a target rebuilding year falling anywhere between the T_{MIN} and T_{MAX} by considering tradeoffs between biological and socioeconomic impacts, a recent Ninth Circuit Court of Appeals decision requires a 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. The current action responds to this by reconsidering the targets and parameters in previously established rebuilding plans with more emphasis placed on swift rebuilding.

Historically, the Council has focused on the first factor, noted above, and modified rebuilding periods to accommodate targeted fishing for healthy stocks that co-occur with depleted species. The depleted species' stock assessments and rebuilding analyses describe the status and biology of the stocks, and their anticipated rebuilding trajectories. Amendment 16-4 and groundfish harvest analyses for 2007 and beyond includes more analysis of the latter two factors in order to inform the decision on rebuilding periods that are as short as possible while taking into account the needs of fishing communities and the role of the stock in the marine ecosystem.

This EIS, which includes an IRFA and an RIR, analyzes the connections between depleted species and fishing communities. Different fishery sectors rely on opportunities to fish for various healthy groundfish stocks, almost all of which occur in mixed stock complexes that include both healthy and

[4] The use of a low bound 50 percent probability is not specified in regulations; it is the result of litigation (*Natural Resources Defense Council v. Daley* (D.C. Cir. April 25, 2000).

depleted groundfish stocks. The EIS shows which fishing communities tend to be reliant on which sectors of the groundfish fishery, and whether those sectors encounter depleted stocks while targeting more healthy stocks. It reviews the effects of varying potential groundfish-related income on the duration of depleted stocks' rebuilding periods. For some stocks, a small sacrifice in near-term groundfish-related income may result in notable gains in the swiftness of the rebuilding period. For other stocks, large sacrifices in groundfish-related income could be required to gain even a few months difference in rebuilding period durations.

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

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

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

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

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

In accordance with the groundfish FMP, beginning in 1990 the Council set Pacific Coast groundfish harvest specifications annually, with harvest specifications and management measures in effect for the calendar year January 1 to December 31. Amendment 17 to the groundfish FMP, approved in 2003, shifted decision-making to a two-year, or biennial, cycle. Under the biennial management cycle, harvest specifications and management measures are established for the two-year period in advance of the biennium. Separate ABCs and OYs are established for each calendar year in the two-year cycle. The first biennial harvest specifications were established for 2005–06; the current action represents the second round of biennial specifications.

Council decision-making for this action occurs over three meetings, culminating in June of the year preceding the biennium. For the 2007–08 biennium, the Council identified a preliminary range of ABCs and OYs at their November 2005 meeting; at their April 2006 meeting they selected preferred alternatives for the rebuilding plan revisions and, directly related to that, preferred ABCs and OYs that will be used as harvest limits during the 2007–08 period. At this meeting, the Council also approved, for analysis, a range of alternatives for management measures. The final decision point for the Council occurred at their June 2006 meeting when they finalized the full package of harvest specifications and management measures, choosing a preferred suite of management measures for 2007–08.

Although Council decision-making is complete by June 2006, there are additional opportunities for public comment under NEPA and the rulemaking process. A DEIS was released for a 45-day public review and comment period beginning on July 28 and closing on September 11, 2006. Another public comment period is associated with publication of the proposed rule to implement the 2007–08 harvest specifications and management measures and Amendment 16-4, which occurred on September 29, 2006. Changes to the rebuilding plans, which would be made via Amendment 16-4 to the groundfish FMP, were transmitted by the Council to NMFS for Secretarial review on August 22, 2006, triggering a public comment period associated with the FMP amendment itself, which runs concurrently with the comment period for the proposed rule. These concurrent comment periods end on October 31, 2006. Subsequent to these public review periods, the approved changes to rebuilding plans will then be incorporated into the FMP, which should occur before the 2007–08 groundfish harvest specifications and management measures are implemented on January 1, 2007.

The choice of harvest specifications and the development of management measures are two separate sets of alternatives, which form the basis of the impact analysis. The OYs for 19 stocks or stock complexes differ among the harvest specification action alternatives. OYs for the remaining stocks are the same across all the action alternatives. (The No Action Alternative represents the status quo, or re-application of 2005–06 harvest specifications. OYs for additional stocks are different under No Action in comparison to the action alternatives.) The differences among the harvest specification action alternatives reflect policy decisions based on various factors, such as scientific uncertainty in stock assessments (e.g., petrale sole), requirements of rebuilding plans, and whether to apply a precautionary reduction for stocks co-occurring with depleted species (e.g., chilipepper rockfish), among other factors.

The Council process for setting groundfish harvest specifications depends on periodic assessments of the status of groundfish stocks, rebuilding analyses of those stocks that are depleted and managed under rebuilding plans, and a report from an established assessment review body or a Stock Assessment Review (STAR) panel. As appropriate, the Council Scientific and Statistical Committee (SSC) recommends the best available science for groundfish management decision-making in the Council process. The SSC reviews new assessments, rebuilding analyses, and STAR panel reports and recommends the data and analyses that should be used to set groundfish harvest levels and other specifications for the following biennial management period. A total of 22 groundfish stock assessments were conducted and approved in support of the process for setting 2007–08 groundfish harvest specifications and management measures. This includes the 2005 Pacific whiting assessment, which was used to set 2005 harvest specifications and management measures for trawl fisheries targeting this stock. The 2005 assessment also forms the basis for ranging 2007–08 Pacific whiting ABC/OY alternatives for analysis, primarily to understand the bycatch implications of potential future fisheries targeting Pacific whiting. However, new annual assessments of the West Coast Pacific whiting stock are anticipated for setting future Pacific whiting harvest specifications and management measures. The remaining 21 groundfish stock assessments conducted in 2005 are explicitly used for deciding 2007 and 2008 harvest specifications and management measures. An overview of the status of groundfish stocks and stock complexes is found in Chapter 4. How results from each of the current and past stock assessments are used to decide new harvest specifications is also discussed in Chapter 4.

1.3.3 Range of Management Measures Considered by the Council

Management measure alternatives combine different management tools available to the Council and NMFS as specified in the FMP and in Federal regulations. Each of these management measure alternatives (except for No Action) is intended to constrain fishing mortality to or below the Council-preferred OY levels determined by the choice among the ABC/OY alternatives mentioned above. (The action alternatives were crafted before performing the detailed analysis necessary to determine total fishing mortality for each stock. Therefore, one or more of the action alternatives may be projected to exceed the Council-preferred OY for one or more stocks. However, the Council-preferred alternative, chosen at the June 2006 Council meeting, is projected to keep total fishing mortality for all stocks within their respective OYs.) This approach also makes it possible to compare the performance of alternative management measures against one standard: the Council-preferred ABC/OY levels chosen from the first set of alternatives.

The types of management measures included in the alternatives are likely to be substantially the same as those used during the 2005–06 biennium, although their application will change so that they are suitable to available 2007–08 harvest levels. Those which may be considered for modification include:

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

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

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

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

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

1.3.4 Key Management Issues in 2007 and 2008

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

Inseason management of California recreational fisheries to constrain mortality of depleted groundfish and stay within other harvest allocations made to that sector will again play an important role in the formulation of management measures for the 2007–08 period. Data from a new recreational catch estimation program, the California Recreational Fisheries Survey (CRFS), will be used in preseason and inseason recreational harvest projections. Because CRFS has only been used since 2004, only two years of catch estimates are incorporated in the California recreational impact model used to project harvests for this fishery.

As mentioned above, regionalizing recreational fisheries management will continue as an important management tool. Historically, the recreational fisheries have had some degree of regional management based on differing state regulations and the geographic distribution of groundfish stocks caught in the sport fishery. For 2007–08, the Council, along with the states, considered more explicit regional allocations in the form of harvest guidelines or targets. The concern that a given sector or region could harvest a disproportionate share of the very low coastwide OYs for certain depleted groundfish, such as canary rockfish, has sparked this discussion.

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

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

Salmon bycatch in directed groundfish fisheries will receive a greater focus in this EIS than in the past. An 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.

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. 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 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 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[6] 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 2007–08 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.

1.3.5 Changes to the FMP Affecting Annual Management

In 2005, the Council took final action on two amendments to the groundfish FMP that will affect management in the 2007–08 seasons. Amendment 18 incorporates into the FMP the preferred alternative in the September 2004 *Pacific Coast Groundfish Fishery Management Plan Bycatch Mitigation Program Final Environmental Impact Statement* (NMFS 2004). The preferred alternative from that EIS includes the use of sector-specific total catch limits as a way of motivating fishery participants to reduce bycatch, especially of depleted groundfish species. The Council has already used total catch limits in certain circumstances, such as the at-sea whiting sector, where real-time monitoring systems are sufficient to make this approach workable. The amendment would also reorganize and update some of the chapters in the FMP to better describe the current management framework. This includes a description of current standardized bycatch monitoring methodologies and other measures for bycatch reduction. Amendment 19 incorporates the preferred alternative adopted by the Council for the identification and mitigation of EFH in a FEIS prepared by NMFS (NMFS 2005). Mitigation measures will have a direct effect on management in the 2007–08 cycle. These measures include 43 areas closed

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

to bottom trawling in waters off all three West Coast states and 17 areas off Oregon and California closed to all bottom-contact gear. Furthermore, all waters deeper than 700 fathoms (fm) would be closed to bottom trawling. An existing measure prohibiting the use of large footrope trawl gear shoreward of a line approximating the 100 fm depth contour; footrope gear larger than 19 inches is prohibited, as is dredge and beam trawl gear. NMFS approval of these amendments, along with implementation of any related regulations is expected to occur in advance of the 2007–08 season.

1.4 Scoping Summary

1.4.1 Background to Scoping

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

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

1.4.2 Council and Agency NEPA Scoping

On October 25, 2005 (70 FR 61595), NMFS and the Council published a Notice of Intent (NOI) in the *Federal Register* announcing their intent to prepare an EIS in accordance with NEPA for the 2007–08 ABC and OY specifications and management measures for the Pacific Coast groundfish fishery.[7] The NOI described the proposed action and the way in which alternatives to be analyzed in the EIS would be formulated; it also enumerated a preliminary list of potentially significant impacts that could result from implementing the proposed action. A period for accepting written public comments on the scope of the EIS ended on November 25, 2005, as announced in the NOI.

The Council process, which is based on stakeholder involvement 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.

7 On March 14, 2006, an amended NOI was published to include revision of rebuilding plans as part of the proposed actions (71 FR 13097).

The Council and its advisory bodies considered 2007–08 specifications and management measures at four meetings in November 2005, March 2006, April 2006, and June 2006. The Groundfish Allocation Committee and the GMT met February 6–9, 2006, to review the range of harvest specifications and provide guidance on allocation of harvest opportunity among different fishery sectors for 2007–08. When the Council considers groundfish management at their meetings, the GMT and GAP provide advice and guidance on the development of harvest specifications and management measures. The GMT also meets outside of Council meetings to develop management recommendations. For the 2005–06 harvest specifications process, they met in October 2003, and February, May, and June 2004. All these meetings are open to the public and are duly noticed.

In addition, both Oregon and California state fish and game departments held public hearings to solicit input on the formulation of management measures. Comments made at these hearings were summarized and made available to the Council in advance of their June 2006 meeting.

1.4.3 Summary of Comments Received

To gauge public attitudes toward the effects of management on fishing communities, written and oral public comments on annual specifications and inseason adjustments between March 2002 and June 2006 were reviewed. Although not all of these relate directly to the 2007–08 annual specifications, they do relate to the cumulative impacts of regulations on fisheries. Comments relating to communities were excerpted in Table 1-1. Most oral comments were summarized from handwritten notes made by staff officers during Council meetings, although some, including all comments made in 2006, were transcribed from recordings. The table also includes comments summarized for the 2004 and 2005–06 groundfish annual specifications EIS, and relevant comments relating to vessel monitoring systems (VMS) and EFH.

Below is a brief summary of the major themes included in the comments:

- Many commenters spoke of the negative cumulative effects of both Federal regulations (such as closed areas, fathom restrictions, season restrictions, salmon closures, and VMS) and non-Federal actions (cable crossings, proposed state restrictions) on fisheries, businesses and communities.
- Crumbling infrastructure was a major theme, especially in 2006. Commenters told of processors, buyers, ice plants, and businesses that support processors closing or consolidating; of physical infrastructure, such as docks and harbors, not being maintained; and of market infrastructure collapsing.
- Commenters told of both recreational and commercial fishing vessels going out of business or being forced to diversify. Many spoke of shrinking commercial and recreational fleets.
- Commenters spoke of vessels being under-maintained, under-insured, and neglected.
- Commenters spoke of fishing-related businesses, such as gear stores, boat repair shops, tackle shops, and fishing equipment manufacturers, and non-fishing related businesses, such as hotels, restaurants, and car dealerships, feeling the impacts of reduced fishing income, including laying off employees or closing.
- Community representatives spoke of decreasing tax bases due to business closures.
- Community representatives spoke of increasing social tensions in communities, such as psychological impacts, marital tension, divorce and suicide.
- Commenters said that restaurants were increasingly selling imported fish.
- Fishing business owners spoke of the difficulty in making business decisions and planning for the future in this regulatory environment.
- Salmon cutbacks have led to further dependence on groundfish in many communities.

- Commenters expressed distrust of the management process.
- There were several calls for more and better socioeconomic data.
- Commenters supported exempted fishing permits (EFP) and their potential to improve fishing methods and provide more fishing opportunities.
- Charterboat interests noted the importance of keeping fisheries open on major holidays and during the tourist season.
- In southern Oregon, commenters talked about the importance of the fall/winter petrale sole fishery to their communities.
- Washington groundfish fishers expressed interest in regional management of yelloweye rockfish.
- Owners of small vessels expressed safety concerns related to area closures.
- Fishermen in the Santa Barbara area favored changes to the CCA boundaries, while environmental organizations and a University of California researcher called for the boundaries to remain firm.
- There was concern about impacts of VMS purchasing regulations on already stressed budgets.
- In 2006 commenters expressed concern about the impacts of rising fuel prices on their businesses.
- Natural Resources Defense Council (NRDC), the Ocean Conservancy, and Oceana stressed the following points:
  - Rebuild yelloweye as quickly as possible and follow SSC advice on rebuilding periods.
  - Caution in the face of uncertainty.
  - Favored regional management of yelloweye.
  - Increased observer coverage and mining of observer data.
  - Develop spatial management tools for yelloweye.
  - Noted that rebuilt populations of groundfish were worth more than the currently depleted stocks.
  - Stressed long-term economic benefit over short-term gains.
  - Noted "the purpose of the [Magnuson-Stevens Act] is clearly to give consideration of fish priority over short-term economic issues" and "the needs of a particular fishing community that is highly dependent on one or more overfished species [does not] trump the requirement to rebuild as quickly as possible" (see section 1.4.3.6).
- Oceana wrote with concerns about Klamath Chinook bycatch in the groundfish trawl and whiting fisheries.

The text and table below summarize comments made by location, from north to south. We make no claims as to the validity of the comments. Comments that did not specifically refer to geographic locations are not included in the summary immediately below, but are summarized later in this section. Comments from nongovernmental organizations (NGO), which discuss community impacts in the context of environmental protection, are discussed below (Section 1.4.3.6). Formal scoping comments are included in Appendix C.

1.4.3.1 Washington Comments

Northern Washington

Comments from 13 different people referred to northern Washington communities, including Bellingham, Hoqiuam, Forks, LaPush, Neah Bay, Port Angeles, Seattle, and Sammamish. The comments are summarized here.

- A Bellingham processor was concerned about the effect of potentially moving a management line to 150 fm (April 2004). He was concerned that this depth restriction would eliminate or sharply reduce the harvest of dogfish and the setline blackcod fishery, resulting in economic hardship.
- Recreational fishers in LaPush were concerned about the lack of regional management in relation to a potential closure of groundfish fisheries. They noted “Groundfish fisheries are critically important to our coastal economy and tourism” (April 2004).
- Recreational fishers from Neah Bay noted the community had invested heavily in a new marina and other facilities that were dependent on recreational fisheries (April 2004).
- Commercial fishers from Neah Bay were concerned that their small boat fishery was being discriminated against, as small boats could only fish during certain seasons due to safety concerns. They emphasized the importance of the small trawl fishery to local communities and expressed frustration at the delay in making management decisions. They noted, “We have already lost so much with the cable crossing, the Vessel Traffic Lane Change, and other inseason adjustments that we have no reserves left to fall back on….” and that, “many of us have been fishing our small family boats for generations. But sadly, many of us do not encourage our children to partake of our tradition of being a fisherman...competition and politics have put an end to that dream” (June 2002 and June 2003). In April 2006, a recreational representative voiced support for a phased-in approach to closures.
- The Quileute Tribe also said it would be economically devastating to the tribe to bear the brunt of additional conservation measures to protect yelloweye rockfish. The Tribe noted that economic opportunities in LaPush were very limited and that fisheries and fish processing offer some of the only jobs outside of tribal government (June 2006).
- A commercial passenger fishing vessel (CPFV) business owner in Sammamish noted that a sport groundfish closure in late 2004 would “require that I cancel all my trips and let my customers also cancel all hotel and dinner plans for October and November of 2004…” (September 2004).
- A commenter expressed concern than “anything other than the status quo or the rampdown strategy [for yelloweye] would eliminate the [fixed gear dogfish] fishery,” including the loss of a market that took 30 years to develop (June 2006).
- A commenter in the sablefish fishery in Seattle also supported the yelloweye rampdown, saying that about 360 people and their families could be affected by a 50 percent reduction in yelloweye (June 2006).
- A troll representative noted that Washington trollers are such a small sector that they don’t affect groundfish models, and therefore, don’t know how they fit into the larger groundfish picture (June 2006).

Central and Southern Washington Coast

Comments from five different people were received from Ilwaco, Westport, Longview, and elsewhere on the central and southern Washington coast. In summary, they said:

- Ilwaco had been negatively affected by recreational groundfish closures; there was a perception that the system favored other states over Washington; and regional management was needed. Commenters described the importance of recreational fisheries to small coastal communities (April 2004).
- Recreational CPFV businesses in Westport called for regional management of fisheries and said they depended upon groundfish and halibut for a major part of their livelihood (April 2004). Recreational interests emphasized that a phased-in approach to cuts in yelloweye quotas would be less damaging to the community than immediate cuts (March and April 2006).

- Recreational commenters from Westport said they supported a phased-in yelloweye approach, and said the fleet in Westport had reduced its yelloweye mortality by 85 percent during the last six years. They noted that since the 1970s the Westport fleet had shrunk from more than 300 vessels to 31. They said further cuts would mean they would lose access to more abundant species, like halibut, that they depended on: "The cutbacks on other fisheries, groundfish and salmon, that would occur to avoid yelloweye, cumulatively will not leave enough to survive on for these communities…" Commenters supported regional management of yelloweye (June 2006).

1.4.3.2 Oregon Comments

Comments were recorded from approximately 77 individuals from Oregon (some of these were provided to the Council in the form of a Sea Grant study that did not differentiate between individual commenters). Forty-four comments did not specify a location in Oregon. Of these, recreational commenters expressed concerns about the economic impacts of fewer recreational fishers coming to the Oregon coast. They named hotels, restaurants, tackle shops, boat repair shops, charter companies, guides, gas stations, and shopping malls as potentially suffering from cuts in recreational fishing, and noted that many communities were already suffering economic distress. They also called for more data on the economic impacts of recreational fisheries.

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

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

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

Northern Oregon Coast

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

Portland and Eugene Metropolitan Areas

There were two comments from the Portland metropolitan area and one from Eugene. Both Portland commenters were recreational fishers, and both expressed concerns about Oregon's coastal economy if proposed groundfish cuts were to go into effect. The Eugene commenter said "As a retired marine ecologist, I'm aware that, for decades, protection…has fallen victim to more immediate economic pleas from fishermen. Please do protect the habitat of groundfish and manage the resource for the long run…"

Central Oregon Coast

Comments were received from 18 individuals from the communities of Garibaldi, Pacific City, Depoe Bay, Newport, Toledo, and Florence.

- A commenter from Depoe Bay voiced concern over the economic and social impacts of a potential sport fishery closure. She noted, "The closure would not only impact the owners of the boats, as they lose their business, but it would also affect from one degree to another all businesses that are touched by charter fishing. Any business that benefits from the tourism generated by the fishing fleet to the marine supply, to fuel docks, restaurants and motels, just to name a few..." She also expressed concern over the fate of the Memorial Day Fleet of Flowers, a 57-year-old tradition in which the charter boat and commercial fleet pay respects to fishermen lost at sea, and other impacts of a weakened charter fleet: "It will mean that no longer will the handicapped, the blind, the deaf, the mentally challenged be able to go ocean fishing. It will mean that many of elderly will not be able to continue with the pleasure of ocean fishing, because there will be no one to take them..." (June 2002).
- The Port of Siuslaw (Florence) wrote with concerns about possible recreational closures outside of 50 fm. They noted, "Recreational angling provides a great economic stimulus for Florence and the surrounding area," and expressed concern over the ripple effect of a fishery closure (September 2003).
- The Garibaldi fishing community was concerned about a recent Labor Day groundfish closure. A processor wrote "that had a tremendous economic impact … [and] a very large psychological impact on my community. It was kind of like a kick in the face...all these people from all over the country who had plans to come to the Oregon coast to go fishing, to spend their money, those plans were stopped with 72 hour notice [or less]." A Garibaldi port commissioner wrote the pre-Labor Day closure had cost Garibaldi $529,000. Both commercial and recreational fishers in Garibaldi stressed the economic impacts of management decisions on their community: "You have hurt us financially, putting our [three] boats… into dry dock because of the low quotas... You've made us ready to quit and sell our boats [rather] than to keep our profession of [fishing]" (November 2005).
- Commenters in Newport pointed out that the coastal economy had been depressed for quite some time. A joint letter from Senators Gordon Smith and Ron Wyden to the Secretary of Commerce noted, "The fishing communities of Oregon are in their worst financial condition in

recent history and are depending upon you to carefully craft a balanced management plan…" (September 2002). A commercial fishing family member wrote, "be aware that the West Coast fishery as a whole is experiencing an overall depression. Depressed prices for salmon, shrimp, crab and tuna are adding to the general poor outlook for fisheries" (November 2002). A petition with 43 co-signers notified the Council "the reduction in fish harvest levels [has] had a drastic impact to our community and that further reduction in groundfish harvest levels will continue to adversely affect every business and family in Newport. The reduction in harvest levels means direct jobs are lost, not only in the commercial fishing industry but also in the recreation fishing industry, processing plants, boat repair businesses and gear shops… The repercussions trickle down to the lodging, restaurant, attraction, entertainment, and retail industries. And when these tourism-based businesses lay off employees due to reduced revenues, this has an effect on other local businesses... It would be difficult to measure the number of jobs and revenues lost to the whole business community." A net shop owner noted, "[We] plead the case here for expanding some fishing grounds or quotas to the draggers deploying this year.... A year from now, if these quotas and closed zones stay in effect, we will be having to turn fishermen away for fears of not being paid. Inventories at shoreside services are dwindling and the entire market infrastructure seems ready to collapse..." (June 2003). Another commenter wrote, "All over Oregon, our skippers and deckhands depend on the ground fishery to make a living and feed their families. Winter months through early spring especially, all they were allowed to catch was bottom fish, to carry them through until salmon season starts again… Now you have ruled to take this away from us leaving nothing to make a living with this winter" (September 2004). The Embarcadero Resort Hotel & Marina estimated 1,650 occupied rooms would be lost to the Resort with severe cuts or complete stoppage of groundfish fishing, and estimated total economic loss at $421,887 per year (September 2002). In June 2006, a commenter noted although Newport is fairly diversified relative to other coastal fishing communities, it has still experienced setbacks, including consolidation of processing facilities, boating accidents, and family stress.

- In Toledo, a recreational fisher wrote, "When [ODFW] shut down bottom fishing it devastated the Oregon coast economy. Not only was the sport industry affected; restaurants, hotels, gas stations, public sector, police, firemen (because of the tax base)... It is heart wrenching, because there [were] people on the Oregon coast who... lost their families, who lost their businesses. There were businesses reported losing $1,400 per week... that had a devastating affect on our tax bases..." (September 2005).
- A commercial fisher from Pacific City, which hosts a dory fleet, expressed concern that VMS would force small vessels with limited income out of the fishery (September 2002).

Southern Oregon Coast

Comments were received from 11 different people in Winchester Bay, Bandon, Coos Bay, Charleston, Port Orford, and Brookings-Harbor. (One comment was gathered as part of a Sea Grant study presented during public comment in September 2002).

- In Winchester Bay, a recreational fisher recalled the impacts of an earlier salmon closure on this primarily recreational port: "Many fishing related businesses closed and this area lost all our charter fishing businesses. We currently have only four charter offices providing offshore angling opportunities for our visitors." He noted, "Recreational angling provides a great economic stimulus for Winchester Bay and the surrounding area. If recreational angling were stopped, we would experience the ripple effect from another loss of fishing species." (September 2003)
- The Port Orford Port Manager commented, "Port Orford fishermen, the Port and the community of Port Orford have long derived economic benefit from groundfish landings from around our

area. All are now suffering hardship because of declining stocks and harvest regulations" (March 2005). In June 2006 a Port Orford fixed gear fisherman said that due to the rising cost of fuel, a two-month blackcod quota of 300 pounds. would present a hardship.

- The Coos Bay Trawlers' Association expressed concern about the cumulative effect of management measures, including the trawl buy-back program, prohibitions on large roller gear, other gear restrictions, observer requirements, VMS, and the RCA, which "reduced time on the water by 75 to 80 percent; reduced our earnings by at least 75 percent" (June 2005). The cost of VMS was problematic: "The state that has the highest unemployment rate, the state with the highest poverty level…has to pay for the system themselves..." (March 2004). In addition, trawlers were frustrated by frequent changes in management direction: "Changing the process again, midstream…is taking all these small [trawl] businesses by surprise… How can any business effectively operate in this kind of environment?..." (September 2003). In June 2006, the Coos Bay Trawlers' Association representative said that "The effects of downsizing from the initial disaster declaration are still surfacing as ice plants are closing and other infrastructures are disappearing from our ports. Waterfront properties that used to house supportive industries to fishing are converting to condos…" and asked for a Petrale season in November and December.
- In Charleston, a processor pointed out the difficulty in planning a business when faced with unexpected cuts: "Without proper notice the RCA zone was moved out to 250 fm, which causes a devastating ripple effect within our company. Over the past several months our company has invested approximately $80,000 to develop our new fillet room with the anticipation of Petrale season opening in October of this year. We are a small company just starting out in this business and this has made an enormous impact on our financial situation... Last year during the months of October, November and December we purchased several thousands pounds of Petrale, which made it possible for us to continue doing business by compensating enough income to keep paying wages of our employees" (November 2004). Another processor emphasized the seasonal importance of the Petrale fishery: "The fall Petrale sole fishery has been a valuable economic asset to both the fishermen and processors at a time when both the weather and the late year limits put an economic hardship on the industry. By the current position of the 250 fm line the Petrale fishery has been eliminated. The Petrale fishery has become an established holiday season marketing item for the processors, brokers, wholesalers, restaurants, and grocery stores" (November 2004).
- Commenters from Brookings-Harbor were concerned about impacts to the recreational fishery. Responding to a sport groundfish closure, one commenter wrote, "Southern Oregon is struggling to create employment opportunities and keep this one key element of the tourism industry alive, which is our recreational fishing industry. This is a blow to our economy that is unexpected and, plainly speaking, should be justified to the general public…" (September 2004). Another commented that the on-again, off-again regulatory pattern "tears families apart, making it impossible to hire, train, and keep good employees, not to mention maintaining boats, trucks, fishing gear, and montages [sic]. It also tears at the social fabric of coastal communities, ports, fuel docks, suppliers, banks, and restaurants and other support industries, and the employees and families of those businesses" (November 2005). An RV park manager noted that when there are closures in California, it should be made clear to the public that they do not necessarily affect recreational fisheries out of Brookings (September 2002). In June 2006, a Brookings trawler said that there were no more fish processors in Brookings; that the fuel dock had closed (and was replaced by one owned by the Port), and that the Brookings ice plant was in trouble. He also noted that Brookings was a retirement community that attracted anglers, and that without fishing opportunities there would be less reason for retirees to move to Brookings.

1.4.3.3 California Comments

Comments were received from approximately 71 individuals in California. Of these, 13 did not specify a city or town in California. Nine were form letters from an angling organization which promoted angling's economic importance and lack of environmental impact. Two other comments from recreational anglers echoed the same concerns.

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

<u>Northern California (San Francisco and points north)</u>

Comments were received from 14 individuals in northern California. Comments came from people located in Crescent City, McKinleyville, Samoa, Newport, Del Norte County, Fort Bragg, and the San Francisco area.

- In Crescent City, commercial fishermen expressed concern about protecting markets for "beach fish" (sanddabs, sole, and flounder) and other nearshore markets. Crumbling market and physical infrastructure were major concerns. A fisherman noted, "We badly need to have an increase in the black and blue rockfish component of our catch allowances. Without the seasonal increases in these fish, some of the last nearshore markets will be lost along with the infrastructure that supports them. Many fishermen, especially those who fish outside of the areas that can supply the live market, cannot make enough money to support their fishing efforts…" (June 2003). Another commercial fisherman was concerned about the effect of VMS requirements on blackcod fishermen (March 2005). The Crescent City Harbor District expressed concern over recreational seasons, saying "the reduction in our groundfish season will have a devastating impact on our port and local community...." Other recreational fishers noted that the recreational fishing season had been cut in 2004 to seven months, leading to economic losses; and the season was cut in 2005 to four months: "with the offshore weather we have here at Crescent City in the summer, the season will be less than [four months]... This is pure and simple economic damage caused by the Federal government to our small community…" (April 2005). The mayor of Crescent City wrote with similar concerns, saying "The recent development of the recreational groundfish regulations is of much concern to the City of Crescent City and its residents. As you know, we have a deep and strong interest in both the commercial and sport fishing activities in our area. Any reduction in this season would have a detrimental effect on our economy and way of life" (April 2005). In June 2006, a commenter related further evidence of crumbling infrastructure, including sinkings and the dock and the Port's inability to pay to retrieve sunken boats. The commenter said that all but one crab processor had left, and that the 300 slips used in 1998 had shrunk to 40 this year.
- In Samoa, a groundfish trawl gear supplier said his business had been cut in half during the past five years, that processing and supply infrastructure had contracted, and fishermen were putting off maintenance on their vessels: "A blanket closure would mean the loss to the nation of these fisheries and the loss of the participants' livelihoods...." (June 2002). A recreational fisher in nearby McKinleyville wrote that a black rockfish closure would hurt California both economically and socially (June 2004).
- In Newport, a commenter said that a thornyheads/sablefish closure had "killed" the Newport dory fleet (September 2002).

- In Fort Bragg, a series of alarming newspaper articles in June 2002 led to a letter from the mayor saying, "This raises concerns in the City of Fort Bragg, because fishing is an important part of the economy. In addition, there are many residents who depend on local fish as a source of food." A charter business commented, "our community has been hit with several extreme newspaper articles… claiming that all fishing, sport and commercial, will be prohibited as of Jan 2003 from Mexico to Canada. Our entire community is up in arms." In November 2005, salmon trollers in Fort Bragg expressed concern about increased fuel costs, asking for higher weekly and daily limits for sablefish. In June 2006, a commenter said that the low 2006 salmon season created more cutbacks in Fort Bragg, and asked for a summer rockfish season to allow for more tourism opportunities. A processor in Fort Bragg said the community is very close to losing its ice plant, the only one in a 200-mile radius. He said, "We're in a crisis situation. I think all the cuts that we've had through the many years since 2000 are finally starting to hit… I think people and businesses to start going under." He also expressed concern about losing markets to Canada (June 2006).
- In June 2003, a recreational fisher passed along an editorial saying "We are already seeing several party boat operations being sold or forced out of business…many boats and supporting businesses (tackle shops, fuel docks, hotels etc.) depend on rockfish for winter their income. It's not a large part of their annual total but enough to pay their employees, insurance and berthing fees until the more lucrative salmon season opens. We are literally one bad salmon season away from losing most of the party boat operations along the Central coast. In a good salmon season these small businesses can scratch out a living but if the salmon don't show the cost of running a boat and paying its crew becomes impossible. Most at risk are boats and businesses in the smaller ports. Two of the largest party boat operations in Bodega Bay are currently selling out or closing down and more are sure to follow from Ft. Bragg to Bodget Bay…"
- In April 2006, a recreational fishing representative said, "If we reach the ABC/OY and have an early closure of any sort at all, we'll have economic effects that will be staggering to the CPFV fleet. Many, many businesses will close; families will be torn apart." A recreational representative in June 2006 said four landings north of Point Conception had gone out of business and "anything less than high OYs or Alternative 3 will devastate ports and counties that are at high risk north of Point Conception, not to mention all of the state.. Even at status quo, the OYs of the charterboat fleet and groundfish trips have been shrinking at an alarming rate."
- A commercial representative encouraged the use of baseline data to measure socioeconomic impacts of fishery management actions (April 2006).

California: Monterey Bay Area (between San Francisco and Morro Bay)

Comments were received from 12 individuals and one organization between San Francisco and Morro Bay, including Half Moon Bay, Monterey, Moss Landing, Marina, and Santa Cruz. The organizational comments are discussed in Section 1.4.3.4. Two comments were in response to potential cutbacks to protect bocaccio. One fisherman said there were no bocaccio where he fished for sablefish, and commented, "Have pity on us. There are no other job opportunities" (June 2002). A commercial fish buyer said his business had lost $1.5 million in potential business during the last three years, and that 40 restaurants had gone out of business due to management restrictions (June 2002). The Harbormaster wrote, "There is a synergy that occurs which is unmeasurable in terms of cash value that needs to be considered in the development of fishing regulations, including the designation of essential fish habitats on the west coast. The public comes to the ports and harbors and enjoys getting their fresh seafood while watching the boats offload their catch. Without that, these small craft harbors become stagnant and turn into yacht harbors for the rich. The little guys are forced out and the working harbors cease to exist. We have seen this in southern California harbors and hope that that does not happen here…" (June 2005).

In June 2006, the Council received seven comments from recreational fishers, and two from commercial fishers, in this area. The recreational comments described a shrinking charterboat fleet and customer base in Monterey Bay and asked the Council to consider Alternative 3B for the 2007–08 seasons, to open to 40 fm in the south central Monterey Bay region, to allow fishing in June in the Half Moon Bay area, and to allow fishing in deeper waters. One commenter said, "The constantly changing, confusing, and restrictive regulations have turned the public off from fishing for rockfish and fishing in general. People never know when the season is open. They are unhappy with only being able to fish for shallow water species. They are not happy with only being able to retain ten fish for their efforts…" Commenters also noted that California Marine Life Protection Act regulations would likely lead to further fishing restrictions. One Monterey commenter said, "The business itself is losing money each year. Our customer base has gone to nothing based on fathoms, restricted time... We can't depend upon salmon, we can't depend upon tuna, we're pretty much a rockfish oriented community." A commercial commenter from Moss Landing said that Moss Landing would risk losing its dredging funds with further cutbacks, meaning that boats would not be able to function in any fishery. The commenter noted, four processors in Moss Landing had gone out of business, the fuel dock was up for sale, and buyers were now buying foreign fish. Another commercial commenter said the creation of the CCA had led to six groundfish boats going out of business and six others having to diversify in order to stay in business.

California: Morro Bay Area to North of Santa Barbara

Comments were received from six individuals in the Morro Bay area, including Avila Beach and Port San Luis.

- In response to concerns raised by the EFH EIS (June 2005), the Mayor of Morro Bay wrote that "our harbor and its commercial fishing businesses depend on groundfish landings to support the harbor infrastructure, since many of our fishermen are mainly albacore, crab or salmon permittees with actual landings in the ports north of Morro Bay. Our City has suffered from the reductions in groundfish quotas, seasonal restrictions and area closures to the extent that the local groundfish market has almost collapsed and just a few of the traditional shore side support businesses are still hanging on." She noted that "In the last two years we have seen some hope as groundfish prices have gone up a little, quotas increased slightly, (but typically not what was promised) due to the Federal buy-back program and Class A permittees have started to see a reasonable economic return for fishing again. We are hopeful that some uncertainty can be relieved for these local businesses and for the City."
- In Port San Luis, the Harbor Master wrote (also in response to the EFH EIS), "there are many small ports and harbors that have a symbiotic relationship with the fisheries industries, both sport and commercial, within the [EFH] EIS study region. These small craft harbors rely on the fisheries to provide steady jobs and act as an economic engine, keeping the community vibrant. In the case of central California harbors, the past few years of increased regulatory actions have had a drastic effect on the ability of the fishing fleets to continue making a profit. This decline, in turn, has had a direct effect on coastal host community (harbors and marinas). The implementation of regulatory closures or restrictions will have a deleterious economic effect on these local coastal communities..." (June 2005).
- One commercial fisherman commented on the difficulty in planning for business when seasons close unexpectedly: "Some folks are considering marketing campaigns [to sell] the fish that are caught…certain marketing campaigns go out — and then all of a sudden the season's closed,

and people have spent a great deal in marketing their fish... or in the case of the recreational fishermen, putting out ads for their season..." (March 2004). In June 2006, the same commenter said that the high OY for canary rockfish being considered was "barely subsistence level." Like other commenters, he said that restaurants were now selling foreign fish and that the number of fishermen participating in the fishery had dropped precipitously.

- Another recreational fisher noted at a Council meeting, "[There has been] economic harm to the southern California sport fishery. It's a disaster. The further north you go, the greater the dependence on rockfish" (June 2003).

California: Santa Barbara and Los Angeles (to Oceanside)

Comments were received from 12 different sources in this region, including a study conducted by the United Anglers of Southern California that was presented during public comment in June 2003 and recorded comments by recreational fishing business owners. Comments came from Balboa, Channel Islands Harbor, Long Beach, Oxnard, Port Hueneme, Santa Barbara Channel, Santa Barbara County, Westminster, Ventura County, and other points in Southern California.

Recreational fishers made the following comments:

- A sportfishing business in Balboa, California noted that several state and Federal closures had "contributed to what can only be described as a catastrophic situation for the sportfishing industry in southern California. A lack of catchable species is now being recognized by our attending and prospective customers and their interest and participation is at an all-time low for this time of year." He noted groundfish are a staple for recreational fishing businesses during winter months when migratory species are absent, and went on to say, "Those who will be affected directly include boat and landing owners, captains, crewmembers, bait haulers, landing office personnel, etc. The businesses indirectly impacted would be tackle providers, fuel docks, boat maintenance and repair facilities (shipyards), manufacturers of fishing electronic equipment, vessel food and beverage vendors, and the list goes on" (June 2003).
- Another sportfishing business owner (in the United Anglers of Southern California (UASC) study) said she had reduced payroll by half and cut back hours to stay in business. She said, "The regulations in place take away any chance of making any money…I don't know what else to do." Other business owners in the UASC study reported on lost clients, declines in charter bookings, lower revenues, layoffs, difficulty in paying harbor fees, and other challenges to their businesses (June 2003).
- A saltwater lure manufacturer (in the UASC study) said December 2002 was the worst December in 42 years of business, and dealers were reluctant to spend money on fishing lures (June 2003).
- Recreational fishermen were very concerned over limits on rockfish. A charterboat owner in Channel Islands Harbor wrote, "We have been regulated and pushed into shorter bag limits, depth restrictions, tackle cut backs, and an extremely short rockfish season in 2005. The toll of these regs have pushed many of us to borderline bankruptcy. Many of us depend upon groundfish to survive. We have been crippled by the extremely conservative approach... many of our livelihoods may lie in the balance of the Council's decision..." (April 2005).
- In June 2006, recreational fishermen noted that the high cost of fuel was impacting their CPFV businesses and possibly reducing the number of customers traveling to go fishing. Fishermen asked for the high OY alternative for the 2007–08 annual specifications and expressed concern about the influence of litigation on management decisions. A fisherman said "[Fishing communities] need to do more than just get by, by just making our boat payment, by just

making our fuel dock payment, our crew expense. We need to do better than just merely exist" and that "Status quo doesn't cut it for us…" They said their businesses would suffer if the fathom line were moved to 40 fm (off Long Beach, California). Recreational fishermen also supported loosening the CCA boundaries.

Commercial fishermen expressed concerns about fisheries infrastructure and cumulative effects:

- A fixed gear fisherman commented, "In Southern California, with the [CCA], [RCA], deeper nearshore permit, nearshore permit, marine sanctuary, whatever, we're running out of stuff to do; and we can't afford to lose this fishery... if we implement this [observer] data, it's going to kill us" (September 2003).
- Others were concerned about small artisanal fisheries in Santa Barbara Channel: "There are small, local, artisanal fisheries that have been fishing sustainably with little bycatch in the Santa Barbara Channel for decades that are going to be eliminated with most of the alternative regulation packages you are considering for resolving the canary, yelloweye, and bocaccio rockfish problems" (June 2002).
- In June 2006, commercial fishermen in the Santa Barbara and Westminster areas expressed support for modifying the CCA boundaries, saying it would provided needed economic relief to the groundfish fishery and infrastructure. One noted that the price of fuel was making it expensive to travel to open fishing locations.
- Dr. Milton Love, a researcher at the University of California Marine Science Institute in Santa Barbara, called for the Council to maintain the CCA boundaries, saying, "1) We don't know what lives in the rocky areas to be opened. Nobody has conducted surveys…in the areas suggested for opening. At the very least, it is not clear that cowcod do not live in the area to be opened to fishing…2) Fishing operations cannot be accurately monitored [in the CCA]…there are numerous steep-sided areas where bottom depth drops off abruptly…it is not credible that ship positions will be able to be assessed sufficiently accurately to detect either inadvertent or intentional poaching…3) The CCA protects more than cowcod… I hope the [commercial and recreational fishing industries] become a lot healthier and more self-sustaining than they are today. But really, prudence should be the watchword here."

California: Los Angeles Area

There were comments from two individuals in the Los Angeles area. One noted, "Recreational fishing businesses, particularly landings and bait and tackle operations, do not benefit from the various programs designed to ease impacts of regulations on the commercial fishing community." The other noted sport fishers need to be able to fish on the continental shelf.

California: San Diego Area

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

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

been regulated to fish only four months of the year! … Regulations are putting me out of business...” (June 2003).

1.4.3.4 Comments from Coastwide and Regional Organizations

Several comments originated with coastwide or regional organizations.

- A representative of Pacific Seafood Group, which operates throughout the West Coast states, said, “If the OYs are overly restrictive, the negative economic consequences could occur in the tens of millions of dollars. Many coastal communities are struggling now. An economic impact of this magnitude would create a depression in some areas. Lastly, the Council management teams and industry have crafted innovative and creative management tools in the last few years. Let us use those tools now to find solutions that avoid economic tragedy” (April 2006). In June the same commenter said “If the lower preferred OYs are adopted, the consequences could be severe enough to topple our industry… The court wanted to “leave some leeway to avoid disastrous short-term consequences for the fishing communities.” We’ve already been declared a disaster...” Another representative from Pacific Seafood Group said the ice plant in Crescent City was operating at a loss, and was being retained in order to provide infrastructure to the fishing fleet there. He also noted that businesses that used to process seafood waste had gone out of business, and said “Anything less than the GAP proposal is going to send us into some serious reconsideration of our businesses up and down the coast” (June 2006).
- The Fishing Heritage Group, made up of representatives of Environmental Defense, the City of Morro Bay, and the City of Monterey, presented a list of their goals and a consensus map of no-trawl zones to the Council. They wrote that “Starting in the early 1990s, fishing opportunities for west coast groundfish…have become increasingly constrained as a result of reductions in total allowable catch. Efforts to keep the fishing open year-round resulted in reductions in smaller and smaller trip limits, making it difficult for fishermen to make a living, and for ports to maintain revenues. The establishment of very large areas closed to rockfish fishing resulted in further economic distress. As a result, the working harbors of the central California coast have become fragile — their health linked to declining fish landings and revenues…” (June 2005).
- A representative of the Recreational Fishing Alliance in California said California Marine Life Protection Act rules going into effect in January 2007 could close as much as 40 percent of the hard bottom in central California (June 2006).
- A representative from the Pacific Whiting Conservation Cooperative called for caution, saying “what is certain are the impacts to commercial and recreational fisheries if your actions are extreme. … Most of us see the need to sustain fishing communities today” (June 2006).
- A letter from the Southern California Trawlers Association (SCTA) noted, “A significant concern relates to the cumulative impacts of these closures on the essential infrastructure required to sustain viable commercial “working” fishing ports and harbors along the 1,100 mile coastline of California. ... How much fishing area, how many fishing boats, are necessary to maintain the year-round sustainable infrastructure of buying stations, ice houses, hoists, fish processing plants, wholesalers and retailers, that can provide fresh California seafood to seafood consumers?” (June 2005). The SCTA also expressed concerns about the viability of small artisanal fisheries operating in the Santa Barbara Channel.
- The Sportfishing Association of Southern California noted in several different comments that closures would have devastating effects on small businesses, and that the high cost of fuel was having a negative impact on the number of passengers carried by charter boats.

- A representative of the Central Coast Fisheries Conservation Coalition noted that between Monterey and Santa Barbara there were only two sport fish landings and two harbors, both of which were at risk of going out of business (June 2006).

1.4.3.5 Comments from Unidentified Locations

Forty-five comments (some of which were multiple comments by the same person) did not specify a geographic origin. Many repeated the themes in the comments listed above. Seventeen comments dealt with general socioeconomic impacts to communities, calling for managers to consider effects on communities, to develop better information on community impacts, to consider the economic impacts of recreational fisheries, and to consider cumulative impacts of regulations on communities. Fourteen comments dealt with the effects of regulations on businesses, saying that if certain closures were to take place, there would layoffs, closures, or other hardships. Four comments dealt with processors, marketing, and infrastructure. Three comments called for long-term environmental protection, including ecosystem management, despite short-term economic consequences.

One comment each said businesses need better information for planning; more EFPs should be implemented; marine sanctuaries would harm the fishing industry; sportfishing caused less ecological damage and more economic benefit than commercial fishing; and closing the recreational fishery during the warmer months would not cause as much hardship as closing it during the winter months, when there are fewer fishing options. One comment questioned the use of 2000–02 as a baseline for socioeconomic impacts; one called for real-time observer data; and one said that nearshore closures can pose safety risks to small trawlers.

1.4.3.6 Comments from Nongovernmental Organizations

Most of the comments described above focused exclusively on socioeconomic impacts. Some referred to the balance between short-term economic impacts and long-term environmental protection. The comments below came directly from nongovernmental organizations (the letters are included in their entirety in Appendix C).

NRDC, the Ocean Conservancy, and Oceana together wrote (March 30, 2006) commenting on the 2007–08 specifications proposed for yelloweye rockfish. The authors take issue with the GMT proposal to increase the OY above that identified by the SSC. The letter calls for the Council to rebuild yelloweye as quickly as possible, and to follow the SSC advice regarding rebuilding periods for yelloweye. The letter expresses concern the GMT proposal would create a risk of serial depletion of yelloweye, and notes that uncertainty levels are very high for this species. The authors call for the Council and NMFS to develop a systematic approach for identifying the shortest time possible for rebuilding overfished species, before the next round of revisions to rebuilding plans, and to pursue steps to reduce yelloweye effort and catch, similar to those taken to reduce cowcod effort quickly in 2003. They also call for regional management of this species, since depletion levels vary significantly by state, and calls for increased observer coverage on the commercial halibut fleet and funding for fishery-independent surveys.

The letter suggests taking quick action to identify and close yelloweye hotspots to reduce bycatch, and mining observer data to develop spatial management tools, noting "the more quickly such action is taken to rebuild populations like yelloweye, the faster fishing communities will reap the benefits of healthier stocks." The authors note, "a recent study of the economic implications of rebuilding depleted rockfish populations found that the catch of overfished Pacific groundfish is worth three times as much (net present value) once they are rebuilt as in their current depleted state…These findings underscore the economic benefits of staying the course of rebuilding and of tools like protected areas that can help avoid overfishing in the first place."

NRDC also wrote on April 13, 2006 recommending the EIS "evaluate fully all potential environmental issues relating to the 2007 specifications and present a full range of alternatives for all important choices faced by the National Marine Fisheries Service in crafting the specifications." The fifteen recommendations are included with the letter in Appendix C.

In oral testimony, a representative from NRDC said, "The 9th Circuit case reaffirms the Magnuson Act requirements to rebuild depleted species as quickly as possible… That language doesn't mean that the Council and NMFS should balance biological and economic needs; on the contrary, the decision reaffirms earlier ones in holding that… 'the purpose of the act is clearly to give conservation of fish priority over short-term economic issues.' …Without immediate efforts to rebuild, the long term survival of fishing communities is in doubt. The court also affirmed that Congress wanted to leave leeway to allow fishing on healthy stocks and avoid disastrous short term effects…" (April 2006).

On May 24, 2006, NRDC wrote with additional comments (Appendix C) including a discussion of the definition of "disastrous short-term consequences for fishing communities." NRDC writes that "the short-term economic needs of an individual fishing community do not constitute the broad type of 'disastrous short-term economic consequences' described by the Court. Taking into account the short-term needs of fishing communities by providing some economic leeway in rebuilding times and mortality levels does not mean that needs of a particular fishing community that is highly dependent on one or more overfished species can trump the requirement to rebuild as quickly as possible. The economic analysis must factor in the long and short-term economic needs of the entire fishery, and even then, cannot prioritize those needs over the clear priority given to conservation in the Magnuson-Stevens Act…" These comments were reiterated in oral testimony given in June 2006.

In addition, Oceana wrote (November 23, 2005) requesting the Council prepare an FMP-level programmatic EIS and called for the Council to shift from a single-species MSY approach to an ecosystem-based approach, including accounting for ecosystem needs in the 2007–08 annual specifications. Oceana also wrote (April 5, 2006) requesting that National Oceanic and Atmospheric Administration (NOAA) Fisheries "immediately review, analyze, and present a comprehensive report of salmon bycatch in the Pacific groundfish fisheries, in particular the whiting fishery and bottom trawl fisheries, to the [Council] and the public… We recommend this information include the estimated interception of Klamath River Chinook salmon" and recommended including "a description of the methodology of salmon bycatch accounting presently used, and a discussion of any deficiencies… [by the April or June 2006 meeting]."

1.4.3.7 Other Scoping Comments

In addition to the comments listed above, we received a scoping letter from the Environmental Protection Agency (EPA) (April 12, 2006) that is included in Appendix C.

1.4.4 Criteria Used to Evaluate Impacts of the Proposed Action

Council and NMFS staff began their work by assessing the proposed actions in order to identify environmental impacts and narrow the scope of the present analysis to the significant issues that will be analyzed in depth and eliminating from detailed study the issues which are not significant (40 CFR 1501.7). They used 16 factors listed and enumerated in NOAA NEPA guidance (NAO 216-6, Section 6.01), which reproduces the factors defining "significant" listed at 40 CFR 1508.27, and Section 6.02, specific guidance on fishery management actions, in order to screen for potentially significant impacts and determine the scope of the analysis. The Section 6.02 criteria are listed first below and generally focus on components of the human environment potentially affected by a fishery management action. The Section 6.01 criteria are related to the intensity—or severity—of the impact, which were considered in the context of the environmental components listed in Section 6.02. As part of this process, NMFS and Council staff reviewed the 2005–06 groundfish harvest specifications and management measures EIS. This review assessed whether the impacts of the current proposed action would differ substantially from those of the interim allocation, increasing the likelihood of significant impacts.

1-2) Can the proposed action be reasonably expected to jeopardize the sustainability of any target or non-target species that may be affected by the action?

The proposed actions have both short- and long-term effects resulting from establishing ABC and OY values for the 2007–08 biennium and, for depleted species, related long-term rebuilding targets. Short-term impacts resulting from harvests during the biennial period will not be significant if total fishing mortality is constrained at or below OYs or other biologically based harvest limits and these limits will allow stocks to remain at or above, or rebuild to, the B_{MSY} proxy, based on stock assessment and rebuilding analyses, which are the best available scientific information. However, there are several sources of uncertainty, which increase the risk that significant impacts could occur. This uncertainty includes measurement error and future natural environmental variation affecting stock productivity. Underestimating actual total fishing mortality, based on landings and observer data, is an example of measurement error that increases the risk of significant impacts. Future adverse environmental conditions affecting recruitment is an example of environmental variation that could delay rebuilding a depleted stock beyond the designated target year. (For a lengthier discussion of sources of risk, refer to Appendix A to the 2005–06 groundfish harvest specifications EIS on pages A-28–A-30.) Thus, although a primary objective of the management regime is to constrain fishing mortality to non-significant levels, data uncertainty and the likelihood of meeting rebuilding targets are also considerations. Chapter 4 evaluates fishing-related impacts to target and non-target groundfish and other incidentally caught fish species.

3) Can the proposed action be reasonably expected to cause substantial damage to the ocean and coastal habitats and/or EFH as defined under the MSA and identified in FMPs?

Disturbance of benthic habitat by fishing gear is the principal impact of the proposed actions. In particular, there is concern about the effect of bottom trawl gear in high relief areas hosting complex biogenic benthic habitat such as cold water corals and large sponges. Given that the amount of fishing effort occurring in 2007–08 is unlikely to increase beyond levels seen in the recent benthic disturbance will not likely increase. Furthermore, NMFS and the Council recently completed a multi-year project to reevaluate the groundfish EFH identification and implement new mitigation measures for fishing-related impacts. These mitigation measures, which include closing areas thought to encompass sensitive habitat to bottom trawling, will likely result in reduced fishing-related impacts to EFH. Chapter 3 describes these mitigation measures and evaluates the impact of the proposed action.

4) Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?

Health and safety related concerns focus on management measures that make it more likely vessels will fish in bad weather or hazardous ocean conditions. For example, RCA—depth-based closed areas established to reduce depleted species bycatch—could require vessels to fish farther offshore in order to access target stocks. Pages A-35–A-38 in Appendix A to the 2005–06 groundfish harvest specifications EIS contains a general discussion of vessel safety. Management measures included under the proposed action are not anticipated to substantially affect vessel safety in a way different from the 2005–06 biennium and these effects are not evaluated further in this EIS.

5) Can the proposed action be reasonably expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?

Groundfish fisheries do incidentally catch species listed under the ESA and marine mammals, but at levels that have been determined not to jeopardize the continued existence ESA-listed species or contribute substantially to mortality of marine mammals not listed under the ESA. Listed stocks of salmon taken in the groundfish trawl fisheries are of principal concern. Pursuant to the ESA NMFS initiated section 7 consultations eight times on the groundfish FMP to address bycatch of listed salmon stocks. The most recent consultation was concluded with the signing of a supplemental biological opinion on March 11, 2006, (NMFS 2006) because expected bycatch in previous incidental take statements had been exceeded three times from 2002 through 2005. Chapter 5 in this EIS evaluates impacts to ESA-listed salmon stocks based on information provided in the supplemental biological opinion.

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

The proposed action will primarily affect biodiversity and ecosystem function through the removal of target, non-target, and protected species. Current understanding is unusfficient to predict how changes in biomass of different stocks and species under the different alternatives will affect ecosystem dynamics. Chapter 3 reviews current information on possible ecosystem effects related to changes in stock status on the food web and long-term genetic and demographic effects.

7) Are significant social or economic impacts interrelated with significant natural or physical environmental effects?

Groundfish landings translate into exvessel revenue and generate income for fishery participants, fish processors, and others in fishing communities. Over the long term depletion of some groundfish species has been a significant natural environmental effect and measures to rebuild these stocks could have significant adverse socioeconomic effects resulting from setting low OYs for these species. Low OYs for depleted species can constrain catches of target species resulting in substantial declines in overall revenue. As discussed previously in this chapter, a recent court decision has emphasized the need to demonstrate the stock rebuilding will occur in the shortest time possible while taking into account the short-term needs of fishing communities. This suggests that significant adverse socioeconomic impacts should be avoided; but some unavoidable significant adverse impacts (for example, to certain fishing communities) could occur in order to rebuild depleted groundfish stocks. Chapter 7 evaluates impacts to fishery sectors and fishing communities.

8) To what degree are the effects on the quality of the human environment likely to be highly controversial?

Past decisions on stock rebuilding and setting harvest specifications has been subject to litigation. As noted, the reconsideration of current rebuilding plans is in response to a court decision. These factors indicate that the effects are considered controversial.

9) Can the proposed action be reasonably expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

Given the nature of the activities authorized under the proposed action, the principal effect to unique areas would be in the context of EFH. These effects are evaluated in Chapter 3.

10) To what degree are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

There is uncertainty about whether short-term harvest limits will result in stock rebuilding by the target year identified in the rebuilding plan. The nature of these risks was summarized in the discussion of factors 1 and 2.

11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Cumulative effects are the incremental impacts of the proposed action when combined with other past, present, and reasonably foreseeable future actions. The approach taken in this EIS is to include a discussion of cumulative effects in each of the chapters (Chapters 3–7) covering different environmental components affected by the proposed action. The direct and indirect effects of the proposed actions are discussed, past, present, and reasonably foreseeable external actions and their effects are identified, and the combined impact of the effects of the proposed actions (direct and indirect) and the other past, present, and reasonably foreseeable actions are summarized.

12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

The proposed action will not affect historic places or result in the loss or destruction of significant scientific, cultural, or historical resources. As noted above, the primary adverse impact of the proposed action is the removal of target and non-target finfish species, potential adverse effects to EFH, and the incidental take of protected species. To the extent these may be construed as scientific or cultural resources, the proposed actions are not expected to result in a significant level of loss or destruction. The proposed actions could have indirect and cumulative adverse impacts to fishing communities, which might affect cultural resources such as the local social fabric, culture, and image of affected communities.

13) Can the proposed action be reasonably expected to result in the introduction or spread of a non-indigenous species?

The proposed actions do not involve the transport of non-indigenous species. Fishing vessels participating in the proposed action are located in local ports and will not increase the risk of introduction through ballast water or hull fouling.

14) Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

The adoption of new rebuilding targets sets a precedent for establishing future harvest specifications consistent with those targets. Rebuilding plans revised by Amendment 16-4 may be further revised by future FMP amendments in response to new information, changes in the law or regulations, or future court decisions. Future effects are likely to be similar to those described in this EIS and past EIS evaluating harvest specifications (in 2003, 2004, and for the 2005–06 biennium). But the intensity of these effects are hard to predict, and could be significant.

15) Can the proposed action be reasonably expected to threaten a violation of Federal, state, or local law or requirements imposed for the protection of the environment?

Chapter 9 describes potentially applicable cross-cutting mandates; the proposed actions will be implemented in such a way as to address applicable requirements of these laws and EOs.

16) Can the proposed action be reasonably expected to result in beneficial impacts, not otherwise identified and described above?

The proposed actions are intended to have a beneficial effect by establishing harvest limits consistent with MSY, including targets to rebuilding depleted stocks to a biomass capable of supporting MSY. This will have both beneficial natural environmental and socioeconomic effects. The socioeconomic effects may be adverse in the short-term, because harvest levels and associated revenue is constrained; but in the long-term there may be socioeconomic benefits as stocks recover, allowing higher levels of harvest.

Table 1–1 Scoping comments related to community impacts.

Comment	Community impacted (when noted)	Sector (when noted)
2002: April		
[Talked about impacts of potential regulations on Crescent City]	Crescent City, CA	Commercial
2002: June		
Losing rockfish would be catastrophic. [Sportfishing business]	Long Beach, CA	Recreational
Closing rockfish would put us out of business. [Charter skipper]	Oxnard, CA	Recreational
Closing the shelf will kill us. [Sportfishing business]	Los Angeles, CA	Recreational
Neah Bay trawlers need to fish in July-August; can't fish later in our small boats. Can only fish on the shelf. Seven-ninths of the Neah Bay fleet are small boats.	Neah Bay, WA	Commercial
Consider economic impacts [Sport fishing operator]	Oxnard, CA	Recreational
[There are no bocaccio where we fish for sablefish.] Have pity on us. There are no other job opportunities. [Commercial fisherman]	Moss Landing, CA	Commercial
There has been $1.5 million in foregone benefits in the last three years in my business. Forty restaurants have gone out of business due to these restrictions. [Commercial fish buyer]	Moss Landing, CA	Fishing-related business
The northern ports in southern California depend heavily on groundfish. People are scared. [There have been] $2.5 billion in recreational impacts in California.	Northern California	Recreational
There has been recent publicity in regional papers that the Council may impose severe measures on commercial and sport fishing for 2003. This raises concerns in the City of Fort Bragg, because fishing is an important part of the economy. In addition, there are many residents who depend on local fish as a source of food.	Fort Bragg, CA	Community
We are in the commercial fishing industry and in the paper we read that we could face worse cutbacks next year [than] we already have. … Someone needs to get their head out of the sand and really see what is happening. … We all have to be put out of business because of someone's assumptions. Why not let the fishermen show what is out there? We all have to sit back and wait while you drive us into bankruptcy when we see the stocks are there. ... It's time to check [your data] or give us a way out without going totally broke!!!!!		Commercial
…The Council is recommending eliminating all bottom fishing by January 2003. If this passes through the Council and is adopted, it will be a disaster for Oregon's coastal economy, as well as a huge disappointment for all sports fishermen. ... I think the economic impact of this decision must be balanced with any concern for the fish.... if there is anything you can do to help keep the sport fishing open, it will keep the charter boats, the guides and the private fishermen on the water. If bottom fishing is eliminated for sportsmen, all the ocean charters will cease to exist... sportsmen make a huge contribution to the local economy. Depending on the area, we are talking about millions and millions of dollars, from gas stations to shopping malls to hotels and restaurants, etc. ... Sportsmen generate 40 times as much money per pound of fish caught than commercially caught fish for the economy...	Wilsonville, OR	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
We operate a charter boat business in Fort Bragg, California. Our community has been hit with several extreme newspaper articles… claiming that all fishing, sport and commercial, will be prohibited as of Jan 2003 from Mexico to Canada. Our entire community is up in arms. For several years, we have asked for biologists to board our vessels and actually document what fish we are catching...	Fort Bragg, CA	Recreational
I implore you NOT to implement closures. Closures are unwarranted. Closures are not needed to help the fish populations. Closures destroy industries. … Those of us who spend time on the water constantly are opposed to closures because we know they are not needed for the fish, and because we know the impact on our industry and related industries will be totally devastating. ...	Santa Barbara, CA	Recreational
… I urge you to make a thorough study of the anecdotal experiences of long time recreational anglers and sport boat captains on a regional basis. In California, we are talking about a constituency of nearly 1,000,000 anglers that pay to use and conserve the resource, not exploit and profit from it. You will find that our reality, times several hundred million dollars of economic impact, differs widely from those who craft research to gain grants, and those who fish for profit alone. [This wording appeared in 9 different emails from anglers]	California	Recreational
Please try to see all sides of the story before making any decisions. The angling community is a large one that contributes to our economy as well as the well being of our oceans.		Recreational
You are certain to hear the many economic reasons of how the closure of the sport fishing industry would impact our already failing economy. The closure would not only impact the owners of the boats, as they lose their business, but it would also affect from one degree to another all businesses that are touched by charter fishing. Any business that benefits from the tourism generated by the fishing fleet to the marine supply, to fuel docks, restaurants and motels, just to name a few. The loss in dollars to the oil companies who supply the fuel and oil for the fleets will not be insignificant, and will certainly spell doom for many of their business[es].	Depoe Bay, OR	Recreational
I would like to address a more finite aspect of a possible loss of the charter fishing fleet. Memorial Day; for the past 57 years the small community of Depoe Bay, Oregon has paid tribute to those lost at sea… Without a charter fleet there will be no Memorial Day Fleet of Flowers. For those of us who have someone "at sea," who have no grave to go to, this one day has deep meaning for us...	Depoe Bay, OR	Recreational
The loss of the charter fleet spells other things as well. It will mean that no longer will the handicapped, the blind, the deaf, the mentally challenged be able to go ocean fishing. It will mean that many of elderly will not be able to continue with the pleasure of ocean fishing, because there will be no one to take them...	Depoe Bay, OR	Recreational
The charter fishing industry is unique; it is not something that can be shut down with the expectation that we can import it from another country. It will be the loss of an important part of a special way of life, of private enterprise; and, more to the point, the loss of a large part of the coastal economy.	Depoe Bay, OR	Recreational
The economic impact of the elimination of the rockfish fishery off the California coast will be devastating, and will surely lead to bankruptcy for many and to major dislocation for others.	California	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
…The closure, if it comes, will have a devastating effect on the small businesses operating charter and open party sport fishing boats in [Congressman Gallegly's district], and appears to be in direct conflict with the overwhelming view of the fishermen that the stocks are, in fact, in better shape that just three years ago!	Moss Landing, California	Recreational
My business has been supplying trawl gear to the groundfish fleet on this coast since 1979. In the past five years, we have seen our business cut in half as a result of the starvation policy you have carried out in an attempt to manage the fisheries on this coast. I feel that a closure of the shelf would mean we could no longer remain in business. The Council's policy of ever-decreasing trip limits has reached its final conclusion; the resource has been wasted, the processing and supply infrastructure has contracted, the fishing vessels have become unsafe and in some cases, completely un-seaworthy. These vessels are now faced with fishing for less fish and less money, while paying more for the necessary supplies with which to do so. ... A blanket closure would mean the loss to the nation of these fisheries and the loss of the participants' livelihoods.... Systematically destroying the economic viability of commercial fishing and thus precipitating a Final Full Closure is not a management method.	Samoa, CA	Fishing-related business
Let me list the fisheries which my business supplies and which will be impacted by this closure: ... Petrale and English sole, sand dabs, pink shrimp, California halibut, and cucumber...hake and chilipepper...prawns.	Samoa, CA	Fishing-related business
There are small, local, artisanal fisheries that have been fishing sustainability with little bycatch in the Santa Barbara Channel for decades that are going to be eliminated with most of the alternative regulation packages you are considering for resolving the canary, yelloweye, and bocaccio rockfish problems.	Santa Barbara Channel, CA	Commercial
2002: September		
Businesses need to plan—need information. Don't hide [information]. Provide some information early on.	Coastwide organization	General
The Embarcadero Resort Hotel & Marine (Newport, OR) estimates 1,650 occupied rooms would be lost to the Resort with severe cuts or complete stoppage of ground fishing. This would further impact the restaurant with local fishing families no longer being able to have a night out, come for Sunday brunch, or have banquets. In addition, the transient tourist who does charter fishing would not be dining either, nor would some of the groups come who focus on fishing as their extracurricular activity. ... Total economic loss [is estimated at] $421,887 [per year]. Quite an impact to what you know will devastate the economy of Newport, Lincoln County, the Oregon Coast, Oregon, the Northwest, and the West Coast. It is obvious the disaster ahead and the many who will suffer.	Newport, OR	Non-fishing business

Comment	Community impacted (when noted)	Sector (when noted)
We, the undersigned citizens and business people of the City of Newport and members of the Greater Newport Chamber of Commerce, notify the PFMC that the reduction in fish harvest levels have had a drastic impact to our community and that further reduction in groundfish harvest levels will continue to adversely effect every business and family in Newport. The reduction in harvest levels means direct jobs are lost, not only in the commercial fishing industry but also in the recreation fishing industry, processing plants, boat repair businesses and gear shops. However, the impact doesn't end there. The repercussions trickle down to the lodging, restaurant, attraction, entertainment, and retail industries. And when these tourism based businesses lay off employees due to reduced revenues, this has an effect on other local businesses... It would be difficult to measure the number of jobs and revenues lost to the whole business community. We urge the PFMC to seriously reconsider the social and economic impacts their decision will have to coastal communities depending on the fishing industry. [43 co-signers]	Newport, OR	Community
…Oregon's commercial fishing industry helped build our state and continues to employ thousands of people involved in catching, processing and distributing high quality seafood across the country. But that industry, its workers and families, are being threatened by drastic reductions to the amount of fish that can be caught off the Oregon coast - reductions that may be made with little regard to the economic consequences. ... We remind you that the fishing communities of Oregon are in their worst financial condition in recent history and are depending upon you to carefully craft a balanced management plan. ... We urge you to direct NMFS to adopt reasonable 2003 groundfish catch guidelines made by the Council that consider sound science and the economic impact to coastal communities.	Newport, OR	Commercial
Significant socioeconomic impacts are already occurring. Community fisheries infrastructure is eroding and all fisheries are being impacted by the reductions in groundfish. Trickle down effects should be considered and are already occurring. The Council should assess the impacts to secondary and tertiary businesses.	Oregon	Community
Landings and value should not be the only data considered in any socioeconomic impact analysis. This will not give you an accurate picture of what is happening at the ground level in coastal communities as a result of management decisions. Landings and value data alone do not reflect the negative impacts to individuals and businesses.	Oregon	Community
Many fishermen fervently feel that fisheries management agencies have an agenda to close down the fishery. Many no longer go to meetings because they feel it makes no difference, they won't be listened to anyway and decisions have been made ahead of time. ... Most fishermen and their families cannot afford the travel time and expense away from home.	Oregon	Commercial
People need information so they can make adjustments to their business strategies now rather than after all their resources are used up trying to hang on.	Oregon	General
I haven't sold a vehicle to a fisherman in two years. [Salesman, auto dealer]	Oregon	Non-fishing business

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

Comment	Community impacted (when noted)	Sector (when noted)
I quit buying groundfish because I couldn't get the mix I needed for my market. I laid off 15 workers. [Fish buyer]	Oregon	Processing
The local grocery store used to carry lots of boat accounts—those are way down now and there are more and more accounts in arrears.	Oregon	Non-fishing business
Lots of associated businesses are being hit—marine electronics included. Business is down and what business they have, it's hard to get folks to keep their accounts current.	Oregon	Fishing-related business
It isn't reasonable for NMFS to seek to enact regulations that will eradicate family businesses without a specific economic plan in place to assist those businesses and replace those jobs. And I'm not talking about 10 dollar an hour jobs—I'm talking about jobs for crewmen who earn between $35,000 and $40,000 per year. [Fisherman's wife]	Oregon	Commercial
Families are so frustrated—we feel we never know what's next. No one can plan a successful fishing business with so many unknowns. Who will be in, who will be out. If you are out then what—nothing. Nothing is clear-cut. We won't even know next year's restrictions until just before the season actually starts—and that's if we are lucky. Our financial reserves are gone—what can we do? [Fisherman's wife]	Oregon	Commercial
Two of my friends are now getting divorces. The financial stress was too much—that and husbands always being angry, moody, and withdrawn. After four years of that, they (the wives) couldn't take it any more. [Fisherman's wife]	Oregon	Commercial
I'm very concerned about the crumbling infrastructure—it's worse in some ports than others but all are experiencing it. Processors, fuel docks, gear suppliers—they are shutting down. Once that happens, I fear we won't be able to go back and rebuild. There may well be no infrastructure left to support the industry of the future. [Gear store owner]	Oregon	Fishing-related business
I have $90,000 worth of netting on order—I had to place the order 6-8 months ago in order for it to be here for the 2003 season (needs one year lead time). The order has been shipped—it's on a ship in a container. I fear once it gets here it will be illegal and I won't be able to sell it. I can't send it back—it's happened to me before. I need to be able to plan my business better than the current management system allows. Seems like I could at least get a tax credit for merchandise I can no longer sell. I have to assume full liability. [Gear store owner]	Oregon	Fishing-related business
Economic data mainly focuses on the commercial sector, not recreational. We need more recreational data. [Charter boat owner]	Oregon	Recreational
Oregon's economy is a mess and the coastal economy is even worse. If you'd just let us work, we have a lot to contribute. [Fisherman]	Oregon	Commercial
Other fisheries are already being negatively impacted by the groundfish crisis—more pressure in albacore tuna specialty markets for example—only so much room on the shelf and existing businesses are being pushed aside. [Fisherman]	Oregon	Commercial
Groundfish issues are of great concern to crabbers. There already have been impacts. There's now more pressure on the resource and there may be gear and habitat conflicts when we start implementing area closures. We're losing processing capacity. [Commodity commission manager]	Oregon	Processing

Comment	Community impacted (when noted)	Sector (when noted)
What are the community impacts of fish businesses using less water and power? This translates to less income for the city/county. [Processor representative]	Oregon	Community
Fishermen are treated as criminals by NMFS for even small overages. And this on top of everything else! Decriminalize the system and us! [Fisherman]	Oregon	Commercial
The Magnuson Act should be the Sustainable Fishing Community Act. [Fisherman's wife]	Oregon	Community
I'm very concerned about our crumbling infrastructure—once existing support facilities like fueling stations and fish processing plants are gone, environmental rules will make it hard for new ones to come in, even when fishing improves. [Sea Grant marine agent]	Oregon	Community
The local women's shelter is full—families are breaking up - this thing has gone on so long and there are so many uncertainties that it's tearing some families apart. You can imagine how it gets at home when money is tight. [Groundfish Disaster Outreach Program staff]	Oregon	Community
How will NMFS gather community impact data such as business impacts? [GDOP staff]	Oregon	Community
You'd think that all the news about sardines is helping the local [Astoria] fleet—no—no local fishermen have the gear or permits to benefit from the fishery. Much of the benefit from that fishery is going out of state. [GDOP staff]	Astoria, OR	Commercial
[Relayed socioeconomic impacts in his area.] Council needs to rectify these problems	El Granada, CA	Commercial
Thornyheads and sablefish [were] closed this summer—it killed the Newport dory fleet.	Newport, CA	Commercial
Work quickly [on EFPs]; the industry needs help fast.		Commercial
Economics of fishing should be given greater emphasis.	California	Commercial
California recreational fisheries will suffer. Economic [impacts] are underestimated.	California	Recreational
2002: November		
Keep flatfish species in the California halibut fishery. We need every dime we can get.	California	Commercial
Although the Council is primarily concerned with groundfish, and the effect of restrictions in the groundfish fleet, be aware that the West Coast fishery as a whole is experiencing an overall depression. Depressed prices for salmon, shrimp, crab and tuna are adding to the general poor outlook for fisheries. There will be a smaller fleet regardless of what this Council does, and regardless of what happens in groundfish. This proposal [fixed gear permit stacking] will provide some economic relief both to those who choose to leave, and those who choose to stay.	Newport, OR	Commercial
2003: April		
We need real time [observer] data. Need to observe where fishermen fish [now], not where they once fished. Closing down coastal communities. We need economic analyses of port impacts.	California	Community
Consider community effects of rebuilding plans.	[Coastwide organization]	Community
Small trawlers are fighting to survive. If we try to go offshore, there are safety risks.	Neah Bay, WA	Commercial

Comment	Community impacted (when noted)	Sector (when noted)
We urge the Council not to adopt this change to the CCA boundaries…especially when the effects of this kind of change under the MSA must be looked at in a balanced view considering also the social and economic impacts to members of our Association, all of whom are individual family fishermen... We have been eking out market orders by adhering to all of the groundfish conservation measures, but barely. Now, with the proposed changes to the CCA, our last few spot prawn areas would be halved...	Santa Barbara Channel, CA	Commercial
2003: June		
[Change the bocaccio OY.] The Morro Bay economy is down 10% overall. The fishery-dependent industry is really hammered.	Morro Bay	Community
[There has been] economic harm to the southern California sport fishery. It's a disaster. The further north you go, the greater the dependence on rockfish.	Southern California	Recreational
Recreational fishing businesses, particularly landings and bait and tackle operations, do not benefit from the various programs designed to ease impacts of regulations on the commercial fishing community.	Huntington Beach, CA	Recreational
Rockfish fishing regulations over the recent past has been dramatically affecting recreational fishing opportunities in Northern Los Angeles, Ventura, and Santa Barbara counties.	Southern California	Recreational
In 1999, two landings, Hornet Sportfishing and Sea Landing, operated here [Santa Barbara Harbor]. Since then, the former has closed with no subsequent information available. Sea Landing had three sport fishing vessels available throughout the year. Now, it has one with a second available in October and November for offshore fishing... Essentially, Sea Landing had 437 fewer passengers in 2002 than 2001 for the three corresponding months (Oct-Dec).	Santa Barbara County	Recreational
The one landing here [Ventura County] that had three vessels operating from it has closed its doors and no records are available. [A landing in Channel Islands harbor had 25.5% fewer passengers in Oct-Dec 2002 than in 2001]	Ventura County	Recreational
Cisco's Sportfishing Landing has been in business and open 24 [hours] per day since 1964. It is the largest landing in the region… The following points are from a conversation with Marlene Wilcox, owner (Feb. 1, 2003): Lack of passengers most apparent on open party boats; overnight boats not getting out at all; [partial day] boats going light; running a two-for-one program; ... business is off a minimum of 25%; ... "The regulations in place take away any chance of making any money"; is reducing everything to stay alive; payroll has been cut in half...used to stay open 24 hours per day - now only 8-12 hours, which is the minimum necessary to stay in business; has cut all corners and still just falling further and further behind; can't pay bills; "I don't know what else to do."	Channel Islands Harbor	Recreational
Captain Hook's Sportfishing opened in 1998 with a half-million-dollar investment… They enjoyed a 15% growth in 1999 and 2000. The downturn started in 2001, and Debbie reports that financially, her business is down 21% and between 45-55% behind on her original business model for the same time frame. ... There's been steady decline in business since May 2002. If the pattern continues or some form of relief isn't forthcoming, they'll be forced into bankruptcy. They never would have invested in the business if they had known this would happen.	Channel Islands Harbor	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
Port Hueneme Sportfishing reflects the same downturn in business that the others in the area show. The owner reports his November and December 2002, and January 2003, were 50% of what he did the previous year. He also reports that he experienced 50% cancellation of charters for the same three months that had been previously booked, and bookings for 2003 are running 75% behind last year. He can't make his monthly lease payments to the Harbor Department. He used to employ two part-time and two full-time employees. He has now laid everyone off.	Port Hueneme, CA	Recreational
Booking of charters for upcoming year [is] over 20% off from last year, and last year was poor.	Channel Islands Harbor	Recreational
New business is substantially curtailed.	Channel Islands Harbor	Recreational
Between the 20 fm closure and island closures, where am I supposed to fish? Give us out to 30 or 40 fm or buy me out. Give me a long-term, low interest loan to fund my boats' transition to ecotourism and I'll never fish again. Right now I'm in the middle of a county-sponsored engine [and] generator re-power that's costing me $200,000, so I can be eco-emission compliant. I'm doing this because they want me to; it's not required. While I'm doing this, other parts of government are putting me out of business.	Southern California	Recreational
Going into savings to keep business afloat. Saltwater fishing business way off; freshwater helping to keep doors open. Sluggish economy not helping, but fishing restrictions most damaging. [Tackle shop owner]	Southern California	Recreational
As of October 15th, bottom fell out of business. November 2002 did 50% of November 2001. December was OK. Attributes [this] to excellent fishing in Santa Monica Bay that month. Laid off an employee of five years in October (shop had three; now has two). Spent less than 50% of what he spent last year at early season trade shows. Bought store six years ago. Retired to this business and loves it. Now he wants to sell. He can't stand the political uncertainty of future. He feels victimized; has no voice. He feels nobody is really listening. [Interview with tackle shop owner]	Southern California	Recreational
Sales for December 2002 not even 50% of December 2001. Worst December in 42 years of business. November 2002 and January 2003 reflect similar trends. Dealers are scared and pulling in horns. They won't spend now. Historically, the industry depended on the quality of the bite, volume of fish that migrate into the region, water temperatures that controlled how eagerly resident fish bite. Now, the business is dependent on political issues. [Interview with saltwater lure manufacturer]	Southern California	Recreational
Business down 20% overall in 2002 as compared to 2001. Considered moving manufacturing out of state (perhaps to Mexico) to lower costs. Has cut back employees' total hours; they are all part time now. These are all ESL employees who have been with him 4 to 8 years. Historically, Fishtrap Lures has contributed and partaken in every underprivileged kids' fishing trip out there. Is stopping all of this—he can no longer afford it. [Manufacturer of plastic baits]	San Diego	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
My concern is with a small footrope I can harvest 20,000 lbs of beach fish [sand dabs, Petrale, English, sand, and flounder sole], which may sustain the markets until we are able to harvest more, but [is] not enough to operate a fishing vessel on… The only option that I can see is to fish a large footrope, which 99% of the fleet will choose to do and the market for beach fish will go away. And that market will take years to get back and will not be there if or when you ever let us catch the beach fish... I will lose my markets and be forced to fish in an area that will be over fished and unsafe for my boat over a fish I do not catch. I believe this inseason management plan will devastate the trawl industry. Markets will be lost and large numbers of boats will be forced to fish in a small area which compromises the safety of the smaller vessels.	Crescent City	Commercial
We need to know what is happening with the current closure for the west coast groundfish. We are getting killed out here! When you first talked about closing the fishery…you said a two week closure…at the most three weeks. Well, we are on week four now...we still have not heard one word from the Council on how things are progressing. ... Do we all need to declare bankruptcy right now?? The appearance of discrimination against those of us that use small footropes nearshore is looking more and more as a fact. Some of us are not capable of fishing with big gear that can operate outside of 200 fathoms...you need to take that into consideration. As I write this, the large vessels continue to tow away... still making a living... they haven't missed a day of fishing. We (small boats) have been shut down for almost a month now...many of us will soon be in jeopardy of losing assets, like our homes or boats. We have already lost so much with the cable crossing, the Vessel Traffic Lane Change, and other inseason adjustments that we have no reserves left to fall back on. ...	Neah Bay, WA	Commercial
The Council's action or lack thereof [has] real human impact. You are literally killing us off out here. ... PLEASE come up with some different restrictions for us that will still allow us to survive...we want a viable sustainable fishery that we can continue our livelihood into the future...many of us have been fishing our small family boats for generations. But sadly, many of us do not encourage our children to partake of our tradition of being a fisherman...competition and politics have put an end to that dream.	Neah Bay, WA	Commercial
I have been told this OY [June 2003] is not large enough to allow the seasonal upward catch adjustments the fishermen need to take advantage of the good weather and strong market of the summer months. This has created a situation that threatens long established markets and infrastructure up and down the coast... We badly need to have an increase in the black and blue rockfish component of our catch allowances. Without the seasonal increases in these fish, some of the last nearshore markets will be lost along with the infrastructure that supports them. Many fishermen, especially those who fish outside of the areas that can supply the live market, cannot make enough money to support their fishing efforts...	Crescent City	Commercial
The management regime for 2003 virtually ended groundfish fishing by recreational anglers.	Southern California	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
[We] plead the case here [Newport, OR] for expanding some fishing grounds or quotas to the draggers deploying this year, as the value of the fish the quotas allow right now would force our net shop out of business, much less a drag boat. A year from now, if these quotas and closed zones stay in effect, we will have to turn fishermen away for fears of not being paid. Inventories at shoreside services are dwindling and the entire market infrastructure seems ready to collapse...	Newport, OR	Fishing-related business
If we do not get back some grounds or quotas in the next couple of catch periods, I am sure there will be some fishermen dangerously close to losing their ability to survive. Look at the value of the fish that you have left us and go through the economics of running a trawler. It does not add up to viable business.		Commercial
…We are already seeing several party boat operations being sold or forced out of business…many boats and supporting businesses (tackle shops, fuel docks, hotels etc.) depend on rockfish for winter their income. It's not a large part of their annual total but enough to pay their employees, insurance and berthing fees until the more lucrative salmon season opens. We are literally one bad salmon season away from losing most of the party boat operations along the Central coast. In a good salmon season these small businesses can scratch out a living but if the salmon don't show the cost of running a boat and paying its crew becomes impossible. Most at risk are boats and businesses in the smaller ports. Two of the largest party boat operations in Bodega Bay are currently selling out or closing down and more are sure to follow from Ft. Bragg to Bodget Bay. ...A blown motor or other major breakdown can cost upwards of $40,000 and quickly force the owner to sell out or into bankruptcy.	Central California	Recreational
I and others had been able to maintain a sustainable [live fish] fishery as well as keep a successful business—with employees! That was when we were allowed to fish all year (with quotas) and target more than one species. Now, we have been regulated to fish only four months of the year! And the license fees are going up! With more licenses! (Deeper nearshore rockfish - a cruel slap in the face to nearshore fishermen not levied on the sport fishing fleet). This situation is unacceptable to this open access participant... Regulations are putting me out of business, by a conspiracy of anti-fishing management staffing... Something must be done to put the commercial fishing industry back to a common sense, profitable state. ...	San Diego, CA	Commercial
…These current species, area and seasonal limitations will, in a relatively short time, cause the ultimate demise of the sport fishing industry. We have already realized a significant decline in our passenger loads and revenue since the most current stringent closure went into effect, i.e. [the] sculpin closure (March 1). This closure, in conjunction with the ongoing whitefish restriction, the "non-opening" for any species of rockfish and the 20 fm...depth limitation have all contributed to what can only be described as a catastrophic situation for the sport fishing industry in southern California. A lack of catchable species is now being recognized by our attending and prospective customers and their interest and participation is at an all-time low for this time of year.	Balboa, CA	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
…The net result…of the closures has been that the sport fishing industry is now crippled by the limitations of allowable catch which has had a devastating effect on our potential customers' participation in the fishing activity. In other words, people are not going fishing because they can keep next to nothing that they catch! To pay to go fishing is not money well spent since the trips result in something more akin to simply a "boat ride."	Balboa, CA	Recreational
Over the past 50 years of recreational sport fishing, we have been able to offer our customers a variety of species in the winter and spring months. Since migratory species, such as tuna, yellowtail, barracuda, etc., are not in our area during these months we have relied on whitefish, sculpin and rockfish (groundfish) as the mainstay of our trips. Needless to say both winter and spring seasons have been disastrous in terms of participation and catch due to the fact that we are unable to fish for any type of groundfish other than sheephead.	Balboa, CA	Recreational
The demise of recreational sport fishing will also have a severe economic impact on those who derive their livelihood from sport fishing. Those who will be affected directly include boat and landing owners, captains, crewmembers, bait haulers, landing office personnel, etc. The businesses indirectly impacted would be tackle providers, fuel docks, boat maintenance and repair facilities (shipyards), manufacturers of fishing electronic equipment, vessel food and beverage vendors, and the list goes on.	Balboa, CA	Recreational
2003: September		
If trawling is closed for three months, the filleters I have would have to get a new job; the truck drivers would leave, and I'd be out of business. It's that serious and that simple.	California	Processing
If we implement this observer data inseason, it's not only going to shut down the trawl fishery; it's going to take the fixed gear fishery also. In Southern California, with the CCA, RCA, deeper nearshore permit, nearshore permit, marine sanctuary, whatever, we're running out of stuff to do. And we can't afford to lose this fishery... if we implement this data; it's going to kill us.	Southern California	Commercial
Changing the process again, midstream…is taking all these small [trawl] businesses by surprise, and will hurt many coastal communities. …How do us small business owners tell our bankers that our government's inseason adjustment has ruined our business plan for the year? How can any business effectively operate in this kind of environment?...	Coos Bay, OR	Commercial
I think a lot of this…is centered on biology rather than thinking about the fishing community… Fishing, fishermen, and fishing communities are all businesses… Communities should be considered. There are a lot of rural communities out there…that are all hurting. This closure could really impact rural communities, if not devastate them. Socioeconomic and drastic impacts must be considered in this decision. Businesses depend on a yearly revenue cycle to make decisions...an inseason adjustments makes no business sense... I can't fathom making decisions every two weeks in another kind of business...		Commercial
If this season is shut down, the economic effect in Port San Luis, Morro Bay, and San Luis County in general is gonna take a real hit. The only processor in Port San Luis…will be out of business… There are approximately 15 trawl vessels that will be out of business in both ports...	Port San Luis and Morro Bay, CA	Commercial

Comment	Community impacted (when noted)	Sector (when noted)
In terms of some of the economic impacts…In Warrenton, Oregon, last year...in period 6 (the whole period that would be closed under on scenario here) the exvessel gross averaged about $60,000 per vessel for the trawl fleet. There are about 30 vessels fishing in Warrenton, so that comes out to about a $1.8 million impact. And if you use a conservative...multiplier (2.5), that's about a $4.5 million impact on the community of Warrenton.	Warrenton, OR	Commercial
Please consider alternatives to protect fisheries who have taken drastic measures in their commitment to save and conserve fish. These changes create scenarios where fishermen cannot function as a business.	Central California	Commercial
[Only 28 of 545 metric tons of shortspine thornyheads are caught in Washington]. You're now taking somebody who's not creating a problem, and trying to put us out of business. I don't understand…	Neah Bay, WA	Commercial
The effects of a total closure could be pretty devastating to some people, and given the doubts about the science that's being used, I think you need to weight that very carefully.	Fort Bragg, CA	Commercial
… One of my landings, Cisco Sportfishing, is out of business, bankrupt, because of the closure of the rockfish fishery.	Southern California	Recreational
Keep the B platoon; it helps the industry. The trawl industry is on its knees.	Oregon	Commercial
If areas outside of the 50 fm line are closed to recreational anglers, we would not have any opportunity to fish for groundfish [due to unique geology of area.] Recreational angling provides a great economic stimulus for Winchester Bay and the surrounding area. If recreational angling were stopped, we would experience the ripple effect from another loss of fishing species. We experienced this in the 80s and 90s with the closure of coho salmon fishing along the Oregon coast. Many fishing related businesses closed and this area lost all our charter fishing businesses. We currently have only four charter offices providing offshore angling opportunities for our visitors. [Received 2 copies from different people]	Winchester Bay, OR	Recreational
The Port of Siuslaw [Florence, Oregon]…is greatly concerned about any pending recreational groundfish closures outside of the 50 fm line… We do not have any coastal reefs that support groundfish. The closest reefs to Florence are at Heceta Banks thirty miles offshore...Recreational angling provides a great economic stimulus for Florence and the surrounding area. If recreational angling for groundfish were stopped, we would experience the ripple effect from the loss of fishing. We experienced this in the 80s and 90s with the closure of coho salmon fishing on the Oregon coast. Many fishing related businesses closed and we lost all our charter fishing businesses.	Florence, OR	Recreational
2003: November		
Closing the [sanddab fishery] makes it hard to pay for VMS.	California	Commercial
I would catch 30% of what I could if forced out to 200 fm.	California	Commercial
The Quileute Tribe at LaPush, Washington is writing in support of the letter you have received from the City of Forks…Like Forks, our community has been struggling financially for many years. Having the only major recreational harbor for many miles, recreational fishing is extremely important to us as well. ...	LaPush, WA	Tribal

Comment	Community impacted (when noted)	Sector (when noted)
2004: March		
Please don't push me out into 120 fm. It's not going to help the yelloweye, and it's going to be very hard on my economics.	Port Angeles, WA	Commercial
I was talking to our harbor manager, and he says he's facing some revenue cuts. How do fish businesses…[recreational boats], processors, buyers, restaurants, fish markets, how do they function and pay taxes and keep the port working if they're not allowed to catch their allocated OY? How do they do their financial planning? Some folks are considering marketing campaigns [to sell] the fish that are caught—to get the highest value added, and certain marketing campaigns go out—and then all of a sudden the season's closed, and people have spent a great deal in marketing their fish... or in the case of the recreational fishermen, putting out ads for their season...	South/Central California	Commercial
Sport fishermen come to the coast, rent a hotel, eat dinners out, buy tackle at the local shop, get their boat serviced/repaired in town… who supports the local economy more with the least impact on fish stocks???	Oregon coast	Recreational
It seems strange to us that the hardest hit west coast fleet is the only U.S. fleet to have to pay for [VMS]… The state that has the highest unemployment rate, the state with the highest poverty level, the state with the most strict and radical regulations in the world and the state with much less powerful Senators has to pay for the system themselves. We now are forced to fish beside vessels who are using government paid for VMS units while we have to borrow money to pay for them. ...	Coos Bay, OR	Commercial
2004: April		
… It has…come to the attention of Arrowac Fisheries that this depth management fisheries approach may result in the fishing depth restriction being moved to 150 fm perhaps as early as June. This depth restriction will be financially devastating to Arrowac Fisheries Inc., [its] employees...and the fishermen who derive their livelihood from the longline fishery off the coast of Washington. It appears the tradeoff for this devastation of the local economy would be to enable the Council to find additional rockfish bycatch biomass to be allocated to another user group... Arrowac Fisheries depends heavily on the dogfish harvest...moving the depth restriction to 150 fm would virtually eliminate the harvest of dogfish...[we also depend] on the set line blackcod fishery that takes place off the Washington Coast. With a depth restriction of 150 fm...an additional negative economic hardship would be experienced... Most likely Arrowac would see a reduction in blackcod pounds delivered...generating less dollar return and reduced work hours...	Bellingham, WA	Processor
With respect to the blackcod fishery of the Washington coast the real negative economic impact would be borne by the setline fishermen. Moving the depth restriction to 150 fm would result in the harvest of small blackcod, generating an average revenue of about a dollar less per pound...	Bellingham, WA	Processor
… I represent the LaPush Area Recreational fisheries in the North of Falcon and PFMC process. …We are extremely concerned about the lack of regional management…There is no fairness in allowing one state's excessive catch to preclude fishing in the other states. Groundfish fisheries are critically important to our coastal economy and tourism.	Forks, WA	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
Our city has been severely impacted by the decline of the groundfish. … The current system appears to favor other states over Washington.	Ilwaco, WA	Community
…I represent the Ilwaco Charter Association. … We are extremely concerned about the lack of regional management on weak groundfish stocks… Groundfish fisheries are critically important for our coastal economies.	Ilwaco, WA	Recreational
…The 30 vessel owner/operators that are members of our association depend upon groundfish and halibut for a major part of their livelihood. …[A call for regional management]	Westport, WA	Recreational
…I am writing on behalf of Southwest Washington Anglers. … These various fisheries are of extreme economic value to our small coastal communities. [A call for regional management]	Oregon and Washington	Recreational
… The Port of Neah Bay has invested heavily in the newly constructed Makah Marina and additional upland facilities that both support and are reliant on the recreational fisheries. A vibrant groundfish and halibut fishery are critically important to Neah Bay's economy, as it is to other coastal communities relying on recreational fishing to survive. We are extremely concerned about the lack of regional management...	Neah Bay, WA	Recreational
2004: June		
[California recreational fishery] needs a 10 month season to survive. About to lose [my] business.	Southern California	Recreational
This [black rockfish] closure hurts California economically and socially while it does nothing to protect California's environment.	McKinleyville, CA	Recreational
I believe you are completely wrong in recommending the closure of the bottom fishing season with all the implications for people who depend on the sea for their food and income…When you close the seasons as you often recommend, it puts an extreme hardship on businesses and their employees.		General
2004: September		
All over Oregon, our skippers and deckhands depend on the ground fishery to make a living and feed their families. Winter months through early Spring especially, all they were allowed to catch was bottom fish, to carry them through until salmon season starts again. This is the cycle you have put us in. Now you have ruled to take this away from us leaving nothing to make a living with this winter. How can you sleep at night??? ... Your inaccurate estimates are interfering with peoples' lives and should be stopped. We have all worked with you, allowing observers to go out on our boats (no charge) and fish checkers to come down to our privately owned docks, to help them do their job. How and what would they feel and you, yourself, if we say - no more!!! ...Give us back our fishing rights.	Newport, OR	Recreational
As the news of the sports ground fishery closure moves like a storm through Brookings Harbor, numerous individuals have contacted the Port… The impact is being felt already by this community and is expected to multiply extensively in the next few days. Southern Oregon is struggling to create employment opportunities and keep this one key element of the tourism industry alive, which is our recreational fishing industry. This is a blow to our economy that is unexpected and, plainly speaking, should be justified to the general public, as each of our fishermen knows very well that there is a tremendous abundance of groundfish available in this area.	Brookings, OR	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
This [sport groundfish closure] will require that I cancel all my trips and let my customers also cancel all hotel and dinner plans for October and November of 2004. … I will now plan on leaving the northern Oregon coast upon the closure of the 2004 salmon season. ... It is sad that the few commercial interests far outdistance the revenue generated by public visiting and spending tourist dollars in these hard hit local coastal towns.	Sammamish, WA	Recreational
[VMS] will force small vessels with limited income out of the fishery.	Pacific City, OR	Commercial
2004: November		
[Wants specific Petrale areas opened.] Petrale is important to the limited entry trawl sector. [We] may not survive a closure. [My] career is probably over without a Petrale season.		Commercial
The fall Petrale sole fishery has been a valuable economic asset to both the fishermen and processors at a time when both the weather and the late year limits put an economic hardship on the industry. By the current position of the 250 fm line the Petrale fishery has been eliminated. The Petrale fishery has become an established holiday season marketing item for the processors, brokers, wholesalers, restaurants, and grocery stores. We all traditionally look forward to this unique fishery opportunity, over the past years, to sell the best available sole we have to offer our customers and the general public. The loss of income produced by this fishery will not only affect the fishermen, their crews, and processing community, but the coastal communities as well.	Charleston, OR	Processing
…Without proper notice the RCA zone was moved out to 250 fm, which causes a devastating ripple effect within our company. Over the past several months our company has invested approximately $80,000 to develop our new fillet room with the anticipation of Petrale season opening in October of this year. We are a small company just starting out in this business and this has made an enormous impact on our financial situation... Last year during the months of October, November and December we purchased several thousands pounds of Petrale, which made it possible for us to continue doing business by compensating enough income to keep paying wages of our employees. Currently we employ 11 employees...in the fillet room; if we continue to lose the upcoming months of Petrale season this number will dramatically decrease, leaving our employees without jobs. In order to help with Petrale season we also employ additional dock crew [and a supervisor].	Charleston, OR	Processing
Taking away access to Petrale...obviously affects more than just the fishermen. It affects many jobs...and it has already taken a serious toll on our small company... By moving the RCA zone we have also lost access to rex sole, English sole, sanddabs, and shallow water dover, which is a smaller market but still provides income to local families that our company employs.	Charleston, OR	Processing
2005: March		
Since a seven month recreational groundfish season in 2004 did not result in a catch exceeding the target harvest, it is difficult to understand why our fishing season has been reduced to four months in 2005. … Because the reduction in our groundfish season will have a devastating impact on our port and local community, and because we have significant new information indicating the reduced season is neither justified nor needed, the Board of Harbor Commissioners of the	Crescent City, CA	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
Crescent City Harbor District respectfully requests that you open the season for recreational rockfish on May 1 and allow it to remain open until October 31.		
Port Orford fishermen, the Port and the community of Port Orford have long derived economic benefit from groundfish landings from around our area. All are now suffering hardship because of declining stocks and harvest regulations. [Request for TIQC to consider fixed gear vessels and keep Port Orford informed.] We believe any groundfish planning should include all gears and harvesters and provide information to communities and a process for communities to participate in the decision-making that will affect their futures.	Port Orford, OR	Commercial
2005: April		
…Blackcod fishermen will be affected [by VMS requirements]. It's going to be a situation where, according to this economic information, which may or may not be true, there's over a million dollars being brought in by those fishermen in our northern area. I don't believe there's been a multiplier applied to that to tell you what the true value is to our communities; it would be at least three times that much. ...I see the VMS being a much larger economic issue than what is being presented to you...	Crescent City, CA	Commercial
In 2004 the [California] Department of Fish and Game cut our fishing season to seven months, with this shortened season Crescent City and Del Norte County suffered some tourism and revenue losses that year. In 2005 the CDFG cut our season to just four months...with the offshore weather we have here at Crescent City in the summer, the season will be less than [four months]... This is pure and simple economic damage caused by the Federal government to our small community. This county cannot afford to let this continue. ...	Crescent City, CA	Recreational
… I have a lot of friends here in Crescent City that fish the ocean waters, this year they are all taking their business to Brookings, Oregon. As you know, tourism is the largest part of Del Norte County's revenue, this county can not afford to let this continue, Crescent City used to be a destination point, not so these days, every business in Crescent City will lose more revenue this year than they did last year, it will be the same in 2006 with another four month fishing season if they're not stopped...	Crescent City, CA	Recreational
The recent development of the recreational groundfish regulations is of much concern to the City of Crescent City and its residents. As you know, we have a deep and strong interest in both the commercial and sport fishing activities in our area. Any reduction in this season would have a detrimental effect on our economy and way of life.	Crescent City, CA	Community
I am a charter boat owner/operator that operates out of Port Hueneme CA. I am writing to convey the urgency for more groundfish opportunity when you are considering inseason adjustments… I ask the members of the Council to consider the fact that I have been driven to near bankruptcy by the extremely cautious approach you have taken in regard to this so-called groundfish crisis. Me and many others that rely on groundfish to survive have been mentally and financially torched by the MRFS data...	Port Hueneme, CA	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
…I own and operate the Seabiscuit (CPFV) out of Channel Islands Harbor… We have been regulated and pushed into shorter bag limits, depth restrictions; tackle cut backs, and an extremely short rockfish season in 2005. The toll of these regs have pushed many of us to borderline bankruptcy. Many of us depend upon groundfish to survive. We have been crippled by the extremely conservative approach... many of our livelihoods may lie in the balance of the Council's decision...	Channel Islands Harbor, CA	Recreational
2005: June		
[Comments on EFH EIS]: There are many small ports and harbors that have mutually beneficial relationships with fisheries industries, both sport and commercial, within the [EFH EIS] study region. These small craft harbors rely on the fisheries to provide steady jobs and act as an economic engine to keep the community vibrant. In the case of several central California harbors, the past few years of increased regulatory actions have had a drastic negative effect on the ability of the fishing fleets to continue making a profit, which has a direct effect on coastal host community (harbors and marinas). The implementation of yet another...closure will have a great economically adverse effect on these local communities...	Moss Landing, CA	Community
[Comments on EFH EIS]: There is a synergy that occurs which is unmeasurable in terms of cash value that needs to be considered in the development of fishing regulations, including the designation of essential fish habitats on the west coast. The public comes to the ports and harbors and enjoys getting their fresh seafood while watching the boats offload their catch. Without that, these small craft harbors become stagnant and turn into yacht harbors for the rich. The little guys are forced out and the working harbors cease to exist. We have seen this in southern California harbors and hope that that does not happen here. ...	Moss Landing, CA	Community
[Comments on EFH EIS]: There are many small ports and harbors that have a symbiotic relationship with the fisheries industries, both sport and commercial, within the [EFH] EIS study region. These small craft harbors rely on the fisheries to provide steady jobs and act as an economic engine, keeping the community vibrant. In the case of central California harbors, the past few years of increased regulatory actions have had a drastic effect on the ability of the fishing fleets to continue making a profit. This decline, in turn, has had a direct effect on coastal host community (harbors and marinas). The implementation of regulatory closures or restrictions will have a deleterious economic effect on these local coastal communities...	Port San Luis, CA	Community
[Comments on EFH EIS]: There is a synergy that occurs which is unmeasurable in terms of cash value that needs to be considered in the development of fishing regulations, including the designation of essential fish habitats on the west coast. The public visits the ports and harbors and loves to get their fresh seafood while watching the boats offload their catch. Without community interest, these small craft harbors become stagnant and turn into yacht harbors for the wealthy or marine malls selling plastic sharks and T-shirts. The small independent business persons (fishermen) are forced out and the working harbors cease to exist. We have seen this in southern California harbors and hope that that does not happen here. ...	Port San Luis, CA	Community

Comment	Community impacted (when noted)	Sector (when noted)
[Comments on EFH EIS]: Consideration of the buyout program and the unintended effects to the local harbors should be considered and offset with mitigation measures to insure the continued infrastructure is in place, new markets are explored, funding for new shore side fisheries support facilities are provided and the economic synergy is maintained for the shoreside businesses in the local coastal communities.	Port San Luis, CA	Community
[Comments on EFH EIS]: …The extreme weather combined with the extreme and rapid harvest controls have made a large portion of the traditional groundfish fisheries economically unviable for the dominant sport charter fleet and small scale fixed gear rockfish fleet.	Santa Barbara, CA	Commercial
[Comments on EFH EIS]: Status quo here means a continuation of heavy management measures while the resources continue to rebuilding. For the trawl fleet, this has meant: fleet reduction via the buy-back program; prohibited large roller gear use…[other gear restrictions]…forced to carry observers for data collection activities; coerced to operate under "house arrest" with the unfunded mandatory VMS program; forced to develop the RCA and boundary modifications; engaged in collaborative research to help improve the science; current development of ITQ program to reduce discards with industry funding; reduced time on the water by 75 to 80 percent; reduced our earnings by at least 75%.	Coos Bay, OR	Commercial
[Comments on EFH EIS]: The City of Morro Bay treasures its fishing heritage and local commercial fishing fleet that provides fresh seafood for this country in a highly regulated and sustainable environment. Our harbor and its commercial fishing businesses depend on groundfish landings to support the harbor infrastructure, since many of our fishermen are mainly albacore, crab or salmon permittees with actual landings in the ports north of Morro Bay. Our City has suffered from the reductions in groundfish quotas, seasonal restrictions and area closures to the extent that the local groundfish market has almost collapsed and just a few of the traditional shore side support businesses are still hanging on.	Morro Bay, CA	Community
[Comments on EFH EIS]: Currently there are five Class A permittees who operate out of our port… Each Class A permittee generally fishes between 5-8 days to make up their 60 day quota; so on most of the days of the year there is no longer even one deep water complex trawler operating on this two hundred miles of coastline. Yet, the port still does get groundfish, and these are the consistent landings that allow our one remaining full service fish buying dock to keep employees working and pay the bills. The City is dedicated to supporting this remaining fish buying dock...	Morro Bay, CA	Community
[Comments on EFH EIS]: Clearly the policy of subsidizing more and bigger trawlers in the 1970s was a disaster, but just as clearly the resource for 15 years now has been very lightly harvested compared to historic levels. Many of our local restaurants no longer can get local fresh fish and have turned, like most of the country, to frozen fish which is oftentimes harvested in environmentally damaging ways in unregulated countries.	Morro Bay, CA	Community

Comment	Community impacted (when noted)	Sector (when noted)
[Comments on EFH EIS]: In the last two years we have seen some hope as groundfish prices have gone up a little, quotas increased slightly, (but typically not what was promised) due to the Federal buy-back program and Class A permittees have started to see a reasonable economic return for fishing again. We are hopeful that some uncertainty can be relieved for these local businesses and for the City.	Morro Bay, CA	Community
[Comments on EFH EIS]: Improve the outreach to community and fishing businesses by considering an ombudsman program, enhancing your sustainable fisheries outreach effort or some mechanism to empower local fishermen to give input and build trust with NMFS and the environmental community.	Morro Bay, CA	Community
[Comments on EFH EIS]: …Virtually 100% of our commercial fishermen are owner operated small businesses. We don't have the corporate interests that can hire lobbyists… It is tremendously difficult for a small business owner/operator or a small city for that matter to take the time to become informed on these issues, much less to attend the many meetings that are needed to have an impact. Thus are voices are often not heard or we find that decisions are made at meetings we are unable to attend. ... All of the above facts lead to a feeling of lack of empowerment and even distrust of the process...	Morro Bay, CA	Commercial
[Comments on EFH EIS]: Any viable economic analysis of minimization measures should include not only the short-term direct costs of management measures, but also the long-term costs of continued habitat damage, as well as the long-term benefits of habitat protection.	[Organization]	Environmental
[Comments on EFH EIS]: With the array of closures already implemented along the California coastline, a significant concern relates to the cumulative impacts of these closures on the essential infrastructure required to sustain viable commercial "working" fishing ports and harbors along the 1,100 mile coastline of California. ...Which additional layer of no-fishing regulation will cross the threshold of cutbacks to the number of boats required to harvest a sustainable yield from California's ocean resources, the number of buying stations still left in Morro Bay, San Pedro or Santa Barbara Harbors, the number of fish processors and/or retailers that can keep their doors open in order to serve the remaining few fishing boats that still go out? The cultural value of working ports and harbors is measured in both cultural heritage and tourism value: it is common knowledge that what attracts tourist dollars to the Morro Bay or Santa Barbara Harbor is "the quaint fishing boats" that still number in the tens, at least, in each harbor...	Southern California	Commercial
[Comments on EFH EIS]: At some point, an additional regulation will be the last one necessary to remove the infrastructure, more or less permanently (due to the failure of the commercial fishing industry to recruit young people among its numbers), that supports this cultural heritage in California ports and harbors. It behooves the Council to carefully consider whether or not further draconian measures are actually required to effectively protect groundfish EFH, or whether these further measures are, in fact, "the last straw" for fisheries culture and infrastructure in these ports and harbors. ...How much fishing area, how many fishing boats, are necessary to maintain the year-round sustainable infrastructure of buying stations, ice houses, hoists, fish processing plants, wholesalers and retailers, that can provide fresh California seafood to seafood consumers?	Southern California	Commercial

Comment	Community impacted (when noted)	Sector (when noted)
[Comments on EFH EIS]: Closing the [recreational] bottom fishing in the warm months would not impact the industry nearly as bad as closing it in the cold months. The sport fishing landings are suffering, trying to find anything to fish for during the winter months with the closures to bottom fishing. ...	California	Recreational
[Comments on EFH EIS]: In the middle of listening to all the rhetoric regarding the implementation of the [Marine Life Protection Act]…we receive your notice of further attacks on the fishing community. Honestly, does anyone consider that if this continues we will be importing all our fish from disease ridden fish farms, or unregulated fisheries of foreign countries? California has vast resources that are being wasted...Many fishermen are going out of business; there was a 50% reduction in fishermen just in our local Morro Bay community. We lost our local weather buoy and weather station recently with no effort to replace them. I feel the state/feds are too biased towards the environmental community and letting the fishing communities die on the vine. Ten years from now, after the current older fishermen retire, there will not be commercial fishing in California at the rate we are going because it will be economically impossible to survive, but maybe that is what everyone seems to want.	Morro Bay, CA	Commercial
[Comments on EFH EIS]: The economic impact these closures would inflict to the coastal economies will be devastating. The demise of the commercial industries have already made a mark on the coastal community and caused them to focus more efforts on sport fishing. The closures proposed would kill not only the local fishers but also the thousands and thousands of tourists drawn to the area for that very reason…		Community
[Comments on EFH EIS]: … There are not huge numbers of sport fishermen, but the numbers represent a much bigger number of visitors to the coast of Oregon to do other activities. If the fishing is restricted unnecessarily, it will have a large negative impact on the economies of the coastal towns that are already in poor economic condition...	Longview, WA	Recreational
[Comments on EFH EIS]: … Sport fishing has been the lifeblood of many small communities along the Oregon coast and represents a substantial infusion of money to local and the state economy… Please take into account when you consider the current closure proposals that the sport fishing fleet does represent a major influence on the economy and does virtually no harm to the ecology or the fishery.	Portland, OR	Recreational
[Comments on EFH EIS]: In our area, where groundfish are particular important, the fishing industry is already hurting and has been in serious decline for years. Overfishing and the use of bottom trawl nets and other heavy fishing gear have depleted fish stocks and caused much damage to the marine habitats the fish depend on... Effective measures to protect those critical habitats and to regenerate and restore fish populations are essential if commercial fishing is to have a future here along the Pacific Coast. ... We believe that an ecosystem-based management plan that truly protects the long-term health of the marine environment offers the only promise for the future of fishing here on the West Coast, both as an important local industry, and as an essential economic resource for the country as a whole.	Bandon, OR	Commercial

Comment	Community impacted (when noted)	Sector (when noted)
[Comments on EFH EIS]: As a retired marine ecologist, I'm aware that, for decades, protection, even when intended, has fallen victim to more immediate economic pleas from fishermen. Please do protect the habitat of groundfish and manage the resource for the long run. …	Eugene, OR	General
[Comments on EFH EIS]: The fishing heritage of central California's harbors is iconic, inextricably woven into the state's history and culture. Moreover, this heritage is alive today--commercial fishing and working harbors provide significant benefits to society, including fresh seafood, tax revenue, tourist attractions, economic benefits that ripple through coastal communities, and a strong voice for conservation (e.g. opposition to pollution). Commercial fishing in this region has a long and colorful history and creates a culture worth sustaining for its own sake. Some communities have been almost entirely dependent on fishing for generations. But California's fishing heritage is at risk.	Regional organization	General
[Comments on EFH EIS]: Starting in the early 1990s, fishing opportunities for west coast groundfish…have become increasingly constrained as a result of reductions in total allowable catch. Efforts to keep the fishing open year-round resulted in reductions in smaller and smaller trip limits, making it difficult for fishermen to make a living, and for ports to maintain revenues. The establishment of very large areas closed to rockfish fishing resulted in further economic distress. As a result, the working harbors of the central California coast have become fragile - their health linked to declining fish landings and revenues. ...[Presented goals of the Fishing Heritage Group and consensus map of no-trawl zones]	Regional organization	General
The Del Norte County Board of Supervisors has been approached by the near-shore sport fishing community concerning shortened sport fishing seasons ordered by the PFMC. The public expressed frustration and concern regarding the impacts associated with shortened seasons...	Del Norte County, CA	Recreational
Over the last several years most of the hook and line fishermen have gone out of business because restrictive regulations have made fishing in this manner economically unrealistic. …Since one of the mandates of the Magnuson Act is to preserve the economic stability of the industry, I urge you to formulate groundfish regulations which are realistic in providing me, and other fixed gear fishermen, with a meaningful opportunity to engage in our method of fishing.	California	Commercial
2005: September		
When [ODFW] shut down bottom fishing it devastated the Oregon coast economy. Not only was the sport industry affected; restaurants, hotels, gas stations, public sector, police, firemen (because of the tax base) - we lost a lot of money on the Oregon coast because of this. It is heart-wrenching, because there were people on the Oregon coast who... lost their families, who lost their businesses. There were businesses reported losing $1400 per week... that had a devastating affect on our tax bases... so, dealing with that was horrifying, when the general public was told that they were not allowed to go out and fish to provide food for their families... We shouldn't let the guessing game [of counting fish] [cause] economic damages to the community or destroy families.	Toledo, OR	Recreational
…At least one week [of fishing] would have made sure they had… electricity, heating oil, stuff like to that to get them through the winter, pay their rent… their basic needs and their basic local taxes… it does have a tremendous effect all the way around.	Toledo, OR	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
Fort Bragg is one of the major DTL ports. Our concern has been with the increased fuel cost, it's considerably more beneficial to us to have higher daily and weekly limits on the sablefish… [With the lower limits and higher fuel costs,] it doesn't leave a lot of money left.	Fort Bragg, CA	Commercial
[Re: black rockfish]. What happened in Oregon, just before Labor Day, all groundfish fishing was stopped. That had a tremendous economic impact on my community, but… it had a very large psychological impact on my community. It was kind of like a kick in the face...all these people from all over the country who had plans to come to the Oregon coast to go fishing, to spend their money, those plans were stopped with 72 hour notice [or less]... And then again this year, [black rockfish was closed in October]. This is not a very safe thing for some of these sports fishermen [who may be tempted to go further out into unsafe waters]... I'm here to beg the [Council] to explore ways of increasing the ABC/OY for black rockfish in Oregon and California. ...	Garibaldi, OR	Processor
The PFMC management style over the last few years has been off and on again more than I can count. This tears families apart, making it impossible to hire, train, and keep good employees, not to mention maintaining boats, trucks, fishing gear, and montages [sic]. It also tears at the social fabric of coastal communities, ports, fuel docks, suppliers, banks, and restaurants and other support industries, and the employees and families of those businesses. ...	Brookings-Harbor, OR	Commercial
The decision of NMFS last year to cut off groundfish days before Labor Day, the largest tourist day on our coastline, was devastating. Over $529,000 was lost to Garibaldi alone. This kind of timing decisions are truly uncalled for and are based on speculation at best. As a Port commissioner to Garibaldi, it is difficult to see the economic impact on an already struggling portal city. Council members demand the facts, review the economic impact—lives are at stake.	Garibaldi, OR	Processor
[In regard to sport canary and black rockfish regulations] - Please consider the economic effects you impose on our communities before you make any more mistakes.	Garibaldi, OR	Recreational
We are northwest fishermen that have been severely affected by your recent change in the bottomfishing quotas. You have hurt us financially, putting our boats (three) into dry dock because of the low quotas. Someone is not properly assessing the fish stocks which we have complained of on numerous occasions...several times we've offered our services to show you fellows the multiple fish schools out there with no response... we feel it's not financially [beneficial] to sit around all summer to catch our few...quotas you've allowed us. You've made us ready to quit and sell our boats than to keep our profession of [fishing].	Garibaldi, OR	Commercial
My wife and I have been hook and line fishing commercially for over the past 11 years, for black rockfish. We fish out of Garibaldi, Oregon. We do this primarily to supplement our social security.	Garibaldi, OR	Commercial
2005: November		
In past years we've created laws to protect the fishing fleet and industry. The reality today is that it's now slowly eliminating the small fisherman… Fishing areas are not being regulated evenly. The scientific data is wrong.	Garibaldi, OR	Processor

Comment	Community impacted (when noted)	Sector (when noted)
2006: March		
I'd like to give support for the stepped-down approach concerning yelloweye rockfish… Buy adopting this approach, we can spare possibly complete closures off the Washington coast and Oregon [in the halibut, bottomfish and salmon recreational fisheries].... The Washington coast recreational halibut fishery…is [worth] at least $1.6 million…	Westport, WA	Recreational
2006: April		
The 9th Circuit case reaffirms the Magnuson Act requirements to rebuild depleted species as quickly as possible… That language doesn't mean that the Council and NMFS should balance biological and economic needs; on the contrary, the decision reaffirms earlier ones in holding that… "the purpose of the act is clearly to give conservation of fish priority over short-term economic issues." …Without immediate efforts to rebuild, the long term survival of fishing communities is in doubt. The court also affirmed that Congress wanted to leave leeway to allow fishing on healthy stocks and avoid disastrous short term effects…	National organization	Environmental
We realize it is critical to rebuild the overfished stocks; it is also critical that we don't precipitate economic disaster. If the OYs are overly restrictive, the negative economic consequences could occur in the tens of millions of dollars. Many coastal communities are struggling now. An economic impact of this magnitude would create a depression in some areas. Lastly, the Council management teams and industry have crafted innovative and creative management tools in the last few years. Let us use those tools now to find solutions that avoid economic tragedy.	Coastwide organization	Processing
…If the [canary rockfish] OY was lowered to 44 metric tons, there's a very real possibility that the trawl survey could potentially shut down the shelf, severely impacting our coastal communities. … With the recreational and commercial salmon fishery all but gone this year, and the Dungeness crab landings tapering off, our coastal communities will be depending on groundfish more than ever... Curtailment of the groundfish fishery not only has a negative short term impact; there's a long-term effect as well... Ask any processor how it is to buy back into the market when farm-raised products and imports have taken the place of our products. These interruptions in product flow almost always result in lower exvessel prices to the fleet, and are detrimental to the entire coastal supply chain… With respect to the health of our coastal communities, I believe that while we are still alive, we are far from healthy. While the cuts each year have been necessary, they have been extremely onerous. Each year the fleet has left millions of dollars of healthy species in the water due to the constraints of overfished species…	Oregon	Commercial
I think the rampdown is a very sensible way to … avoid unnecessary impacts on small businesses. In the north where yelloweye impacts are the greatest, most open access and recreational businesses are small businesses, and they are the ones that are going to be impacted … the most. They're more susceptible to quick economic downturns, due to smaller profit margins… and they have smaller reserves. … Due to past reductions, most small business fisheries have been at or near the tipping point—that's the point where you're not making enough profit to be able to justify your effort…and I think a rampdown might even be	Crescent City, CA	Commercial

Comment	Community impacted (when noted)	Sector (when noted)
a way to allow some fishermen to plan their exit from the fishery… giving someone a few years to plan his exit is a way to keep him from just facing a disastrous event all at once… [Quoted from "Trends in Fishing and Seafood Processing-Related Establishments and Employment in West Coast Fishing Communities," pp. 11, 15; noted that the five most dependent communities were all on the northern California and Oregon coast.] This is the area which is going to be hit hardest. This is the area where ports and people are more dependent on rock cod than other fisheries… We don't have a lot of other industries besides our ports.		
The fishing community is basically on life support… As you make your decisions today, think about how the fishing community is being impacted. …Specifically, each metric ton that you allow the nearshore minor south to take… that's a lot of money. Considering what's going on with the salmon… these folks, all of us, are basically on life support. You're talking about short term needs—we need these fish…	Morro Bay area, CA	Commercial
We are continuing to work with state and Federal agencies to quantify the socioeconomic impacts of changes to the groundfish fishery on our community. The use of 12-13 metric tons of yelloweye for 2007-2008 would put and end, pretty much, to the positive changes we're making, and we think a minor disruption in the time to rebuild caused by a phase-in is far preferable to the major economic disruption caused by a drastic cut. We need the flexibility in the phase-in to continue what we've been doing.	Westport, WA	Recreational
If we do start out at 12.0 or 12.6 metric tons, instead of the phased in, stepped down approach, it will close our halibut fishery in the ocean, and that would be devastating, it would be a disaster. So we have to support the stepped down approach.	Neah Bay, WA	Recreational
Even with or without a normal salmon season, we need our rockfish. If we reach the ABC/OY and have an early closure of any sort at all, we'll have economic effects that will be staggering to the CPFV fleet. Many, many businesses will close; families will be torn apart. In one month alone, October for example, if [it's] closed in the north central, it'll cost a minimum of $2 million in just lost fares alone on the CPFV boats. … Every pound of fish not accessible can be directly translated into lost dollars. Alternative 4 will not hurt the fishery or the resource, but it will help to support those who make their living in the nearshore [fishery], by helping to give us as long a season as possible to avoid economic disaster.	Northern California	Recreational
… Adopt the highest OYs possible; anything less represents an economic hardship that really would be excruciating, so much so it would cause myself and others to be on the brink of, if not already have, filed bankruptcy, especially in light of the salmon situation… This is a burden that's going to be too big for a lot of us to bear, and we're all going to end up… facing losing a business and a livelihood that I have been in for virtually all of my life. I'm not young; for me to go do something else at this time of my life is getting to be pretty hard…		Recreational
[To evaluate socioeconomic impacts, we need baselines for measuring these changes. Referred to Moss Landing harbor report by Dr. Carrie Pomeroy & Dr. Mike Dalton as a good example of baseline information.]		Commercial

Comment	Community impacted (when noted)	Sector (when noted)
[Supports stepped down yelloweye plan]. At the 12 metric ton level, we determine that in the Oregon recreational [fishery] that the season would be so short that dramatic, catastrophic monetary losses would occur. ...I would hope that the economic numbers could move up on the priority list, because of some of these conditions that are actually not even the fault of fishermen.	Oregon	Recreational
2006: June		
We [fixed gear limited entry] support the phase in of the yelloweye rampdown system. If we took a 50% reduction in yelloweye it would be reasonably disastrous to the sablefish fishery… There are 164 fixed gear limited entry permits, and they harvest that fish on about 90 vessels, so…of those 90 vessels, if you assume about four crewmen on average, you're talking about 360 people or possibly 360 families that are a part of this fishery, and the fixed gear portion of the sablefish fishery is about a $19,000,000 fishery to this coast, and when you expand that out to its impact on the communities, you're talking about $57 million. So the fixed gear sablefish fishery is…very important to those people that are involved; we obviously don't want to see it go away...	Seattle, WA	Commercial
We [trawlers] support all the recommendations the GAP has presented today, because the industry cannot take another economic hit and expect to survive the long term, and for many of us it's getting to be the short term we're not going to be able to survive. The effects of downsizing from the initial disaster declaration are still surfacing as ice plants are closing and other infrastructures are disappearing from our ports. Waterfront properties that used to house supportive industries to fishing are converting to condos… It is utmost important for our association boats to have a Petrale season in November and December; if not I know some of my boats are going to be sold or go into bankruptcy...	Coos Bay, OR	Commercial
…The high cost of fuel is having a huge negative impact on the number of passengers we carry. We're having excellent fishing right now in southern California, and often the boats are struggling to get even half loads, and we believe that part of that problem is that the cost of gas is turning people away, so we need to have as much opportunity for fishing to bring these people as we can…	Southern California	Recreational
I [trawl representative] believe that setting an OY on darkblotched at anything less than 330 mt would needlessly shut down or constrain the harvest of other healthy species prematurely, and that would have disastrous short-term consequences on our coastal fishing communities…The reality of the situation is that there's a very good chance that darkblotched, bocaccio and widow rockfish will all be declared rebuilt after next year's stock assessments, and we'll be standing here before you wondering why you didn't give the fishing communities the flexibility today that they so desperately need for the upcoming 2007-2008 seasons. [Q: Are fishing community needs being met today under current OY levels?] A: No. We're being shut down [frequently]… It's really upsetting the product flow; the processors have a hard time getting back in the market when they can't produce fish the last couple months of the season…	Oregon	Commercial

Comment	Community impacted (when noted)	Sector (when noted)
When you're considering OYs for 2007-2008, you need to take into consideration the effects on the coastal communities—and the plants, and the fishermen. In Fort Bragg we're close to losing our ice plant. It's the only one within a 200 mile radius. There's no salmon; could have more cuts on groundfish; I don't know how they're going to survive—how the boats are going to survive with no ice. And just last night the Port of Crescent City, which I believe is almost bankrupt, they're considering taxing the processors for all fish and crabs landed, just to stay afloat. On top of our rent that we're paying. We're in a crisis situation. I think all the cuts that we've had through the many years since 2000 are finally starting to hit… I think people and businesses to start going under. In Fort Bragg we've lost our chilipepper fishery due to bocaccio. Now we're losing our slope rockfish because of darkblotched. This year we've caught six tons of darkblotched below 40°10', and now we're going to be pushed out to 250 fm. We're gonna leave 90% of the rest of the slope rockfish on the table. And that's a big hit for the boats. I mean, we've been doing it every year, but this year it's a lot worse… [Re market effects:] If all's you have is Dover, you need a variety of fish to sell the Dover… You just can't sell one product. Canada, they have a lot more rockfish, they have a different program; they just beat us up because they'll have rockfish and Dover and they'll get the orders because they have a variety. And we'll lose the markets, and then they get back in… There was another processor [in the late 1990s] in Fort Bragg that's no longer there; now we're the only one that processes groundfish. There were several gear stores; we're down to one. We've only had one ice plant, we've only had one fuel dock, and I don't know how that fuel dock is staying open…	Fort Bragg, CA	Processor
[Re whiting fishery:] The biological information [about increasing rockfish numbers] is new and untested and uncertain, and thus you're compelled to act cautiously. However, what is certain are the impacts to commercial and recreational fisheries if your actions are extreme. … Most of us see the need to sustain fishing communities today. So as you act to set harvest levels, do use caution, but please also use reason.	Coastwide organization	Commercial
As for dogfish, anything other than the status quo or the rampdown strategy would eliminate the [fixed gear] fishery. There are six boats during an average season…; each has three or four people attached to it; the fish plant has 40 full time employees; the trading company in Seattle has ten full time employees; if we were to lose our market, which took 30 years to develop…that market would be gone. People have been talking about infrastructure falling apart; well, that would be the case with this dog fishery. It also affects several Puget Sound fishermen who fish dogfish in Puget Sound, and several Canadian boats that deliver…	Northern WA	Commercial
In 1998 we had eight boats, 12 people working for us; at the present time we have four. We've sold five of our boats. We are, every year, struggling just to make enough for the skippers to keep going. The business itself is losing money each year. Our customer base has gone to nothing based on fathoms, restricted time... We can't depend upon salmon, we can't depend upon tuna, we're pretty much a rockfish	Monterey, CA	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
oriented community. We had approximately 22 boats in the Monterey Bay area in 1998; we're down to eight, and my understanding today is that one of those is being sold now. It's very tough and economically devastating. We would like to stay in business; we've been there 57 years; we'd love to continue. We'd love your help.		
Reducing the OY to 12.6 metric tons is a disaster that we do not deserve to receive. We will be facing a total loss of the north coast recreational halibut fishery. The businesses that supply, support, transport, and process this fishery will fail... The hard-line approach, even if it lasts 2-4 years, will take decades to recover from. Nobody jumps back into an area that's failed right away, so you lose what makes these communities special. The cutbacks on other fisheries, groundfish and salmon, that would occur to avoid yelloweye, cumulatively will not leave enough to survive on for these communities. Private recreational effort will also fail due to the lack of infrastructure; every commercial on the Washington coast will suffer somehow… We need the rampdown alternative to survive, to adjust, to improve education, and to look not at what we might lose in the long term, but what we can gain from having the fisheries survive. The Westport fleet, since the 1970s, has gone from 300+ vessels down to 31.	Westport, WA	Recreational
Rebuilding quickly is a matter of law but it's also a matter of economics. A recent University of British Columbia study shows that rebuilt populations are worth 3-5 times more in terms of exvessel revenue and recreational value than they're worth in their current depleted state. The Ninth Circuit also reaffirmed several earlier decisions concluding that the purpose of the SFA is clearly to give conservation of fish priority over short-term economic interests. In addition, the court reaffirmed that Congress wanted to leave leeway to allow fishing on healthy populations to avoid disastrous short term impacts. The example the court gave of disastrous effects is an absolute ban on the mortality of rebuilding species. I just want to assure you that NRDC is not suggesting complete moratorium on groundfish or on all mortality of overfished species… we think that preferred low alternative meets the requirements of the SFA and of the ninth circuit…	National organization	Environmental
My family's been in business since the early 1930s. Our fleet once consisted of as many as 14 charter boats, and now we have one charter boat. In the late 1990s there were approximately 20 Coast Guard-certified commercial passenger fishing boats in the Monterey Bay area, and now there are seven. And one of those is for sale. In fact, I'm sure there are others who would sell just to keep from losing their collective shirts… It is a full time job to keep up on all the stuff the lawmakers and number crunchers can come up with… If it were not for the canaries and yelloweye and bocaccio, we might still have a 12-month season without depth restrictions… On our boats in our area, canaries and yelloweye have always been a very small percentage of our catch… Our industry will not survive without a longer season and depth limit. I ask that the option that provides for the most liberal of seasons and depth restrictions be adopted.	Santa Cruz, CA	Recreational
Anything less than high OYs or Alternative 3 will devastate ports and counties that are at high risk north of Point Conception, not to mention all of the state.. Alternative numbers 1, 2 and 3 are all less than the status quo, and less than the 2000 year threshold. Even at status quo, the OYs of the charterboat fleet and groundfish trips have been	San Francisco area	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
shrinking at an alarming rate. Just in '04 and '05, charter trips north of Conception decreased by 40%... Four landings are no longer in business either… In Half Moon Bay, where I'm out of, 16 charter boats shrank to seven, with most hardly working. One works full time… Captain John's [bait shop] was a pioneer in our area…I think he was in business for 50+ years, and because of the… regulations his fleet went down to… well, when the shop was sold he had two boats, one of which was working. [Before that he had 8 or more.]		
Between Santa Barbara, on the south, and Monterey on the north, which is about 1/5th of the coastline of California, there are only two sport fishing landings. And only two harbors. The owners of those landings … have told me that if you pick any option other than the high option, they will be out of business next year. They have put up personal money to get through this year... these businesses I'm telling you about, if you don't pick the high option, will not survive, and they will go extinct. And they're human beings, and this is the type of disastrous economic impact that the Ninth District was talking about. …I noticed [NRDC/the Ocean Conservancy] talked about speedy recovery, but didn't address the mandate by the court to avoid disastrous short-term consequences for fishing communities. We implore you to pick the only option that's going to save these businesses and not have this disastrous consequence – the high option. They've been selling [their boats] off as fast as they can. And when they go extinct, it's a vacuum. Nobody's going to replace them. Nobody'd be dumb enough to buy or start a sportfishing landing in this state, not with the current economic climate…	California (central coast)	Recreational and commercial
[Support Option 3 and GAP recommendations.] I can no longer operate at a profit. I'm gambling my home, my health, on a possible future when I can. It seems that every time we've been asked to sacrifice, we've stepped up and swallowed this bitter pill. When we do, we work within the new parameters and stay below the harvest rates, and we are rewarded with yet another cut… There's been a tremendous reduction in the [recreational fishery's] ability to fish... In our own harbor, [Half Moon Bay area], we've gone from 16 boats down to seven, of which several are only part time… The decline of public fishing can be shown through the number of fishing licenses sold in the state, and their decline. They've gone from 2.2 million in 1976 to an estimated 1 million in 2006. This does not even include one-day licenses and their declines, because these would represent a lot of our customers on the CPFVs. Our region, north central, has taken some of the largest cuts since the collapse of groundfish. Our area has shown that we can work within the limits of the canaries, but to what sacrifice? We need to be able to fish in deeper water to relieve the pressure on the nearshore stocks… Please give us the best opportunity to survive this depression so we can return to a better time in our lives where we can at least start having a profit, or even just breaking even... From 2000 to now… I can see where our overall harbor, our business is down a good 60-65%. Maybe more.	Half Moon Bay, CA	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
I believe we're at the tipping point. If you're going to do something about coastal communities, you should be doing it now. I have for you an example from Crescent City. I'm sure you're all aware of what happens when derelict boats are left in harbors… they're put off to the side of the harbor where they sit. They're probably not maintained; maybe they're not washed; they sink. … In the last year, we've had three sinkings. The first two, which were [last fall], they were raised; they were cleaned up; the tab is roughly $40,000… when the last boat sank… that boat is still to this day sitting on the bottom of Crescent City harbor. The harbor is not capable of taking that boat off the bottom and floating it. We don't have the funds any longer. The crane that we used to have that sat on a barge was sold at auction last summer. It's gone. The men that we had that knew how to handle that crane… those people retired and they were not replaced… This is what's happening in our port right now… we're at the tipping point. We need relief, because we've done all we can to stay afloat and to take further cuts simply means we are going to be at the end of our rope. We have two hoists that are not being used…they were all used in 2000. The number of boats using the fuel dock is down dramatically [since 2000]. … Prior to 2000, say 1998, we had three processors that processed right there. At one point we had none, now we have one who's cooking crab. The harbor spent almost a million dollars to build a water treatment plant…the plant is not being used. They had planned for that plant to be paid for by the processor which left… Beyond that, how we have an ice plant at the harbor is beyond me… [The economic momentum] is slowly slowing down. … The harbor is going to put out 40 slips [for recreational fishers] this year. In 1998 they put out almost 300 slips… Crescent city saw one of the greatest reductions in its drag fleet through the buyback, and I understand that of the two boats that are left, one of them is broken, and…they have no reason to hurry to repair it… We've done the consolidation we can do… the few that are left are the ones hanging on, and a lot of them took out loans, as I did, to be where we are. And we expected to at least be able to make some kind of payback on that equity. Just in the last couple of years I've been able to do some of that, but that will end if you do the lower cuts that you're talking about.	Crescent City, CA	Commercial
[Endorsed GAP statement and high OYs]… The high OY is barely subsistence level. The low OY is a bankruptcy OY. The difference between the high OY and the low OY in canary is basically a rebuilding of three years…it's so far in the future, why put us out of business in the meantime? We have approximately 67 fishermen still participating in the nearshore fishery in the Avila/Morro Bay area… In 1997 we had 300; in 2000 we had 120… Our fishermen provide live fish to the live fish restaurants in San Francisco and Los Angeles… Lately, though, because we haven't been able to provide enough fish, there are now Mexican fish coming in… Social consequences: my port, in the last five years we've had two suicides out of 100 fishermen; that's 2%. I've known both of those people personally. One specifically said "I can't fish." Well, the next thing, let's pull the trigger. I couldn't believe it when I heard it, but I did hear it. Where do you want us to fish, Highway 101? You have to choose a high alternative…	Morro Bay/Avila, CA	Commercial

Comment	Community impacted (when noted)	Sector (when noted)
I wish to speak to something that I keep hearing from various people around fishery management about "no matter what the constraints are, the fishermen always seem to find a way to make it work." Well, I'd like to take issue with what "making it work" means, and so I've developed an analogy that would explain how a lot of fish harvesters see "making it work" and what it really is…. [Used analogy to describe process of Federal government taking away more and more fishing opportunities, and thinking that fishermen are "making it work" despite increasingly negative effects.]	Oregon	Recreational
Part of the problem with us [Washington trollers] doing anything is we're being told that we're statically not at a high enough level to affect the model, so we're not sure what we can do. I think everybody knows from March and April the troll fleet is down significantly; how do you get that in the model? We don't know; we're not statistically significant…	Washington	Commercial
[Support GAP statement.] Seems that when you don't believe things can get worse, they can. If the lower preferred OYs are adopted, the consequences could be severe enough to topple our industry. We are dependent on commercial fishermen. The lower preferred OYs could well be the last nail in the coffin-building process. The court wanted to "leave some leeway to avoid disastrous short-term consequences for the fishing communities." We've already been declared a disaster. Now there's a basement level? ... The GAP proposal will keep us at the disaster level. Anything less merely sets the stage and the time as to when we reach the end of the plank.	Coastwide business	Processing
[Maintain current CCA boundaries. Be cautious due to lack of data about cowcod. Changing the boundaries could undermine research and monitoring. No surveys have been done in areas to be opened. CCA affects more than just cowcod.]	National organization	Environmental
[We own the ice plant in Crescent City.] Since the buyback I can't sell enough ice to support a snow cone machine, but we do so in order to have infrastructure in Crescent City. It's the only ice that's available there; otherwise we truck it in from Brookings, which is also going broke… so industry is supporting its own infrastructure; we're in a situation now where getting rid of our seafood waste…is becoming a major issue, because those people can no longer sustain their businesses… Anything less than the GAP proposal is going to send us into some serious reconsideration of our businesses up and down the coast. In 2000 there were a couple more major processors actually buying in the port [of Eureka]; there was another processing facility, a successful ice house and cold storage; today… Caito is processing crab, but Eureka Fisheries is gone, the ice house is still in operation but if they were solely dependent on being an ice house they probably would not survive as well… We also had on-site local rendering companies that have gone out of business, so now we are forced to put our product on trucks to Modesto or Crescent City…[it's very expensive.] There are around 20 draggers left in port. I couldn't tell you how many salmon fishermen are left, 'cause nobody salmon fishes there anymore… there's probably 20 hook and line vessels there, and there's still a very healthy crab fleet, but most of the crab fleet is combination	Coastwide business	Processing

Comment	Community impacted (when noted)	Sector (when noted)
boats – drag fishermen and crabbers or shrimper/crabbers or longline/crabbers. Everybody has to do as much as they possibly can with their vessels to survive.		
You've got a choice between alternatives that make no difference to rebuilding time… and yet at the same time overlaid on that is the difference between economic disaster, or leaving things where they are, or a little bit better in terms of the economy… You're gonna make a choice that causes an already-declared disaster fishing [to get] worse for no benefit to the stocks? I don't think so… I was down at the dock in Brookings the other day; we used to have three buildings there that processed fish. They're all gone… The fish company in Port Orford's gone. …Some years ago Hans Radtke did some rollover values from the fish on the coast… And what they found was that fish that was processed in a community where it was caught had a rollover value of about three times the exvessel value. If it was taken out buy a buying station, taken somewhere else for processing, it was about equal to the exvessel value. So for Curry County, which doesn't have any processing anymore, even if we had the same dollars coming in, we've seen a reduction of the impact to the community by two-thirds… Infrastructure—I am part owner of an ice plant in Brookings…the ice plant in Charleston closed last week. You heard about Crescent City, Eureka, Fort Bragg. We're thinking about closing. We don't really want to; if we close…it probably doesn't open again, and the infrastructure at Brookings is gone… We have to keep subsidizing that plant just to keep it going… You mentioned the fuel dock. The fuel dock closed when the last processing plant closed. So the port started their own fuel dock…so that the recreational fishermen could get fuel… Trawlers can't afford to pay the prices that the port is charging, so we get it trucked down… [Also] Brookings is a retirement community. Gold Beach is a retirement community. We have the highest average age of any place in Oregon. And the major reason that people move to that area is because…you get to go fishing. Or used to… But they're not too gloomy yet because they have groundfish… But frankly if you don't have fishing there, there's a whole lot of people with no reason to live there. It changes the nature of that community. And that's an impact that I don't think people quantify.	Brookings, OR	Commercial
[Fishing communities] need to do more than just get by, by just making our boat payment, by just making our fuel dock payment, our crew expense. We need to do better than just merely exist. We've been doing this for a long time. When I first started participating in this process I heard over and over "best available science." Now I hear "Ninth District Court of Appeals" or "threat of litigation." I want to have faith in this process, but if certain overfished stocks are getting close to being rebuilt, I feel litigation or some other obstacle will get in the way of best available science. Our industry has made huge sacrifices, including large area closures, reduced bag limits, depth restrictions, and early season closures. Once again I'm asking for the support of action alternative 3… In closing I can only hope this process is a due process, and that we are truly looking toward the needs of fishing communities, as well as rebuilding stocks in the fastest possible time.	Long Beach, CA	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
Status quo doesn't cut it for us… we're constrained with a 60 fm line now… our critters hang in a lot deeper water down [in California]. If we lower it down to 40 fm, I'm toast – I'm taking a 37 grand hit, and I can't make it up on the slope… Danny's guys are gonna be nailed. They're gonna be toast. We start talking about cutting this thing down, we're gonna be impacted. If we get moved into shallow water, we're in deep trouble… keep that in mind please.	Long Beach, CA	Recreational
It seems like the walls are closing in on us on recreational fishing. As early as January 2007 we're gonna implement new closures under the MLPA in central California, and that might close as much as…40% of the hard bottom in that region, and that's definitely not gonna be improving our take of rockfish… We're under some extreme restrictions already, and we need a little more living room.	California (coastwide organization)	Recreational
There are extended effects that we were unable to show in our GAP report, for instance the effects [of cutbacks] in the groundfish fishery where we already have lost boats in the central California area… I know just speaking from the Moss Landing perspective that we will not be able to get dredging funds losing our vessels like this. Two-thirds of our 50' vessels slips are empty now. If we fall below 30% they will not be able to get the $200,000 to dredge those harbors, and those boats will not be able to get in to function in any fishery. There is a necessity to maintain levels of bocaccio, canaries and widows south of 40°10' because they will be the most constraining to the nearshore fishermen… Over the last few years we've lost four processors in Moss Landing alone…who all sold to San Francisco and San Jose buyers. Now they're buying foreign fish. The fuel dock is up for sale... I know there was, over a 10 year period, 50% of our fleet lost.	Moss Landing, CA	Commercial
It's hard to switch jobs, especially when you're doing what you love… I am literally losing sleep at night trying to figure out how to get across to NMFS, the Council, how important these OYs are. It's really, really important. We have given you everything that you've asked for…creating a record…detailing out the impacts… Offering the high OYs, maintaining status quo, isn't meeting the needs of fishing communities, but at least you're recognizing them or taking them into consideration… I'm imploring you to go with the GAP recommendations… [Newport] has changed a lot. Newport is fairly diversified, and it's still suffering, and that's what worries me about other communities. Newport Fishermen's Wives' Association is one of the only wives' associations that's left…we support fishing families who are going through hard times… and what we've seen more and more is people needing counseling… just on the bay front alone, you know the processors consolidated; some of the smaller businesses have gone away; we've had boats that have been involved in accidents… it's hard, but I'm actually more worried about other communities than I am Newport. We're suffering, but not as much as some of the other [communities].	Newport, OR	Community
In 2001 there were about 12 groundfish boats fishing slope rockfish in the CCA. When the CCA was enacted, six of them went out of business; six others were multiple fishery boats that had permits for other fisheries, and were able to survive…. There's not much of a fleet left.	Monterey Bay area, CA	Commercial

Comment	Community impacted (when noted)	Sector (when noted)
With the salmon season problems with the Klamath River, a total closure for the Fort Bragg region is a real possibility next year. …They want a guaranteed fishing season in June, whether it be salmon or rockfish. There's no guarantee for salmon, so they opted for a June opener for the rockfish. June, July and August—that's their tourist season. That's when that area of the north central makes their money. That's when they make their living and feed their families…	Fort Bragg, CA	Recreational
Our area, which is known as the North Central region, has been the most severely restricted during this whole collapse of the groundfish fisheries. We are now seeing some of these restrictions starting to pay off with increases…Give our region the month of June…this would give our area more opportunities.	Half Moon Bay, CA	Recreational
[Support phased-in yelloweye (YE) approach]. Over the past six years our fleet in Westport has reduced its yelloweye mortality [by 85%]. This has been accomplished through both regulations and avoidance of areas that are prone to YE encounters. Although further reductions are possible, the social and economic cost becomes quite large. We would lose access to the more abundant species that our livelihoods depend upon. [Support regional management of YE].	Westport, WA	Recreational
It is time somebody stands up for the fishermen whose livelihoods have been so negatively impacted by this overreaching and unnecessary [CCA] closure. Please support changing the outer boundary of the entire CCA to 175 fm.	Southern California	Recreational
[Support modifying the CCA boundaries.] This action is constant with the PFMC Strategic Groundfish Plan and will provide need[ed] economic relief to our local groundfish fishery and fishing infrastructure.	Santa Barbara area, CA	Commercial
[The Ninth Circuit Court example of "disastrous short-term consequences"] is a total moratorium on all fishing due to an absolute ban on any bycatch of overfished species. NRDC is not suggesting that a complete moratorium on groundfish fishing is a feasible or desirable outcome. The Council seems to be interpreting very broadly what economic 'leeway' it is permitted to take in extending the lengths of rebuilding plans beyond Tmin… What is clear…is that the short-term economic needs of an individual fishing community do not constitute the broad type of "disastrous short-term economic consequences" described by the Court. Taking into account the short-term needs of fishing communities by providing some economic leeway in rebuilding times and mortality levels does not mean that needs of a particular fishing community that is highly dependent on one or more overfished species can trump the requirement to rebuild as quickly as possible. The economic analysis must factor in the long and short-term economic needs of the entire fishery, and even then, cannot prioritize those needs over the clear priority given to conservation in the Magnuson-Stevens Act… A potential use for the results of the analysis—to balance, or arguably prioritize, the needs of the fishing communities over the need to rebuild as soon as possible—conflicts with the Council's own interpretation of the Ninth Circuit's opinion currently contained in draft Amendment 16-4… The Council may not extend a rebuilding period or Ttarget based on new optimistic stock assessment data. Nor may it use more optimistic data to increase mortality levels while leaving Ttarget alone. "As short	National organization	Environmental

Comment	Community impacted (when noted)	Sector (when noted)
as possible," providing some leeway, does not allow for longer periods unless the stock declines unexpectedly in the middle of a rebuilding period and maintaining the same T_{TARGET} would lead to "disastrous short-term consequences." The economic leeway provided under a plan in one year cannot be expanded based on better data without making T_{TARGET} shorter. The leeway remains the same because the "disastrous short-term consequences" that are avoided one year can presumably be avoided the next at the same low catch level.		
It's hard for me to only go after 300 pounds [of blackcod] with fuel prices so high. [Please consider keeping the blackcod "A" fixed gear quota for the two month periods at the 900 pound limits].	Port Orford, OR	Commercial
[Please change the CCA borders to the 175 fm curve]. Presently, we have to travel 120 miles (one way) to fish for blackgill rockfish, and with the price of fuel, the vagaries of the weather (we are a small boat) and the U.S. Navy, we are coming to the point where financial survival is a serious question.	Westminster, CA	Commercial
Since [1991] our season opener went from the middle of February to starting April 1st to almost no season this year. People still think it is closed [due] to all the bad press. Rock cod season was year round with no depth restrictions [and is now] a six-month season with a 120-foot depth restrictions. This has destroyed our business, forcing us to sell the big boat and buy a six pack boat and get a part time land job to keep the business going. Now with the MLPA's closing a lot of our shallow water to us maybe unemployment is an option… Opening up the deeper water and lighting [sic] our season could possibly save the remaining businesses (hotels, restaurants, tackle stores, marine stores, etc.).	Santa Cruz, CA	Recreational
I am writing to express strong concerns regarding the negative economical impact that is being realized due to recent fishery management decisions… the decisions [have] had severe repercussions to the industry, producing hardships for many. The ability to maintain business and/or employment is increasingly threatened as a direct result. Several businesses have closed while others face great struggle and debt to remain in business. The Monterey Bay area party boat fleet has diminished. What was once known as a thriving fleet of close to two dozen licensed vessels is now a struggling fleet of less than ten licensed vessels due to sportsmen declining to partake in a favored activity when numerous inconsistencies and constant revisions exist in the often confusing and stringent regulations. The long-term closures and current shallow water restrictions have further diminished participation. This has also caused a severe decline in license sales for the State of California… The ability to … fish throughout deeper waters will enhance the fisheries by taking pressure off a specific area, additionally business and employment will again prosper.	Monterey, CA	Recreational
I am writing this letter with regards to the devastating impact that overly restrictive regulations on rockfishing has had upon the charter fishing boat business in Monterey Bay. Five years ago there was a total of 18 charter fishing boats that regularly fished for rockfish in the Monterey Bay. There was 12 boats in Monterey, five in Santa Cruz and one in Moss Landing. To break it down further Monterey had four charter fishing businesses, with a total of 12 boats; now there are two businesses with a total of five boats fishing; in Santa Cruz there was three businesses, now there is two with two boats; in Moss Landing there is one charter boat operation with one boat that is currently for	Monterey, CA	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
sale. They are calling it quits after this season. The numbers of people going rock fishing has been declining every year. The cumulative effect of the shortened and inconsistent periods of time to fish, types of fish, size and bag limits of so many species of fish, regulations changing in the middle of the season are all very confusing and turns the people off. This year is quite possibly going to be our worst year ever. [Morro Bay's fishing is in 240 feet or less while Monterey is in 120 feet; therefore Monterey is at a disadvantage]… All we want is a level playing field. Your consideration in giving Monterey 240 feet in July would be very helpful. What we really need in the future is more time on the water.		
[Retain the CCA boundaries.] 1) We don't know what lives in the rocky areas to be opened. Nobody has conducted surveys…in the areas suggested for opening. At the very least, it is not clear that cowcod do not live in the area to be opened to fishing…2) Fishing operations cannot be accurately monitored [in the CCA]…there are numerous steep-sided areas where bottom depth drops off abruptly…it is not credible that ship positions will be able to be assessed sufficiently accurately to detect either inadvertent or intentional poaching…3) The CCA protects more than cowcod… I hope the [commercial and recreational fishing industries] become a lot healthier and more self-sustaining than they are today. But really, prudence should be the watchword here."	n/a	Environmental/ research
Our family has been in the sportfishing business since 1949…In 1998 we had eight boats, eight skippers and four shop people. Now we have only three skippers and one shop person… Out of 22 party boats [in 1998] there are now only 8 boats in the south Monterey Bay region. Two of the party boat companies in Monterey and two in Santa Cruz have gone out of business. Our customer base has been reduced due to the limit restrictions, time on the water and fathom restrictions. The economic impact on our business has been devastating. No salmon and no albacore and all the restrictions[.] We have tried to do everything in our power to keep our skippers working and our business going… We strongly urge the Council to raise the OY and consider Alternative 3 (high B) for the 2007—08 season and in July 2006 open to 40 fm in the south central Monterey Bay region.	Monterey, CA	Recreational
Over the past five plus years, the regulations governing the rockfish fisheries have been a total disaster for the party boat industry. In Monterey we have seen a reduction in the number of fishing party boats from a high of 13 to a barely surviving five. The number of people going fishing for rockfish has been so greatly reduced that what was once the backbone of the business is now just a side fishery. The constantly changing, confusing, and restrictive regulations have turned the public off from fishing for rockfish and fishing in general. People never know when the season is open. They are unhappy with only being able to fish for shallow water species. They are not happy with only being able to retain ten fish for their efforts… Bottom line: better quality fish from increased access to deep water will mean more happy fishermen and possibly a regeneration of a sputtering business (especially with the horrible salmon season of 2006, it would be nice to finish the year in the black.)	Marina, CA	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
Considering the significant difference in catch favoring the non-treaty fleet and the pre-conservation measures that the Quileute Tribe has already taken to protect [yelloweye rockfish], the Tribe believes it would be both a violation of its Treaty with the United States and economically devastating for the Tribe to bear the brunt of any additional conservations measures… Additional conservation measures would have severe economic impacts on the entire Quileute Tribal fishing fleet and the broader Tribal community. The Quileute Indian Reservation is located in La Push, Washington… it is a rural reservation in an area with very few economic opportunities for tribal members. Other than work in tribal government, fisheries represent the only other significant source of jobs for tribal members on the reservation. There are usually between 5 and 7 tribal boats that participate in the tribal ocean fisheries, which provide jobs for not only the vessel owners but crew members as well. In addition, the Tribe owns a fish processing plant that is dependent in large part on the catch that is brought in by tribal fishermen. This fish processing plant is also an important source of employment for tribal members, as well as an important source of revenue for the Tribe itself. The diminishment or loss of fishing related jobs would have a very significant and potentially devastating impact on the Tribe's economy.	La Push, WA	Tribal
The need for accurate socioeconomic information grows every day. Commercial fishermen are eager to share their knowledge of the sea and local industry, and to work hand-in-hand with the scientific community to integrate what the industry knows with what the scientific community has learned… In my experience, [NMFS] has only paid lip service to the vital role this type of data can play in modern fisheries management. Getting information directly from the source—the local fishermen—can generate a wealth of data and provide a credible and thorough database on the socioeconomics of fisheries management…	Oregon	Community
Other documents (scoping summaries from rebuilding plans and environmental impact statements)		
Consider effects of decisions on fishing community infrastructure (cumulative from all rebuilding plans)		Community
Consider socioeconomic impacts on coastal (not just fishing) communities.		Community
Create and distribute a document describing individual and cumulative effects on communities.		Community
Current limits will cause the demise of the California sportfish fishery and those who depend on it.	Newport Beach, CA	Recreational
Fishermen will have a hard time surviving unless quotas or fishing grounds increase; cannot operate business.		Commercial
Regulations are putting me out of business		Commercial
The market infrastructure seems about to collapse.		Community
With the current trip limits in the California sportfish fishery, people are not going fishing.	Newport Beach, CA	Recreational

Comment	Community impacted (when noted)	Sector (when noted)
If small trawl fishery in northern Washington cannot survive, will have negative impact on communities.	Neah Bay, WA	Commercial
Evaluate impacts on individual communities, not just fishery sectors.		Community
Small boats in northern Washington have suffered many setbacks already: can only fish nearshore; limited by weather; closures due to cable crossings, etc.	Neah Bay, WA	Commercial
Magnuson Act says that fisheries must be sustainable for fish AND fishermen; take this into account.	Neah Bay, WA	Community
Take into account small family-owned boats that fish in northern Washington state.	Neah Bay, WA	Commercial
The RCA isn't hurting communities as far as trawlers are concerned; the problem is that processors don't want to buy the types of fish that can be caught cleanly. Processor limits force fishermen to discard target species.		Commercial
Look at the sociocultural value of recreational fishery resources.		Recreational
Look at fish processing as part of the system and whether this system maintains the viability of processors.		Processing
The Council seems only to consider the economic value of processors.		Processing
Look more at social impacts of recreational fisheries management, including culture of recreational fishing and the relationship to tourism.		Recreational
Previous economic analyses have underestimated the economic costs of limiting catches in the January-February and November-February periods when Petrale sole catch is not limited by management measures.		Commercial

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

There are two suites of alternatives analyzed in this EIS. The first suite of alternatives is the range of 2007-08 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 2007-08 OY alternative serves two purposes: both as the harvest specifications for the years 2007 and 2008 and, for depleted species, as the next step in the longer term mortality schedules for rebuilding plans. The target rebuilding year for each depleted species under rebuilding is also set in this decision step as the most likely year to rebuild under the Council-preferred OY and mortality schedule. Harvest specification (and rebuilding plan) alternatives are described in section 2.1.

The second suite of alternatives analyzed in this EIS is alternative 2007-08 management measures. Alternative management measures adopted for analysis are designed to illustrate the potential efficacy and tradeoffs of management strategies and allocations considered for the next biennial management period by the Council. The overarching objectives of 2007-08 management measures are to stay within the Council-preferred annual OYs for groundfish stocks and stock complexes and to equitably allocate fishing opportunities and other fishery benefits across fishing sectors and regions under Council jurisdiction. Alternative 2007-08 management measures are described in section 2.2.

2.1 Alternative Harvest Specifications

Table 2-1 depicts the alternative harvest specifications for groundfish stocks and stock complexes managed under the FMP and considered by the Council for the 2007-08 management period. The Council decided to average projected 2007 and 2008 OYs from adopted assessments and rebuilding analyses with the intent to specify an average OY, which is applied to both years. In some cases, and only for stocks with quantitative assessments, the Council also decided to average projected ABCs for the 2007-08 management period (see Groundfish FMP §4.3.1). In cases where the OY might exceed an ABC in any one year, the OY is capped at that ABC since an ABC cannot legally be exceeded.

2.1.1 Depleted Groundfish Species

Depleted groundfish species are those with spawning biomasses that have dropped below the Council's depletion or overfished threshold of 25 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 to ensure they comply with the MSA as interpreted by the courts. Therefore, the range of harvest specifications for depleted groundfish species under rebuilding and analyzed in this EIS has been expanded to more effectively analyze what it means to "rebuild in the shortest time possible, taking into account the needs of fishing communities" by considering the impacts of allowing some access to healthy fish stocks. Access to healthy fish stocks would mean some mortality of depleted species that are caught as bycatch in these fisheries would be allowed. Any harvest of depleted groundfish stocks is anticipated to be unavoidable bycatch. The Council-preferred harvest specifications for depleted species are the mortality limits for these species that the Council recommends under rebuilding to avoid disastrous short-term socioeconomic impacts to West Coast fishing communities. Rebuilding periods for depleted species are coincident with the Council's recommendation for OYs for these species and defined in the Council's rebuilding framework, as specified in the Groundfish FMP, as the median time to attain the target spawning biomass of $B_{40\%}$ under a given harvest rate or mortality schedule.

Prior to the new groundfish assessments conducted, reviewed, and adopted in 2005 under Council procedures, the depleted groundfish species under rebuilding were bocaccio (in waters south of 40°10' N latitude), canary rockfish, cowcod, darkblotched rockfish, lingcod, Pacific ocean perch (POP), widow rockfish, and yelloweye rockfish. However, the 2005 lingcod assessment (Jagielo and Wallace 2006) indicates that the coastwide lingcod stock has attained (and exceeded) the $B_{40\%}$ spawning biomass threshold and is now considered successfully rebuilt. No new species were declared depleted from the 23 groundfish assessments conducted in 2005. Therefore, the Council is continuing rebuilding plans for the other seven species only and reconsidering those plans in response to a 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 (Table 2-2a). Each of these OY alternatives is based on the best available science as recommended by Stock Assessment Review (STAR) panels and the Council's Scientific and Statistical Committee (SSC). Section 2.1.1 describes the scientific basis for each depleted species' OY alternative and describes the strategic analyses of these alternatives that are presented in more detail in subsequent chapters of this EIS.

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 total mortality and duration of rebuilding for each depleted species under a range of harvest rates.

Though some rebuilding analyses reported median rebuilding times to five significant digits, the SSC has advised that the rebuilding simulation program does not have this level of accuracy. Following this guidance, predicted rebuilding periods reported with a decimal point (i.e., fractions of a year) have been rounded up to the following year in this EIS and in Amendment 16-4 revisions to the rebuilding plans. For example, the darkblotched rebuilding analysis estimates that under a 2007-08 OY of 229 mt the median rebuilt year is 2010.2, and under an OY of 330 mt the median rebuilt year is 2010.5; both of these have been rounded to 2011. The ramp-down strategy for yelloweye rockfish is estimated to have a median rebuilding time of 2083.5, which is rounded to 2084.

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. The OY alternatives for depleted species are described in section 2.1.1.1.

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

	No Action Alternative				2007 and 2008 Action Alternatives a/													
Stock	**2005 ABC**	**2005 OY**	**2006 ABC**	**2006 OY**	**Alt 1 2007 ABC**	**Alt 2 2007 ABC**	**Alt 1 2008 ABC**	**Alt 2 2008 ABC**	**Alt 1 OY**	**Alt 2 OY**	**Alt 3 OY**	**Alt 4 OY**	**Alt 5 OY**	**Alt 6 OY**	**High/ Low Depleted Species OY Alts. b/**	**Council 2007 ABC b/**	**Council 2008 ABC b/**	**Council OY b/**
Lingcod - coastwide c/	2,922	2,414	2,716	2,414	6,706		5,853		6,280	6,088						6,280	6,280	
Columbia and US-Vanc. areas		1,694		1,694					5,428	5,428								
Eureka, Monterey, and Conception areas		719		719					852	660								
N. of 42 (OR & WA)		1,801		1,801					5,558	5,558								5,558
S. of 42 (CA)		612		612					722	530								612
Pacific Cod	3,200	1,600	3,200	1,600	3,200		3,200		1,600							3,200	3,200	1,600
Pacific Whiting (U.S.)	269,545	269,069	488,850	269,069	244,425	733,275	244,425	733,275	134,534	403,604						To be determined in March 2007 and 2008		
Sablefish (Coastwide)	8,368	7,761	8,175	7,634	6,210		6,058		4,574	5,934						6,210	6,058	
N. of 36 (Monterey north)		7,486		7,363					4,411	5,723								5,723 d/
S. of 36 (Conception area)		275		271					162	210								210
PACIFIC OCEAN PERCH	966	447	934	447	900		911		0	87	405	514	749		44 or 100	900	911	150
Shortbelly Rockfish	13,900	13,900	13,900	13,900	13,900		13,900		13,900							13,900	13,900	13,900
WIDOW ROCKFISH	3,218	285	3,059	289	5,334		5,144		0	329	456	917	1,369		120 or 368	5,334	5,144	368
CANARY ROCKFISH	270	47	279	47	172		179		0	24	44	68			32 or 44	172	179	44
Chilipepper Rockfish	2,700	2,000	2,700	2,000	2,700		2,700		2,000	2,700						2,700	2,700	2,000
BOCACCIO	566	307	549	309	602		618		0	149	218	315	424		40 or 218	602	618	218
Splitnose Rockfish	615	461	615	461	615		615		461							615	615	461
Yellowtail Rockfish	3,896	3,896	3,681	3,681	4,585		4,510		4,548							4,548	4,548	4,548

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

	No Action Alternative				2007 and 2008 Action Alternatives a/													
Stock	2005 ABC	2005 OY	2006 ABC	2006 OY	Alt 1 2007 ABC	Alt 2 2007 ABC	Alt 1 2008 ABC	Alt 2 2008 ABC	Alt 1 OY	Alt 2 OY	Alt 3 OY	Alt 4 OY	Alt 5 OY	Alt 6 OY	High/ Low Depleted Species OY Alts. b/	Council 2007 ABC b/	Council 2008 ABC b/	Council OY b/
Shortspine Thornyhead – coastwide e/					2,488		2,463		1,661	2,476						2,476	2,476	e/
Shortspine Thornyhead - N. of 34deg27' e/	1,055	999	1,077	1,018					1,240	1,634								1,634
Shortspine Thornyhead - S. of 34deg27' e/									421	841								421
Longspine Thornyhead – coastwide e/	2,851				3,953		3,860		2,696	3,930						3,907	3,907	e/
Longspine Thornyhead - N. of 34deg27' e/		2,656	2,851	2,656					2,220	2,989								2,220
Longspine Thornyhead - S. of 34deg27' e/									476	941								476
COWCOD - S. of 36 (Conception area)	5	2.1	5	2.1	17		17		0	4	7	9	11		4 or 8 f/	17	17	4
COWCOD - Monterey area	19	2.1	19	2.1	19		19		0	4	7	9	11			19	19	
DARKBLOTCHED	269	269	294	200	456		487		0	130	229	330	472		130 or 229	456	487	290 (in 2007); 330 (in 2008)
YELLOWEYE g/	54	26	55	27	26		26		0	12	17	21	24	27	12.6 or Ramp-down h/	26	26	Ramp-down h/
Black Rockfish (WA)	540	540	540	540	540		540		540							540	540	540
Black Rockfish (OR-CA)	753	753	736	736	725		719		722							722	722	722
Minor Rockfish North	3,680	2,250	3,680	2,250	3,680				2,250	2,270	2,290					3,680	3,680	2,270
Nearshore Species		122		122					122	142	162							142
Shelf Species		968		968			968		968	968	968							968
Slope Species		1,160		1,160			1,160		1,160	1,160	1,160							1,160
Remaining Rockfish North i/	1,612	1,216	1,612	1,216	1,612		1,612		1,216									
Bocaccio	318	239	318	239	318		318		239									
Chilipepper - Eureka	32	32	32	32	32		32		32									
Redstripe	576	432	576	432	576		576		432									
Sharpchin	307	230	307	230	307		307		230									
Silvergrey	38	29	38	29	38		38		29									
Splitnose	242	182	242	182	242		242		182									
Yellowmouth	99	74	99	74	99		99		74									
Other Rockfish North i/	2,068	1,034	2,068	1,034	2,068		2,068		1,034									

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

	No Action Alternative				2007 and 2008 Action Alternatives a/													
Stock	**2005 ABC**	**2005 OY**	**2006 ABC**	**2006 OY**	**Alt 1 2007 ABC**	**Alt 2 2007 ABC**	**Alt 1 2008 ABC**	**Alt 2 2008 ABC**	**Alt 1 OY**	**Alt 2 OY**	**Alt 3 OY**	**Alt 4 OY**	**Alt 5 OY**	**Alt 6 OY**	**High/ Low Depleted Species Alts. b/**	**Council 2007 ABC b/**	**Council 2008 ABC b/**	**Council OY b/**
Minor Rockfish South	3,412	1,968	3,412	1,968	3,403		3,403		1,753	1,855	1,898	2,006				3,403	3,403	1,904
Nearshore Species		615		615					413	515	558	666						564
Shelf Species		714		714					714	714	714	714						714
Slope Species		639		639					626	626	626	626						626
Remaining Rockfish South i/	854	689	854	689	854		854		689									
Bank	350	263	350	263	350		350		263									
Blackgill	343	305	343	305	292		292		292									
Gopher	97	48.5	97	48.5	302		302		49	151	227	302						
Sharpchin	45	34	45	34	45		45		34									
Yellowtail	116	87	116	87	116		116		87									
Other Rockfish South i/	2,558	1,279	2,558	1,279	2,558		2,558		1,279									
California scorpionfish	Not specified - managed as part of Minor RF South				137	219	137	219	137	219						219	219	175
Cabezon (off CA only)	103	69	108	69	94		94		69							94	94	69
Dover Sole	8,522	7,476	8,589	7,564	28,522		28,442		16,500	28,482						28,522	28,442	16,500
English Sole	3,100	3,100	3,100	3,100	6,773		5,701		6,237							6,237	6,237	6,237
Petrale Sole (coastwide) c/	2,762	2,762	2,762	2,762	2,917		2,919		1,921	2,499	2,883					~~2,917~~ 3,025	2,919	2,499
Columbia and US-Vanc. areas									910	1,347	1,347							
Eureka, Monterey, and Conception areas									1,012	1,152	1,536							
N of 40deg10'									1,176	1,651	1,752							
S of 40deg10'									745	848	1,131							
Arrowtooth Flounder	5,800	5,800	5,800	5,800	5,800		5,800		5,800							5,800	5,800	5,800
Starry Flounder	Not specified - managed as part of Other Flatfish				1,221		1,395		890	1,186						1,221	1,221	890
Other Flatfish	6,781	4,909	6,781	4,909	6,731		6,731		4,884							6,731	6,731	4,884
Other Fish	14,600	7,300	14,600	7,300	14,600		14,600		7,300							14,600	14,600	7,300
Kelp Greenling HG (OR)									No Fed HG	fed HG = state HG								No Fed HG

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

a/ The Council elected to average OY projections for 2007 and 2008 and analyze/specify the average OYs for each year. ABCs, in some cases, are specified similarly for some species with quantitative assessments. Otherwise, ABCs are year-specific.
b/ High/Low Depleted Species Alternatives are the two preferred alternatives selected by the Council for future analysis at the April 2006 meeting. Council ABC and Council OY represent the Council's preferred harvest alternative for 2007 and 2008.
c/ Area OYs/HGs are stratified according to the assessment areas and alternatively adjusted by management areas for lingcod and petrale sole. The 2007 petrale sole ABC specified by the Council in June 2006 was subsequently found to be in error. The Council made the technical correction to the 2007 ABC in September 2006 to comply with the assessment.

d/ The Council specified 2007-08 sablefish total catch OYs north and south of 36º N. lat. (Alt. 2 OY). However, sector allocations are based on the total catch OY north of 36º N. lat.
e/ Under the No Action alternative, there was no ABC or OY specified for the southern Conception area (south of 34°27' N. lat.) for longspine thornyhead or shortspine thornyhead. For longspine thornyhead under the No Action alternative, ABCs/OYs were specified between north and south of 36º N. lat., but these values are aggregated in this table to an ABC and OY north of 34°27' N. lat. Under the final Council-preferred alternative, coastwide ABCs and separate OYs north and south of Pt. Conception at 34º27' N. lat. were specified for both thornyhead species.

f/ The preferred OY is for the Conception and Monterey areas combined.

g/ The yelloweye OY alternatives originally specified for analysis in Nov. 2005 were based on the 2005 assessment. The revised 2006 assessment and rebuilding analysis, adopted in Mar. 2006, projects a range of allowable 2007-08 OYs under a constant harvest rate strategy of <=15 mt. Therefore, alternatives 3-6 were eliminated from further analysis.

h/ 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.

i/ The Remaining Rockfish and Other Rockfish categories are shown to understand how the Minor Rockfish complex harvest specifications are derived. These are not management targets.

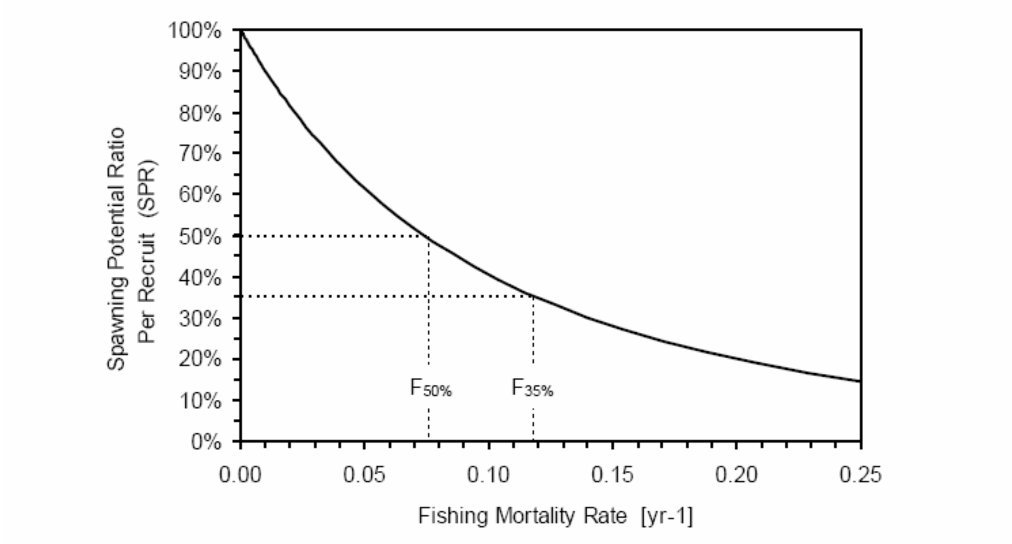

Figure 2-1. Relationship between SPR and instantaneous fishing mortality rate (F) for a hypothetical rockfish.

Next, rebuilding alternatives were developed by arranging the depleted species' OYs in various combinations (Table 2-2b) and then modeling changes to the current management regime to understand how rebuilding plans for different species interact to constrain fishing opportunities. The OYs in these rebuilding alternatives are strategically arrayed to illuminate how each species might differentially constrain fishing opportunities by sector (or gear type) and region along the West Coast, depending on the amount of allowable harvest of each species. It is important to note that the full range of OY alternatives described in Table 2-2a are not used to structure these rebuilding alternatives. Some of the higher OY alternatives in Table 2-2a are not used to structure the rebuilding alternatives in Table 2-2b. For example, the highest OY alternative for widow rockfish (OY Alternative 5) was not included among the rebuilding alternatives because it represents an amount of bycatch not observed in the current management regime. Prior to 2003, when there was a directed midwater trawl fishery for yellowtail and widow rockfish, catches of widow rockfish approached the level of mortality consistent with the OY Alternative 5 in Table 2-2a. However, the current understanding of the association of the more constraining canary rockfish stock with yellowtail rockfish leads to the conclusion that the available potential harvest of canary rockfish (as described by the range of OYs in Table 2-2a) would constrain directed midwater trawl opportunities for yellowtail rockfish before the widow rockfish bycatch would approach the higher available OYs for that stock. Therefore, the rebuilding alternatives in Table 2-2b are structured using a narrower range of depleted species' OYs than those depicted in Table 2-2a. The rebuilding alternatives are described in detail below, in Section 2.1.1.2.

At their April 2006 meeting, the Council selected a preferred OY alternative for all managed groundfish species and species complexes except for the seven depleted species (Table 2-1). For the depleted species, the Council selected two preferred OY alternatives (a preferred Low OY and a preferred High OY) for further analysis for each stock. The final Council-preferred OY and rebuilding plan for each depleted species were decided at the June 2006 Council meeting. As discussed above, the final Council-preferred OY alternative for the 2007-08 fisheries must be consistent with any intent to modify depleted species rebuilding plans. Therefore, the choice of a final preferred OY alternative involves consideration of both short-term effects (during 2007-08) and long-term effects (the future application of rebuilding plans as revised by Amendment 16-4).

2.1.1.1 Optimum Yield Alternatives for Depleted Species

Table 2.2a depicts the range of depleted species' OY alternatives specified for analysis by the Council in November 2005, April 2006, and June 2006. The numbered OY alternatives in Table 2-2a correspond to the alternative harvest levels that the Council originally selected for analysis in November 2005. In April 2006, the Council decided that the Preferred Low OY and High OY alternatives would represent the range of OYs that should be the focus of more detailed analysis, though the Council stated that, if analysis of this range suggested that a harvest level outside the range was more appropriate, then this level would also be analyzed. In June 2006 the Council adopted the final Council-preferred OY alternatives for depleted species and their resultant rebuilding plans. Table 2-3 and Figure 2-2 indicate the median time to rebuild under each 2007-08 OY alternative.

Table 2-2a. Range of 2007-08 OYs for depleted groundfish species decided at the November 2005 and April 2006 Council meetings.

		2007-08 OYs (mt)								
Stock	Association	OY Alt. 1	OY Alt. 2	OY Alt. 3	OY Alt. 4	OY Alt. 5	OY Alt. 6	Pref. Low OY Alt.	Pref. High OY Alt.	Final Council-Pref. OY Alt.
Yelloweye a/	Northern Shelf	0	12	17	21	24	27	12.6	Ramp-down b/	Ramp-down b/
Canary		0	24	44	68			32	44	44
Cowcod c/	Southern Shelf	0	8	14	18	22		4	8	4
Bocaccio		0	149	218	315	424		40	218	218
Darkblotched	Northern Slope	0	130	229	330	472		130	229	290 (in 2007); 330 (in 2008)
POP		0	87	405	514	749		44	100	150
Widow	Midwater	0	329	456	917	1,369		120	368	368

a/ A 2007-08 OY >= 15 mt for yelloweye would result in a less than a 50% probability of rebuilding before Tmax, which is not legally viable. OY Alternatives 3-6 are discussed further in section 2.1.5 of the EIS.

b/ 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.

c/ OY alternatives for Conception and Monterey areas combined.

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

		2007-08 OYs (mt)					
Stock	Association	"Status Quo" Reb. Alt. a/	Reb. Alt. 1	Reb. Alt. 2	Reb. Alt. 3	Reb. Alt. 4	Reb. Alt. 5
Yelloweye	Northern Shelf	27	21	17	21	12	12
Canary		44	24	44	68	24	24
Cowcod b/	Southern Shelf	5	8	18	22	14	3
Bocaccio		149	149	218	424	315	40
Darkblotched	Northern Slope	229	330	229	472	472	130
POP		87	405	87	749	405	44
Widow	Midwater	329	456	329	917	329	120

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

b/ OY alternatives for Conception and Monterey areas combined.

Table 2-3. Estimated time to rebuild relative to the alternative 2007-08 OYs for depleted West Coast groundfish species.

Species	Year Stock Declared Overfished	Ttarget in the FMP (Status Quo)	OY Alt. a/	Median Time to Rebuild	2007-08 OY (mt)	SPR Harvest Rate	2007-08 ABC (mt)	Tmin	Tmax	T (F=0)
Bocaccio (S of 40deg10')	1999	2023 b/	1	2021	0	100%	602	2018	2032	2021
			Pref. Low OY	2022	40	92.8%				
				2024	106	88.3%				
			2	2024	149	84.4%				
			Final Council-Pref. OY (Pref. High OY; 3)	**2026**	**218**	**77.7%**				
			4	2029	315	69.2%				
			5	2032	424					
				2050	602					
Canary	2000	2074	1	2053	0	100%	172	2048	2071	2053
			2	2058	24	93.5%				
			Pref. Low OY	2060	32	91.6%				
			Council-Pref. OY (Pref. High OY; 3)	2063	44	88.7%				
			4	2071	68	83.1%				
Cowcod (Concep.+ Monterey areas)	2000	2090	1	2035	0	100%	26	2035	2074	2035
			Final Council-Pref. OY (Pref. Low OY)	**2039**	**4**	**90.0%**				
				2040	4.6	90.0%				
			Pref. High OY (2)	2043	8	85.0%				
			3	2052	14	75.0%				
			4	2062	18	69.0%				
			5	2074	22	63.0%				
Darkblotched c/	2000	2030	1	2010	0	100%	456	2009	2033	2010
			Pref. Low OY (2)	2010	130	80.9%				
			Pref. High OY (3)	2011	229	69.9%				
			Final Council-Pref. OY for 2007	**2011**	**290**	**64.1%**				
			Final Council-Pref. OY for 2008 (4)	**2011**	**330**	**60.7%**				
			5	2012	472	50.0%				
				~~2014~~	~~521~~	~~46.1%~~				
				~~2016~~	~~581~~	~~42.9%~~				
				~~2033~~	~~696~~	~~37.6%~~				

Table 2-3. Estimated time to rebuild relative to the alternative 2007-08 OYs for depleted West Coast groundfish species (continued).

Species	Year Stock Declared Overfished	Ttarget in the FMP (Status Quo)	OY Alt. a/	Median Time to Rebuild	2007-08 OY (mt)	SPR Harvest Rate	2007-08 ABC (mt)	Tmin	Tmax	T (F=0)
POP	1999	2026	1	2015	0	100%	900	2015	2043	2015
			Pref. Low OY	2015	44	95.5%				
			2	2016	87	92.0%				
			Pref. High OY	2016	100	90.5%				
			Final Council-Pref. OY	**2017**	**150**	**86.4%**				
			3	2021	405	69.6%				
			4	2025	514	64.4%				
			5	2048	749	54.4%				
Widow	2001	2038	1	2013	0	100%	5,334	2013	2033	2013
			Pref. Low OY	2014	120	97.3%				
			2	2015	329	96.0%				
			Final Council-Pref. OY (Pref. High OY)	**2015**	**368**	**95.0%**				
			3	2016	456	93.6%				
			4	2020	917	88.6%				
			5	2027	1,369	83.4%				
Yelloweye d/	2002	2058	1	2048	0	100%	26	2046	2096	2048
			2	2078	12	73.8%				
			Pref. Low OY	2083	12.6	71.9%				
			Final Council-Pref. OY (Pref. High OY)	**2084**	**Ramp Down e/**	**NA**				
			~~3~~	~~2097~~	~~17~~					
			~~4~~	~~2068~~	~~21~~					
			~~5~~	~~2080~~	~~24~~					
			~~6~~	~~2099~~	~~27~~					

a/ The numbered OY alternatives were specified for analysis by the Council in Nov. 2005. The Preferred OY alternatives were specified for analysis by the Council in April 2006.

b/ The 2005 bocaccio rebuilding analysis (MacCall 2006a) clarified that the target rebuilding year had been incorrectly stated in the adopted rebuilding plan to be 2023. The correct value of T_{targ} is 2027.

c/ Darkblotched OY alternatives cannot exceed the ABC (456 mt in 2007 and 486 mt in 2008). Therefore, OY Alt. 5 can only be considered in 2008. The SPR harvest rates reported for the final Council-preferred alternative are based on that amount being taken in both years. However, the effective SPR harvest rate under the final Council-preferred alternative, where 290 mt are taken in 2007 and 330 mt are taken in 2008, is 61.8 percent.

d/ A 2007-08 OY >= 15 mt for yelloweye would result in a less than a 50 percent probability of rebuilding before Tmax, which is not legally viable. Alternatives 3-6 are discussed further in section 2.1.5 of the EIS.

e/ 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.

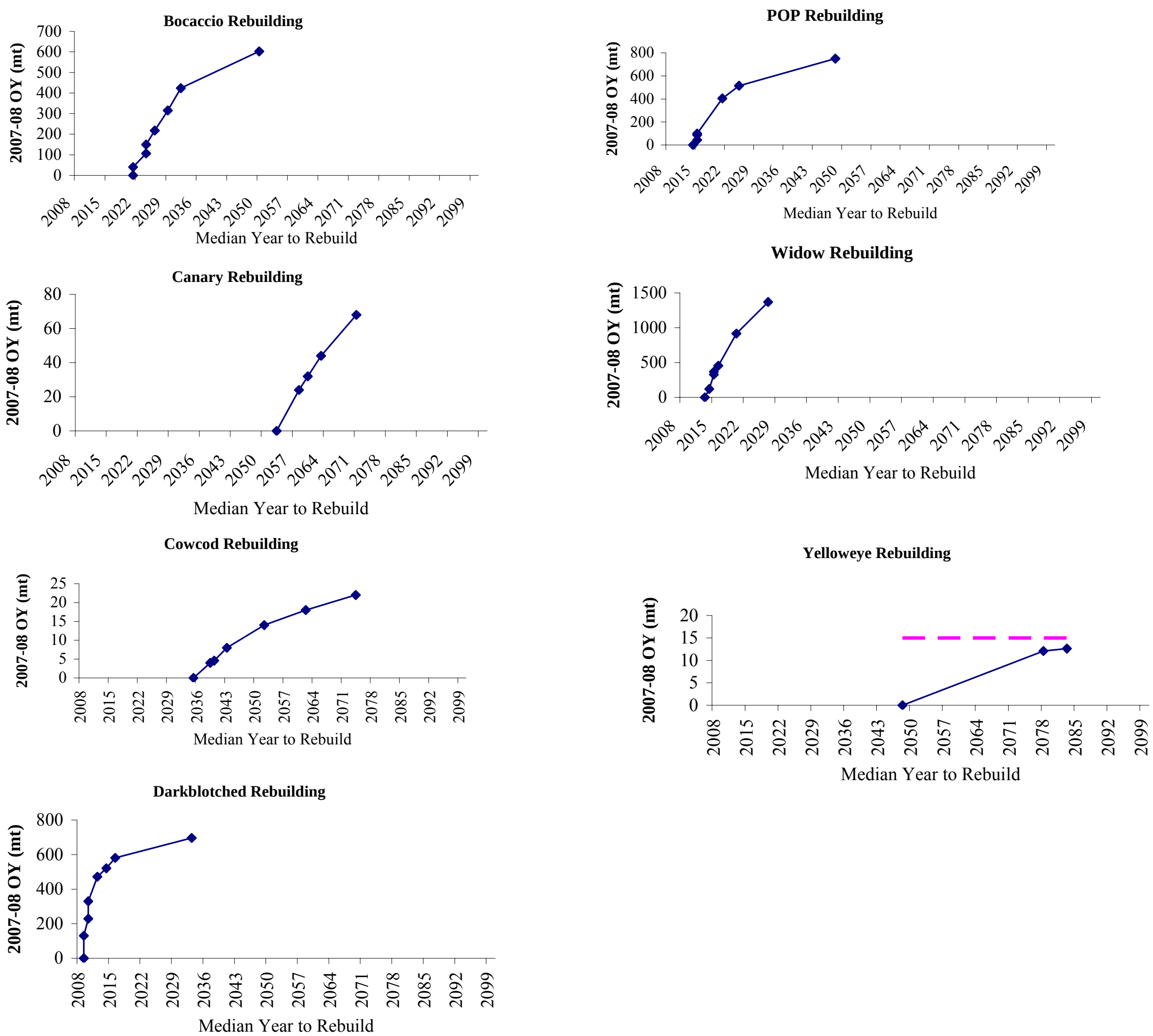

Figure 2-2. Predicted rebuilding duration vs. allowable 2007-08 harvests for seven depleted West Coast groundfish species.

<u>Bocaccio (in Waters off California South of 40°10' N Latitude)</u>

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

The zero harvest alternative would rebuild the stock by 2021, which is the shortest possible time to rebuild ($T_{F=0}$) given our current understanding of stock productivity.

The 40 mt alternative is the Council's Preferred Low OY Alternative specified by the Council in April 2006. The median time to rebuild the stock under this alternative is 2022, or one year longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The corresponding SPR rate is 92.8 percent.

The 149 mt alternative is based on the effective harvest rate in 2005 projected forward to 2007 and 2008. The Groundfish Management Team (GMT) determined the effective harvest rate by applying the best estimate of total mortality in 2005 divided by the exploitable biomass in 2005. The GMT then applied the resulting rate to the projected exploitable biomass in 2007 and 2008 (MacCall 2006b) to determine projected OYs, which were then averaged for those years. The median time to rebuild the stock under this alternative would be 2024, or 3 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The 218 mt OY alternative is the Council's Preferred High OY Alternative and represents the OY under an 80 percent rebuilding probability (P_{MAX} or the probability of successfully rebuilding the stock in the maximum allowable time under the current National Standard 1 Guidelines) from the 2003 rebuilding analysis (MacCall 2003a). The median time to rebuild the stock under this alternative would be 2026, or 5 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The corresponding SPR rate is 77.7 percent. At the June 2006 meeting, the Council selected 218 mt as the **final Council-Preferred OY Alternative** for 2007-08 and adopted specifications in Amendment 16-4 that revise the bocaccio rebuilding plan in accordance with the harvest rate and median time to rebuild under this OY.

The 315 mt OY alternative represents the current SPR harvest rate of 69.2 percent applied to the 2007 and 2008 projections of exploitable biomass. This is the harvest rate used to establish the status quo 2005 and 2006 OYs. The median time to rebuild the stock under this alternative would be 2029, or 7 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The 424 mt OY alternative represents the OY under a re-estimated P_{MAX} of 50 percent from the new rebuilding analysis (MacCall 2006a). This is the highest OY that can be considered for bocaccio in that it is based on the best available science and is at the 50 percent rebuilding probability threshold established in litigation (*Natural Resources Defense Council v. Daley*, April 25, 2000, U.S. Court of Appeals for the District of Columbia Circuit). The median time to rebuild the stock under this alternative would be 2032, or 10 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

Canary Rockfish

The OY alternatives specified for analysis for the coastwide canary rockfish stock are 0 mt, 24 mt, 32 mt, 44 mt, and 68 mt (Tables 2-1 and 2-2a). This compares to the status quo OY of 47 mt in 2005 and 2006.

The zero harvest alternative would rebuild the stock by 2053, which is the shortest possible time to rebuild ($T_{F=0}$) given our current understanding of stock productivity.

The 24 mt OY alternative represents the OY under a 60 percent rebuilding probability (the status quo P_{MAX}) from the new rebuilding analysis (Methot 2006). The median time to rebuild the stock under this alternative would be 2058, or 5 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The 32 mt alternative is the Council's Preferred Low OY Alternative. The median time to rebuild the stock under this alternative is 2060, or 7 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The corresponding SPR rate is 91.6 percent.

The 44 mt OY alternative is the Council's Preferred High OY Alternative and applies the current SPR harvest rate of 88.7 percent to the 2007 and 2008 projections of exploitable biomass. This is the harvest rate used to establish the status quo 2005 and 2006 OYs. The median time to rebuild the stock under this alternative would be 2063, or 10 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). At the June 2006 meeting, the Council selected 44 mt as the **final Council-Preferred OY Alternative** for 2007-08 and adopted specifications in Amendment 16-4 that revise the canary rockfish rebuilding plan in accordance with the harvest rate and median time to rebuild under this OY.

The 68 mt OY alternative represents the OY under a re-estimated P_{MAX} of 50 percent from the new rebuilding analysis (Methot 2006). This is the highest OY that can be considered for canary rockfish in that it is based on the best available science and is at the 50 percent rebuilding probability threshold. The median time to rebuild the stock under this alternative would be 2071, or 18 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

Cowcod

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

The zero harvest alternative would rebuild the stock by 2035, which is the shortest possible time to rebuild ($T_{F=0}$) given our current understanding of stock productivity.

The 4 mt alternative is the Council's Preferred Low OY Alternative specified by the Council in April 2006. The median time to rebuild the stock under this alternative is 2039, or 4 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The corresponding SPR rate is 90.0 percent. At the June 2006 meeting, the Council selected 4 mt as the **final Council-Preferred OY Alternative** for 2007-08 and adopted specifications in Amendment 16-4 that revise the cowcod rebuilding plan in accordance with the harvest rate and median time to rebuild under this OY.

The 8 mt OY alternative is the Council's Preferred High OY Alternative and represents the OY under a re-estimated 80 percent rebuilding probability from the new rebuilding analysis (Piner 2006). The median time to rebuild the stock under this alternative would be 2043, or 8 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The corresponding SPR rate is 85.0 percent.

The 14 mt OY alternative represents the OY under a re-estimated 70 percent rebuilding probability from the new rebuilding analysis (Piner 2006). The median time to rebuild the stock under this alternative would be 2052, or 17 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The 18 mt OY alternative represents the OY under a re-estimated 60 percent rebuilding probability (the status quo P_{MAX}) from the new rebuilding analysis (Piner 2006). The median time to rebuild the stock under this alternative would be 2062, or 27 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The 22 mt OY alternative represents the OY under a re-estimated P_{MAX} of 50 percent from the new rebuilding analysis (Piner 2006). This is the highest OY that can be considered for cowcod in that it is based on the best available science and is at the 50 percent rebuilding probability threshold. The median time to rebuild the stock under this alternative would be 2074, or 39 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

Darkblotched Rockfish

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

The zero harvest alternative would rebuild the stock by 2010, which is the shortest possible time to rebuild ($T_{F=0}$) given our current understanding of stock productivity.

The 130 mt OY alternative is the Council's Preferred Low OY Alternative and represents the OY specified in 2001. *NRDC, vs. NMFS*, 421 F.3d 872 (9th Cir.2005), discussed above, had disputed the 2002 darkblotched harvest specification, which had changed this 2001 OY to a higher value. The median time to rebuild the stock under this alternative would be 2010, or less than a year longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The corresponding SPR rate is 80.9 percent.

The 229 mt OY alternative is the Council's Preferred High OY Alternative and is based on the effective harvest rate in 2005 (F = 0.0216) projected forward to 2007 and 2008. The GMT determined the effective harvest rate by applying its best estimate of total mortality in 2005 divided by the exploitable biomass in 2005. The GMT then applied the resulting harvest rate to the projected exploitable biomass in 2007 and 2008 (Rogers 2006) to determine projected OYs, which were then averaged for those years. The median time to rebuild the stock under this alternative would be 2011, or less than a year longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The corresponding SPR rate is 69.9 percent.

The 330 mt OY alternative applies the harvest rate used to set the 2005 OY (F = 0.032) to the 2007 and 2008 projections of exploitable biomass (OYs averaged and applied to each year). The median time to rebuild the stock under this alternative would be 2011, or 1 year longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The corresponding SPR rate is 60.7 percent.

At the June 2006 meeting, the Council selected 290 mt (for 2007) and 330 mt (for 2008) as the **final Council-Preferred OY Alternative.** The median time to rebuild the stock under this alternative would be 2011, or 1 year longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The SPR harvest rates calculated to produce the 290 mt and 330 mt OYs are 64.1 percent and 60.7 percent, respectively (Table 2-3). However, the effective SPR harvest rate under the final Council-preferred alternative, where 290 mt is specified in 2007 and 330 mt is specified in 2008, is 61.8 percent. The Council also adopted specifications in Amendment 16-4 that revise the darkblotched rockfish rebuilding plan in accordance with the 330 mt SPR harvest rate (60.7 percent) and median year to rebuild (2011) projected under this harvest rate.

The 472 mt OY alternative represents the OY capped at the average 2007-08 ABC specification. This is the highest OY that can be considered for darkblotched rockfish in that the ABC cannot be legally exceeded. The re-estimated P_{MAX} under this alternative is 97 percent. The median time to rebuild the stock under this alternative would be 2012, or 2 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

Pacific Ocean Perch

The OY alternatives specified for analysis for the coastwide POP stock are 0 mt, 44 mt, 87 mt, 100 mt, 150 mt, 405 mt, 514 mt, and 749 mt (Tables 2-1 and 2-2a). This compares to the status quo OY of 447 mt in 2005 and 2006.

The zero harvest alternative would rebuild the stock by 2015, which is the shortest possible time to rebuild ($T_{F=0}$) given our current understanding of stock productivity.

The 44 mt alternative is the Council's Preferred Low OY Alternative specified by the Council in April 2006. The median time to rebuild the stock under this alternative is 2015, or by the same year as the zero harvest alternative (Table 2-3 and Figure 2-2). The corresponding SPR rate is 95.5 percent.

The 87 mt OY alternative is based on the effective harvest rate in 2005 projected forward to 2007 and 2008. The GMT determined the effective harvest rate by applying its best estimate of total mortality in 2005 divided by the exploitable biomass in 2005. The GMT then applied the resulting harvest rate to the projected exploitable biomass in 2007 and 2008 (Hamel 2006b) to determine projected OYs, which were then averaged for those years. The median time to rebuild the stock under this alternative would be 2016, or a year longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The 100 mt OY alternative is the Council's Preferred High OY Alternative. The median time to rebuild the stock under this alternative would be 2016, or 1 year longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The corresponding SPR rate is 90.5 percent.

At the June 2006 meeting, the Council selected 150 mt as the **final Council-Preferred OY Alternative** for 2007-08 and adopted specifications in Amendment 16-4 that revise the Pacific ocean perch rebuilding plan in accordance with the harvest rate and median time to rebuild under this OY. The estimated SPR harvest rate under this alternative is 86.4 percent. The median time to rebuild the stock under this alternative would be 2017, or approximately 2 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The 405 mt OY alternative represents the OY under a re-estimated 80 percent rebuilding probability from the new rebuilding analysis (Hamel 2006a). The estimated SPR harvest rate under this alternative is 69.6 percent. The median time to rebuild the stock under this alternative would be 2021, or approximately 6 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The 514 mt OY alternative represents the OY under a re-estimated 70 percent rebuilding probability (the status quo P_{MAX}) from the new rebuilding analysis (Hamel 2006a). The median time to rebuild the stock under this alternative would be 2025, or 10 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The 749 mt OY alternative represents the OY under a re-estimated P_{MAX} of 50 percent from the new rebuilding analysis (Hamel 2006a). This is the highest OY that can be considered for POP in that it is based on the best available science and is at the 50 percent rebuilding probability threshold. The median time to rebuild the stock under this alternative would be 2048, or 33 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

Widow Rockfish

The OY alternatives specified for analysis for the coastwide widow rockfish stock are 0 mt, 120 mt, 329 mt, 368 mt, 456 mt, 917 mt, and 1,369 mt (Tables 2-1 and 2-2a). This compares to the status quo OYs of 285 mt in 2005 and 289 mt in 2006.

The zero harvest alternative would rebuild the stock by 2013, which is the shortest possible time to rebuild ($T_{F=0}$) given our current understanding of stock productivity.

The 120 mt alternative is the Council's Preferred Low OY Alternative and is predicted to rebuild the stock by 2014, which is 1 year longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The corresponding SPR rate is 97.3 percent.

The 329 mt OY alternative is based on the effective harvest rate in 2005 projected forward to 2007 and 2008. The GMT determined the effective harvest rate by applying its best estimate of total mortality in 2005 divided by the exploitable biomass in 2005. The GMT then applied the resulting harvest rate to the projected exploitable biomass in 2007 and 2008 (He, *et al.* 2006a) to determine projected OYs, which were then averaged for those years. The median time to rebuild the stock under this alternative would be 2015, or 2 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The 368 mt alternative is the Council's Preferred High OY Alternative decide for analysis in April 2006 and is predicted to rebuild the stock by 2015, which is 2 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The corresponding SPR rate is 95.0 percent. At the June 2006 meeting, the Council selected 368 mt as the **final Council-Preferred OY Alternative** for 2007-08 and adopted specifications in Amendment 16-4 that revise the widow rockfish rebuilding plan in accordance with the harvest rate and median time to rebuild under this OY.

The 456 mt OY alternative applies the current SPR harvest rate of 93.6 percent to the 2007 and 2008 projections of exploitable biomass. This is the harvest rate used to establish the status quo 2005 and 2006 OYs. The median time to rebuild the stock under this alternative would be 2016, or approximately 3 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The 917 mt OY alternative represents the OY under a re-estimated 80 percent rebuilding probability from the new rebuilding analysis (He, *et al.* 2006b). The SPR harvest rate under this alternative is estimated to be 88.6 percent. The median time to rebuild the stock under this alternative would be 2020, or 7 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The 1,369 mt OY alternative represents the OY under a re-estimated P_{MAX} of 60 percent from the new rebuilding analysis (He, *et al.* 2006b). The median time to rebuild the stock under this alternative would be 2027, or 14 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

Yelloweye Rockfish

The OY alternatives originally specified for analysis for the coastwide yelloweye rockfish stock were 0 mt, 12 mt, 17 mt, 21 mt, 24 mt, and 27 mt (Tables 2-1 and 2-2a). The first five yelloweye OY alternatives were derived from the 2005 yelloweye assessment and rebuilding analysis. However, in November 2005 the Council requested a new yelloweye assessment be done over the winter when numerous assessment data issues became known. The Council also specified the status quo 27 mt OY alternative for analysis in case a new, more optimistic assessment and rebuilding analysis were approved in 2006.

A new yelloweye stock assessment (Wallace, *et al.* 2006) and rebuilding analysis (Tsou and Wallace 2006) were approved in March 2006. The new 2006 assessment was more pessimistic than the 2005 assessment and one implication of the new rebuilding analysis was that the projected range of allowable 2007-08 OYs under a constant harvest rate strategy is ≤ 15 mt. That is, higher OYs would result in a < 50 percent probability of rebuilding by Tmax, which is not legally viable. Therefore, yelloweye OY Alternatives 3-6 in Table 2-2a were eliminated from further detailed study (see section 2.1.5).

The Council adopted for analysis an OY alternative of 12.6 mt for 2007-08 and consideration of a yelloweye harvest rate ramp-down strategy, which is explained in more detail below. Therefore, the full range of viable yelloweye OY alternatives analyzed for 2007-08 and Amendment 16-4 are 0 mt, 12 mt, 12.6 mt, and the harvest rate ramp-down strategy, which specifies OYs of 23 mt and 20 mt for 2007 and 2008, respectively. This compares to the status quo OYs of 26 mt in 2005 and 27 mt in 2006.

The zero harvest alternative would rebuild the stock by 2048, which is the shortest possible time to rebuild ($T_{F=0}$) given our current understanding of stock productivity.

The 12 mt OY alternative would rebuild the stock by 2078, or 30 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2).

The 12.6 mt alternative is the Council's Preferred Low OY Alternative and is based on a re-estimated 80 percent rebuilding probability from the new rebuilding analysis (Tsou and Wallace 2006). This is the rebuilding probability from the status quo rebuilding plan and the SPR harvest rate under this alternative is estimated to be 71.9 percent. The median time to rebuild the stock under this alternative would be 2083, or 35 years longer than $T_{F=0}$ (Table 2-3 and Figure 2-2). The corresponding SPR rate is 71.9 percent.

The yelloweye harvest rate ramp-down strategy is the Council's Preferred High OY Alternative and is designed to provide the Council time to develop management strategies to reduce current yelloweye impacts by more than 50 percent. The ramp-down strategy would sequentially lower the yelloweye harvest rate in the next four years before resuming a constant harvest rate rebuilding strategy in 2011. The OYs would be 23 mt, 20 mt, 17 mt, and 14 mt in 2007-2010, respectively. Under this strategy, the constant harvest rate would be the same as for the Preferred Low OY Alternative (SPR harvest rate = 71.9 percent) beginning in 2011. The median time to rebuild the stock under this alternative would be 2084, or 36 years longer than $T_{F=0}$ and less than a year longer than the Preferred Low OY Alternative (Table 2-3 and Figure 2-2). At the June 2006 meeting, the Council selected the ramp-down strategy as the **final Council-Preferred OY Alternative** for 2007-08 and selected specifications in Amendment 16-4 that would revise the yelloweye rebuilding plan in accordance with the harvest rate (beginning in 2011) and median time to rebuild under this mortality schedule.

2.1.1.2 Rebuilding Alternatives

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

The "status quo" rebuilding alternative is comprised of OY alternatives based on the effective harvest rates for each of the depleted stocks in 2005 projected forward to 2007 and 2008. The effective harvest rates were determined by applying the GMT's best estimate of total mortality in 2005 divided by the exploitable biomass of each stock in 2005. These harvest rates were then applied to the projected best exploitable biomasses in 2007 and 2008 to determine projected OYs. In other words, if all the same management measures, including inseason adjustments that were implemented in 2005 were implemented in 2007-08, the impacts to depleted species described under the "status quo" rebuilding alternative would be anticipated.

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

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

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

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

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

2.1.2 Precautionary Zone Groundfish Species

Cabezon (in Waters off California)

A new cabezon (*Scorpaenichthys marmoratus*) assessment 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 have an estimated spawning output less than $B_{40\%}$, cabezon in waters off California are considered a "precautionary zone" stock.

The Council has identified one OY alternative, 69 mt, to be analyzed for the cabezon stock in waters off California (Table 2-1) for 2007 and 2008. This is the same as the status quo OY alternative, which was based on the 2003 assessment (Cope, *et al.* 2004) and an $F_{45\%}$ proxy MSY harvest rate for the ABC and CDFG's precautionary 60-20 rule[8] for setting the OY. The ABC alternative identified for analysis is 94 mt for both 2007 and 2008, which is based on the sum of average 2007-08 ABCs for the northern and southern substocks (north and south of Pt. Conception), as determined in the 2005 stock assessment.

The Council selected the 2007-08 ABC and OY of 94 mt and 69 mt, respectively as the final Council-preferred alternative.

Pacific Whiting

Pacific whiting (*Merluccius productus*) are managed based on an annual assessment prepared jointly by U.S. and Canadian scientists. 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 2007 ABC and OY will be adopted by the Council at its March 2007 meeting. As placeholders, the Council specified a range of coastwide ABC and OY alternatives for analysis as follows: an OY range of 134,534 mt to 403,604 mt (Table 2-1). This compares to the status quo U.S.

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[8] CDFG's precautionary 60-20 rule is analogous to the Council's 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. CDFG uses the 60-20 rule for managing stocks under their authority. Since cabezon are only caught in nearshore state waters and the CDFG proposed OY was more precautionary than the other OY alternatives from the 2003 and 2005 assessments, the Council recommended the 2005-2008 OY of 69 mt.

OY of 269,069 mt for 2006. The range of 2007 and 2008 ABC alternatives specified for analysis are 244,425 mt to 733,275 mt. The status quo 2006 ABC is 488,850 mt.

Petrale Sole

A new 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 $B_{34\%}$ and the portion of the stock in the southern assessment area (Conception, Monterey, and Eureka INPFC areas) had an estimated spawning stock biomass of $B_{29\%}$. Since the stock's spawning biomass is less than $B_{40\%}$, this is considered a "precautionary zone" stock.

Three 2007-08 OY alternatives for petrale sole (coastwide) have been analyzed for Council decision: 1,921 mt, 2,499 mt, and 2,883 mt (Table 2-1). This compares to the status quo OY of 2,762 mt in 2005 and 2006.

Table 2-1 shows the coastwide petrale sole OY alternatives stratified north and south of the Columbia-Eureka INPFC area line, which is how Lai et al. (Lai, *et al.* 2006) stratified the assessment, and north and south of the management line at 40°10' N latitude, which was re-stratified by the GMT based on the recent average catch contribution in the Eureka area north of 40°10' N latitude. These area depictions were done to better understand area-specific assessment results and harvest implications. Sensitivity to model results was analyzed by Lai et al. (Lai, *et al.* 2006) by varying forecasted results from the base model, which assumed the point estimate for 2004 spawning stock biomass was the correct state of nature, and two bracketing models, referred to as the Low and High Spawning Stock Biomass models and determined assuming the 2004 spawning stock biomass varied ± 1.25 standard deviations.

The coastwide OY of 1,921 mt under OY Alternative 1 was determined using the average OYs projected in 2007 and 2008 from the Low Spawning Stock Biomass model in the assessment (Lai, *et al.* 2006). The coastwide OY of 2,499 mt under OY Alternative 2 was determined using the base model with the 40-10 precautionary adjustment for the northern and southern substocks, with an additional 25 percent reduction in the OY for the southern substock to account for greater assessment uncertainty. The coastwide OY of 2,883 mt under OY Alternative 3 was determined using the base model with the 40-10 precautionary adjustment for the northern and southern substocks, but without the additional 25 percent reduction in the OY for the southern substock.

The ABC alternatives identified for analysis are 2,917 mt for 2007 and 2,919 mt for 2008. Using results from the 2005 stock assessment, each ABC was calculated by summing the north and south ABCs.

The Council selected ABCs of 2,917 mt in 2007 and 2,919 mt in 2008 and a 2007-08 OY of 2,499 mt (OY Alternative 2) as the final Council-preferred alternative.

Subsequent to the Council's decision on petrale sole harvest specifications in June 2006 it was discovered the 2007 ABC specification was in error. The Council should have specified an ABC of 3,025 mt for 2007, which is the sum of the northern ABC of 1,397 mt and the southern ABC of 1,628 mt from the Lai et al. (2006) assessment. Instead, the 2007 ABC of 2,917 mt chosen by the Council in June was incorrectly calculated by summing the northern 40-10 adjusted OY of 1,289 mt and the southern ABC of 1,628 mt. Therefore, the Council made a technical correction to the 2007 petrale sole ABC by specifying an ABC of 3,025 mt at their September 2006 meeting (Table 2-1). The 2008 ABC value of 2,919 mt recommended by the Council is calculated correctly as the sum of the northern ABC of 1,475 mt and the southern ABC of 1,444 mt and therefore did not need to be changed.

Sablefish

A new sablefish (*Anoplopoma fimbria*) assessment was done in 2005 (Schirripa and Colbert 2006) indicating the coastwide spawning stock biomass in 2005 was $B_{35.2\%}$. Since this level of depletion is less than $B_{40\%}$, this is considered a "precautionary zone" stock.

The West Coast sablefish stock is managed using a coastwide ABC determined using the proxy F_{MSY} rate of $F_{45\%}$ and total catch OYs specified north and south of 36º N latitude. The Council identified the following alternatives to be analyzed for the coastwide sablefish stock: a coastwide OY of 4,574 mt (OY Alternative 1; total catch OYs north and south of 36º N latitude of 4,411 mt and 162 mt, respectively) and a coastwide OY of 5,934 mt (OY Alternative 2; total catch OYs north and south of 36º N latitude of 5,723 mt and 210 mt, respectively) (Table 2-1). This compares to the status quo coastwide OY of 7,761 mt in 2005 (total catch OYs north and south of 36º N latitude of 7,486 mt and 275 mt, respectively) and 7,634 mt in 2006 (total catch OYs north and south of 36º N latitude of 7,363 mt and 271 mt, respectively). 2007 and 2008 coastwide ABCs identified for analysis are 6,210 mt and 6,058 mt, respectively. OY Alternative 1 is calculated by applying the 40-10 adjustment to the ABC using the low stock/production model in the 2005 sablefish assessment, which assumes a survey catchability coefficient (q) of 0.37 and a spawner-recruit curve steepness (h) of 0.26. OY Alternative 2 is calculated by applying the 40-10 adjustment to the projected ABC using the assessment's base case model, which assumes a survey catchability coefficient (q) of 0.33 and a spawner-recruit curve steepness (h) of 0.34.

Each coastwide OY alternative is also divided into total catch OYs north and south of 36º N latitude using status quo proportions, since fixed sablefish allocations are based on the total catch OY for the area north of 36º N latitude. Alternative methods for apportioning the OY were not considered because the STAR Panel (Barnes, *et al.* 2006a) recommended calculating coastwide biomass without including Conception area survey data.

The Council selected the following as the final Council-preferred alternative: a 2007-08 coastwide OY of 5,934 mt (OY Alternative 2; total catch OYs north and south of 36º N latitude of 5,723 mt and 210 mt, respectively) and coastwide ABCs of 6,210 mt in 2007 and 6,058 mt in 2008.

2.1.3 Healthy Groundfish Species

Arrowtooth Flounder

As arrowtooth flounder (*Atheresthes stomias*) is a healthy stock, the Council identified the status quo ABC/OY alternative, 5,800 mt, to be analyzed (Table 2-1) and then selected this as the final Council-preferred ABC and OY alternative. This is the only harvest alternative analyzed in this EIS since the stock has not been assessed since the original catch curve analysis in 1993 (Rickey 1993); and therefore, there is no basis for identifying an alternative other than status quo.

Black Rockfish (in Waters off Oregon and California)

The most recent assessment of black rockfish (*Sebastes melanops*) in waters off Oregon and California was in 2003 (Ralston and Dick 2003). This assessment indicated the stock was healthy with an estimated spawning output in 2002 of $B_{49\%}$. The Council specified one OY alternative for analysis for the portion of the black rockfish stock in waters off Oregon and California, 722 mt (Table 2-1), based on a projection from the base model in the 2003 assessment. The projected ABCs (725 mt in 2007 and 719 mt in 2008) were averaged and specified for each year (722 mt). Since this is a healthy stock with a spawning biomass above $B_{40\%}$, the OY was set equal to the ABC. This compares to the status quo OYs of 753 mt in 2005 and 736 mt in 2006, both of which had been set equal to the ABC for that year. Management of the southern black rockfish stock is divided at the California/Oregon border using state-specific harvest guidelines based on a 58:42 Oregon: California sharing of the OY. 722 mt was chosen as the final Council-preferred ABC and OY alternative.

Black Rockfish (in Waters off Washington)

The northern black rockfish stock in waters off Washington is healthy. Therefore, the Council identified a single ABC/OY alternative, 540 mt, to be analyzed (Table 2-1); the Council then chose this value as the final Council-preferred ABC/OY alternative. This is the same as the status quo ABC/OY for 2005 and 2006 and prior since the stock has not been assessed since 1999 (Wallace, *et al.* 1999)}; therefore, there is no basis for selecting an alternative other than the status quo. This alternative is determined by apportioning the average historical catch share from Washington (88 percent) to the northern ABC for the assessed stock north of Cape Falcon, Oregon.

California Scorpionfish

California scorpionfish (*Scorpaena guttata*) was first assessed in 2005 (Maunder, *et al.* 2006), and therefore 2007 will be the first year in which it is not managed as part of the Minor Nearshore Rockfish South complex and the first time that the Council adopts an ABC and an OY for the stock. The Council has specified two ABC/OY alternatives for analysis: 137 mt and 219 mt (Table 2-1).

The 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).

Both the original stock assessment ABC/OY and the modified stock assessment ABC/OY are provided as alternatives for California scorpionfish. Both alternatives are based upon the assessment model that includes sanitation district data. The first alternative of 137 mt is based on the average projected 2007-08 ABC/OY as modified by the methods described above. The second alternative ABC/OY of 219 mt is based on an average of the 2007 and 2008 ABC/OYs projected from the base model in the assessment without the CPFV modification (2007 = 236 mt, 2008 = 202 mt).

The Council selected an intermediate value, 175 mt, as the final Council-preferred OY alternative for 2007-08; the final Council-preferred ABC for 2007-08 is 219 mt.

Chilipepper Rockfish

The Council has specified two alternatives for 2007-08 chilipepper rockfish (*Sebastes goodei*) OYs: 2,000 mt and 2,700 mt, and one value, 2,700 mt, for the stock's ABC (Table 2-1). An ABC of 2,700 mt and an OY of 2,000 mt is status quo and has been since the last assessment in 1998 (Ralston, *et al.* 1998). The lower OY alternative is a precautionary specification to control the bycatch of bocaccio. The higher OY alternative equals the status quo ABC, since the stock is considered healthy. The rationale for considering this higher alternative is that depth-based management may be an adequate bocaccio bycatch control mechanism. The Council selected the lower OY alternative of 2,000 mt and the 2,700 mt ABC as the final Council-preferred alternative. The GMT notes that fisheries have not been attaining chilipepper rockfish harvest levels in recent years because its harvest has been constrained to protect co-occurring depleted species.

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

Dover Sole

A coastwide Dover sole (*Microstomus pacificus*) assessment was done in 2005 (Sampson 2006) and forms the basis for the stock's recommended 2007-08 harvest specifications. The Council identified an ABC alternative of 28,522 mt for 2007 and 28,442 mt for 2008; these were then selected as the final Council-preferred alternative (Table 2-1). These ABCs were calculated using the $F_{40\%}$ proxy harvest rate and represent the combined total of the north and south portions of the stock. The OY alternatives specified for analysis for Dover sole stock are 16,500 mt and 28,482 mt. This compares to the status quo OYs of 7,476 mt in 2005 and 7,564 mt in 2006. The first OY alternative is equal to the equilibrium MSY from the 2005 stock assessment and the second alternative is set equal to the average of the 2007 and 2008 ABCs. The Council could set an OY as high as the ABC since this is a healthy stock with an estimated spawning stock biomass in 2005 of $B_{63\%}$.

The Council selected the following as the final Council-preferred alternatives: a 2007-08 OY of 16,500 mt and ABCs of 28,522 mt in 2007 and 28,422 mt in 2008.

English Sole

A coastwide English sole (*Parophrys vetulus*) assessment was done in 2005(Stewart 2006) and forms the basis for the stock's recommended 2007-08 harvest specifications. The Council identified an ABC alternative of 6,773 mt for 2007 and 5,701 mt for 2008. These year-specific ABCs were averaged and the resultant average ABC of 6,237 mt was specified for each year as part of the final Council-preferred alternative (Table 2-1). The OY in the final Council-preferred alternative was set to the ABC since this stock is healthy with an estimated spawning stock biomass in 2005 of $B_{91.5\%}$. This compares to the status quo OY of 3,100 mt for 2005 and 2006.

Lingcod

A coastwide lingcod (*Ophiodon elongatus*) assessment was done in 2005 (Jagielo and Wallace 2006) and forms the basis for the stock's recommended 2007-08 harvest specifications. The estimated coastwide spawning stock biomass in 2005 was $B_{60\%}$ indicating this stock, which was formally under rebuilding after having been declared overfished in 1999, is now successfully rebuilt and considered healthy.

The coastwide lingcod OY alternatives specified for analysis are 6,280 mt and 6,088 mt (Table 2-1). This compares to the status quo coastwide OY of 2,414 mt for 2005 and 2006; these 2005-06 specifications were adopted by the Council in accordance with the lingcod rebuilding plan prior to the stock being declared rebuilt from its overfished status in November 2005. While lingcod is currently estimated to be above 40 percent of unfished biomass on a coastwide basis, the southern portion of the stock in California is estimated to be just below 25 percent. The first alternative does not apply the 40-10 adjustment to the California portion of the coastwide OY, while the second alternative does apply the 40-10 adjustment. The OYs are also subdivided by INPFC regions according to the stratification in the assessment (Columbia and US-Vancouver areas; and Eureka, Monterey, and Conception areas) and by latitude (north and south of 42° N latitude) to provide for state-based management. The Council's specified 2007 and 2008 ABC alternatives for analysis are 6,706 mt and 5,853 mt, respectively.

The Council selected 6,280 mt as the final Council-preferred ABC alternative, which is the average of the 2007 and 2008 coastwide ABCs projected from the base model in the assessment. The final Council-preferred OY alternative for north of 42° N latitude is 5,558 mt and 612 mt for the area south of 42° N latitude. The final Council-preferred OY alternative for south of 42° N latitude is based on a proposal from CDFG to maintain the current status quo OY of 612 mt, which is an intermediate value between OY Alternatives 1 and 2. The final Council-preferred alternative therefore recommends managing the lingcod stock with two separate OYs specified north and south of the Oregon-California border at 42° N latitude.

Longspine Thornyhead

A coastwide longspine thornyhead (*Sebastolobus altivelis*) assessment was done in 2005(Fay 2006) and forms the basis for the stock's recommended 2007-08 harvest specifications. The coastwide longspine thornyhead OY alternatives specified for analysis are 2,696 mt and 3,930 mt (Table 2-1). This compares to the status quo OY of 2,656 mt for 2005 and 2006. The first alternative, 2,696 mt, is based on assuming constant density throughout the Conception area and the proportion of the area north and south of Pt. Conception (21 percent of the Conception area) with a 25 percent precautionary reduction to account for higher assessment uncertainty. The second alternative, 3,930 mt, is based on assuming constant density throughout the Conception area and the proportion of the area north and south of Pt. Conception (21 percent of the Conception area) without the precautionary 25 percent reduction. As a healthy stock with a spawning stock biomass in 2005 of $B_{71\%}$, the OY can be set equal to the ABC, which is how the second alternative was determined. The OYs are also subdivided north and south of Pt. Conception (34°27' N latitude) to distribute harvest opportunities proportional to the relative abundance of the resource. However the status quo alternative OYs for 2005 and 2006 were specified north and south of 36° N latitude. The Council's specified ABC alternatives for 2007 and 2008 are 3,953 mt and 3,860 mt, respectively.

The Council selected 3,907 mt as the final Council-preferred coastwide ABC alternative. The Council did not adopt a preferred OY alternative at a coastwide level, but rather specified separate preferred OY alternatives for north and south of Pt. Conception at 34°27' N latitude. The final Council-preferred OY alternative for north of Pt. Conception is 2,220 mt and, for south of Pt. Conception, the OY is 476 mt.

Shortbelly Rockfish

Shortbelly rockfish (*Sebastes jordani*) is unexploited due to its small size, except as infrequent incidental catch. The 13,900 mt ABC/OY is a continuation of a conservative Council policy for this species based on a catch curve analysis in 1989 (Pearson 1989). Since that "assessment", the peak one-year shortbelly landings have been <100 mt.

The final Council-preferred ABC/OY alternative is 13,900 mt.

Shortspine Thornyhead

A coastwide shortspine thornyhead (*Sebastolobus alascanus*) assessment was conducted in 2005 (Hamel 2006c) and forms the basis for the stock's recommended 2007-08 harvest specifications. The stock is considered healthy with an estimated spawning stock biomass in 2005 of $B_{62.9\%}$.

A coastwide OY is not proposed under this EIS. Instead, alternatives for separate OYs north and south of Pt. Conception at 34°27' N latitude are proposed. The status quo OY of 1,055 mt for 2005 and 1,077 mt for 2006 applied only to the area north of Pt. Conception. The Council's specified coastwide ABC alternatives for 2007 and 2008 are 2,488 mt and 2,463 mt, respectively.

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

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

The Council selected 2,476 mt as the final Council-preferred coastwide ABC alternative. However, the Council did not adopt a preferred coastwide OY alternative, but rather specified separate preferred OY alternatives for north and south of Pt. Conception. The final Council-preferred OY alternative north of Pt. Conception is 1,634 mt and, for south of Pt. Conception, it is 421 mt.

Splitnose Rockfish

A 1994 splitnose rockfish (*Sebastes diploproa*) assessment (Rogers 1994) forms the basis for status quo and proposed 2007-08 harvest specifications for this stock. As in 2005-06, 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 615 mt and 461 mt as the final 2007-08 Council-preferred ABC and OY, respectively.

Starry Flounder

Starry flounder (*Platichthys stellatus*) was assessed for the first time in 2005 (Ralston 2006) and is now proposed to be managed with a separate ABC and OY. Previously, the stock had been managed as a component stock of the Other Flatfish complex. Therefore, there are no status quo ABC or OY alternatives for the stock. The Council requested the following two OY alternatives for analysis: 890 mt and 1,186 mt (Table 2-1). OY Alternative 1 (890 mt) is based on a 25 percent reduction of the combined area OYs from the base model in the stock assessment as a result of the 25 percent precautionary reduction for data-poor stocks. OY Alternative 2 (1,186 mt) is based on the combined area OYs from the based model in the stock assessment without the 25 percent precautionary reduction. The ABC alternative identified by the Council is 1,221 mt for 2007 and 1,395 mt for 2008.

The Council chose 1,221 mt and 890 mt as the final Council-preferred 2007-08 ABC and OY, respectively.

Yellowtail Rockfish

Yellowtail rockfish (*Sebastes flavidus*) is a healthy rockfish stock that had a new stock assessment in 2005(Wallace and Lai 2006). Year-specific ABCs were projected following the Council's policy of using an $F_{50\%}$ harvest rate as a proxy for F_{MSY} for rockfish; the 2007 ABC for this species is 4,585 mt and the 2008 ABC is 4,510 mt. These ABCs were averaged (4,548 mt) and specified for both years. The OYs were set equal to ABC because the stock is above $B_{40\%}$. The GMT notes that the fisheries have not been attaining yellowtail rockfish harvest levels in recent years because its harvest has been constrained to protect co-occurring depleted species.

The Council chose 4,548 mt as the final Council-preferred ABC alternative and the final Council-preferred OY alternative in 2007-08.

2.1.4 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: Minor Nearshore Rockfish, Minor Shelf Rockfish, and Minor Slope Rockfish. The Council has identified four Minor Rockfish South OY alternatives for analysis: 1,753 mt, 1,855 mt, 1,898 mt, and 2,006 mt (Table 2-1). The OY alternatives calculated for nearshore species, shelf species, and slope species sum to equal the overall Minor Rockfish South OY alternatives. These 2007-08 OY alternatives compare to the status quo Minor Rockfish South OY of 1,968 mt.

The ABC alternative for the Minor Rockfish South complex identified by the Council for analysis is 3,403 mt. This compares to a status quo ABC of 3,412 mt for 2005 and 2006. The ABC alternative for 2007 and 2008 reflects three adjustments to account for the reassessment of blackgill rockfish and the new assessments for gopher rockfish and California scorpionfish (the Council elected to continue management of blackgill and gopher rockfish within the Minor Rockfish South complex and manage California scorpionfish with stock-specific harvest specifications). First, the status quo contribution of blackgill rockfish to the ABC (343 mt) was removed from the complex ABC and replaced with the new blackgill ABC/OY of 292 mt (based on the 2007-08 average ABC/OY). This results in an overall reduction of 51 mt from the ABC. Second, the status quo contribution of gopher rockfish (97 mt) was removed and replaced with the new gopher rockfish ABC/OY of 302 mt (based on the 2007-08 average ABC/OY), resulting in an overall increase of 205 mt to the ABC. Third, the status quo contribution of California scorpionfish (163 mt) was removed from the ABC as this species will now be managed under its own ABC/OY.

The Council chose 3,403 mt as the final Council-preferred ABC alternative in 2007-08 and 1,904 mt as the final Council-preferred OY alternative in 2007-08.

Minor Nearshore Rockfish Species

The complex, Minor Nearshore Rockfish south of 40°10' N latitude, is further subdivided into the following management categories: 1) shallow nearshore rockfish [comprised of black and yellow rockfish (*S. chrysomelas*); China rockfish (*S. nebulosus*); gopher rockfish (*S. carnatus*); grass rockfish (*S. rastrelliger*), and kelp rockfish (*S. atrovirens*)]; 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*)]. California scorpionfish was part of this complex, but on the basis of the new assessment in 2005, the Council elected to remove this species from the complex and specify a species-specific ABC/OY beginning in 2007.

For the 2003 Minor Rockfish South OY, the Council adopted a nearshore species contribution equal to 541 mt. This was based upon the Groundfish FMP policy for specifying OYs for unassessed species using 50 percent of recent landings, and was recalculated from the 2001-2002 OY of 662 mt using updated estimates of recreational and commercial harvest. For the 2004 nearshore contribution to the OY, an adjustment was made to account for removal of black rockfish; however, this adjustment started with the 2002 OY contribution of 662 mt and not the 2003 OY contribution of 541 mt. The resulting OY contribution of 615 mt was adopted by the Council for 2004 for the 2005-06 management cycle. For the 2007-08 management cycle, the Minor Nearshore Rockfish South OY is corrected by subtracting the black rockfish OY of 47 mt from the 541 mt OY contribution, resulting in a value of 494 mt.

This initial value for the southern Minor Nearshore Rockfish species OY contribution is then adjusted to account for the new California scorpionfish and gopher rockfish assessments. The current contribution for California scorpionfish of 81.5 mt is removed from the combined OY. Because gopher rockfish cannot be managed separately from other nearshore rockfish species without significantly increasing bycatch and because of uncertainty regarding the assessment because of its poor data quality, gopher rockfish will remain in the southern Minor Nearshore Rockfish species OY and will have a point of concern set at a level determined appropriate to the adopted OY. The following four alternatives portray different methods for accounting for these changes. The 413 mt OY alternative includes the 48.5 mt contribution of gopher rockfish (494 mt minus the California scorpionfish contribution of 81.5 mt equals 413 mt). OY alternative 2 is determined by removing the current contribution for gopher rockfish (48.5 mt) from the OY portion and then increasing the gopher rockfish OY contribution by 50 percent of the new gopher rockfish ABC/OY of 302 mt (based on the 2007-08 average ABC/OY; 2007 = 340 mt, 2008 = 264 mt), leading to a value of 515 mt. The 558 mt OY alternative is determined by removing the current contribution for gopher rockfish (48.5 mt) from the OY and then increasing the OY by 75 percent of the new gopher rockfish ABC/OY of 302 mt (based on the 2007-08 average ABC/OY; 2007 = 340 mt, 2008 = 264 mt). OY alternative 4 is determined by removing the current contribution for gopher rockfish (48.5 mt) from the OY portion and then increasing the OY by the new gopher rockfish ABC/OY of 302 mt (based on the 2007-08 average ABC/OY; 2007 = 340 mt, 2008 = 264 mt), leading to an OY of 666 mt. These four OY alternatives compare to the status quo 2005-06 OY of 615 mt.

The Council chose 564 mt as the Minor Nearshore Rockfish South OY as part of the final Council-preferred alternative for the Minor Rockfish South complex in 2007-08. This value is derived from a change to the gopher rockfish contribution to the OY to 200 mt, which is intermediate between

Alternatives 2 and 3. A point of concern of 200 mt will be set for gopher rockfish for 2007-08 and will be used to monitor the need to adjust catch levels inseason.

Minor Shelf Rockfish Species

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

The Council has identified the status quo OY of 714 mt as the only alternative to be analyzed for this complex during the 2007-08 management cycle (Table 2-1). This is therefore the OY for the Minor Shelf Rockfish South complex under the final Council-preferred alternative.

Minor Slope Rockfish Species

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

The Council identified one OY alternative of 626 mt for this complex, which is therefore the OY for the Minor Slope Rockfish South complex under the final Council-preferred alternative. This OY was determined by the following calculation: the status quo contribution of blackgill rockfish (305 mt) was removed from the complex and replaced with the new blackgill ABC/OY of 292 mt (based on the 2007-08 average ABC/OY; 2007 = 294 mt, 2008 = 290 mt). This alternative compares to the status quo 2005-06 OY of 639 mt. A point of concern of 292 mt will be set for blackgill rockfish for 2007-08 and will be used to monitor the need to adjust catch levels inseason.

2.1.4.2 Minor Rockfish North

The Minor Rockfish North complex is comprised of three major assemblages of rockfish species: Minor Nearshore Rockfish, Minor Shelf Rockfish, and Minor Slope Rockfish. The Council has identified three Minor Rockfish North OY alternatives for analysis: 2,250 mt, 2,270 mt, and 2,290 mt (Table 2-1). These OY alternatives represent the sums of the corresponding alternatives for nearshore species, shelf species, and slope species OYs. These 2007-08 OY alternatives compare to the status quo OY of 2,250 mt.

The Council chose the 2005-06 status quo ABC of 3,680 mt as the final Council-preferred Minor Rockfish North ABC in 2007-08 and 2,270 mt as the final Council-preferred Minor Rockfish North OY alternative in 2007-08.

Minor Nearshore Rockfish Species

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

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

The Council chose an OY of 142 mt for the Minor Rockfish North complex under the final Council-preferred OY alternative for 2007-08.

Minor Shelf Rockfish Species

The 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 Minor Shelf Rockfish North complex, 968 mt, is recommended under the final Council-preferred alternative for 2007-08 (Table 2-1).

Minor Slope Rockfish Species

The 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 final Council-preferred alternative for 2007-08 (Table 2-1).

2.1.4.3 Other Unassessed Species

Pacific Cod

The West Coast population of Pacific cod (*Gadus macrocephalus*) has never been formally assessed. Therefore, as in 2005-06, 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 (Table 2-1).

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 final Council-preferred alternative.

Other Fish

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

The Council uses historical landings to specify the ABC of 14,600 mt and an OY of 7,300 mt for the Other Fish complex, which is consistent with the Council's precautionary 50 percent OY adjustment for unassessed species (Table 2-1). With no new information available regarding the status of species in the Other Fish complex, no change from status quo is identified by the Council for analysis. Therefore, the ABC and OY of 14,600 mt and 7,300 mt, respectively are recommended under the final Council-preferred alternative.

Kelp greenling was assessed for the first time in 2005. Though the assessment covered both California and Oregon, the Council adopted only the Oregon substock assessment for use in management. Due to the considerable uncertainty associated with the assessment, the Council furthermore decided not to set independent harvest specifications for kelp greenling. Rather, the Council considered two different approaches with respect to the harvest guideline for kelp greenling in Oregon waters (1) to not adopt a Federal harvest guideline or (2) to set the Federal harvest guideline equal to the state harvest guideline.
The stock assessment indicates that the state of Oregon is managing at a level lower than that which could be harvested sustainably, given that the substock biomass is above $B_{40\%}$ (and so the harvest level could be set equal to the ABC). Given this precautionary management maintained by the state, the Council decided, under the final Council-preferred alternative, not to adopt a Federal harvest guideline for kelp greenling for the 2007-08 management cycle, with the state of Oregon retaining management authority of this species.

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*).

2007-08 harvest specifications for the Other Flatfish complex differ from status quo since there is a new assessment for starry flounder. On that basis, the Council recommends removing starry flounder from the complex and managing that stock with its own ABC/OY (see discussion above). The Council has identified an Other Flatfish OY alternative of 4,884 mt to be analyzed. This OY is based on the ABC with a 25 percent precautionary reduction for sanddabs and rex sole and a 50 percent precautionary reduction for the remaining species. The starry flounder contribution (25 mt) is removed from the status quo Other Flatfish OY (4,909 mt) to determine the recommended 4,884 mt OY for 2007-08 (Table 2-1).

The Council has identified an ABC alternative of 6,731 mt to be analyzed for 2007 and 2008. This ABC alternative is based on the following historical catch levels: the highest landings of Pacific sanddabs (in 1995) and rex sole (in 1982) for the 1981-2003 period and, on average, landings during 1994-1998 for the remaining Other Flatfish species. The starry flounder contribution to the ABC (50 mt) is removed from the status quo ABC (6,781 mt) to determine the recommended 6,731 mt ABC for 2007-08 (Table 2-1).

The Council recommends the Other Flatfish ABC of 6,731 mt and an OY of 4,884 mt under the final Council-preferred alternative for 2007-08.

2.1.5 Alternative Harvest Levels Considered, But Eliminated From Detailed Study

The new darkblotched rebuilding analysis indicates that some otherwise viable OY alternatives exceed the ABC, which is based on a proxy F_{MSY} harvest rate. However, a stock's OY cannot legally exceed the ABC, which for darkblotched is 456 mt and 486 mt in 2007 and 2008, respectively. Therefore, OY Alternative 5 (472 mt) can only be considered in 2008 as a year-specific OY. Since the Council intends to average the darkblotched OY from rebuilding analysis projections and specify the same average OY for 2007 and 2008, OY Alternative 5 is eliminated from detailed study.

Yelloweye OY Alternatives specified by the Council in November 2005 for analysis were based on the 2005 rebuilding analysis by Tsou and Wallace (2005)[9]. However, a new yelloweye assessment and rebuilding analysis were adopted as the best available science by the Council in 2006. The new rebuilding analysis (Tsou and Wallace 2006) indicates a 2007-08 OY $\geq$ 15 mt for yelloweye would result in a less than a 50 percent probability of rebuilding by T_{MAX}, which is not legally viable. Therefore, OY Alternatives 3-6 under a constant harvest rate rebuilding strategy are eliminated from further study in this EIS.

[9] Since the 2005 yelloweye assessment (Wallace et al. 2005) and rebuilding analysis (Tsou and Wallace 2005) were superseded by the 2006 assessment (Wallace et al. 2006) and rebuilding analysis (Tsou and Wallace 2006), they were not published in a Stock Assessment and Fishery Evaluation document. However, these documents are posted on the Council's web site at pcouncil.org for those who are interested.

2.2 Alternative Management Measures

2.2.1 Catch Sharing Agreements and Yield Set-Asides

2.2.1.1 Catch Sharing Guidelines

2007-08 harvest allocations for canary rockfish, yelloweye rockfish, and black rockfish are included within the final Council-preferred Action Alternative.

The California Fish and Game Commission (CFGC) has delegated authority to the California Department of Fish and Game (CDFG) to take management action to stay within Council-adopted harvest guidelines and OYs. Therefore, in order to facilitate inseason action by CDFG, the Council adopted recreational harvest guidelines for the more constraining stocks (i.e., canary rockfish, yelloweye rockfish, black rockfish, and lingcod). A description of the Council-preferred harvest guidelines follows.

<u>Canary Rockfish and Yelloweye Rockfish</u>

Under the final Council-preferred Action Alternative the recreational harvest guidelines for canary and yelloweye rockfish are:

	2007 Recreational HGs	2008 Recreational HGs
Canary rockfish	8.2 mt – Washington/Oregon 9.0 mt – California	8.2 mt – Washington/Oregon 9.0 mt – California
Yelloweye rockfish	6.8 mt – Washington/Oregon 2.1 mt – California 1.5 mt – Sport residual	6.8 mt – Washington/Oregon 2.1 mt – California

Upon adoption of these harvest guidelines, the Council noted their intent to reserve the 1.5 mt yelloweye rockfish residual in 2007 for use by recreational fisheries in the three states, if needed. However, they also stated that if it were determined inseason that the additional harvest would not be needed by the recreational fisheries, they would consider providing this to another fishery to prevent its premature closure.

Upon approval of this EIS, these recreational harvest guidelines will be adopted in Federal regulations via the footnotes to the ABC/OY tables published in 50 CFR 660. As in past years, NMFS will also publish any estimated research catch, tribal allocations, recreational set-asides, open access allocations, and limited entry trawl and non-trawl allocations, as appropriate, in the footnotes to those tables. Unless otherwise previously designated by regulation, allocation scheme, or specified by the Council, NMFS will use the values provided in Table 2-24, the bycatch scorecard for the final Council-preferred Action Alternative.

<u>Black Rockfish</u>

Under the final Council-preferred Action Alternative, the black rockfish catch sharing framework for 2007-08 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 419 mt and a California harvest guideline of 303 mt. The states of California and Oregon have factored in precautionary approaches in managing to these black rockfish targets. Washington fisheries will manage to the northern black rockfish OY of 540 mt, which is the same as status quo.

2.2.1.2 Research Catches

Under the MSA and the Pacific Coast Groundfish FMP, the term fishing refers to the catching, taking, or harvesting of fish; the attempted catching, taking, or harvesting of fish; any other activity which can reasonably be expected to result in the catching, taking, or harvesting of fish; or any operations at sea in support of, or in preparation for the catching, taking, or harvesting of fish. Activity by a vessel conducting authorized scientific research is not considered fishing under the MSA or the Pacific Coast Groundfish FMP. However, nothing within the MSA or the Pacific Coast Groundfish FMP is intended to inhibit or prevent any scientific research activity conducted by a scientific research vessel.

The Federal regulations, § 600.310 (f)(4)(iii) require that fishing mortality be counted against the OY, including that resulting from bycatch, scientific research, and other fishing activities. In past years, prior to the establishing harvest guidelines for fishing activities, the Council has set aside a portion of the OY for each stock of stock complex projected to be taken by vessels conducting scientific research. The projected amounts were based on the most recent years' research catch summaries and were modified to account for changes in research activities between years. Because the research catch amounts are projections, the catch levels have on occasion been modified during the year when the catch of a constraining overfished species was higher than originally projected.

Table 2-4 summarizes the scientific research catch for 2005. Research catch projections for the overfished species are presented in the estimated mortality impact tables (i.e., bycatch scorecards) that have been prepared for each alternative. For 2007 and 2008, the depleted species' research catch projections are held constant under the different alternatives with the exception of yelloweye rockfish. Yelloweye rockfish values are increased over previous years in response to an increase in survey stations in the IPHC's annual Pacific Halibut longline survey. The additional survey stations are in yelloweye rockfish habitat and are expected to provide much needed fishery independent biological data on yelloweye. However, under the Preferred Low OY alternatives for depleted species, the new IPHC survey stations are not included. The values for bocaccio, widow and canary rockfish are based on the summary of research catch in 2005. These values were rounded up given the understanding that the biomass levels for these stocks are increasing and therefore, they will be more likely to be taken in research catches. Cowcod projections are also based on the summary of 2005 research catch. Although the total research catch in 2005 for darkblotched rockfish and POP was lower than originally projected, the research catch amounts for 2007 and 2008 are the same as those set aside at the beginning of 2005. The catch of these species varies considerably between years (darkblotched rockfish: 5.14 mt in 2003, 0.08 in 2004, and 2.08 mt in 2005; POP: 5.0 mt in 2003, 0.35 mt in 2004, 1.84 mt in 2005). In addition, the biomass levels for these stocks are increasing and they are more likely to be taken in research catches.

2.2.1.3 Exempted Fishing Permit Catches

Applications for a 2007 Exempted Fishing Permit (EFP) will be considered by the Council in November 2006 (and likewise 2008 EFP applications will be considered in November 2007). However, applications received prior to the June 2006 Council meeting were reviewed by the Council, and the applications' depleted species mortality set-aside requests were considered when adopting the Council-Preferred depleted species OYs and Action Alternative. The requested set-asides from two of the applications were included within the final Council-preferred Action Alternative bycatch scorecard (Table 2-24) as preliminary EFP caps. Using the values from these applications does not assure that the applications will be accepted in November; the Council will choose from among any of the EFP applications received by that time or may choose instead to distribute that harvestable amount in another manner.

Table 2-4. Summary of total catch (mt) data from scientific fishing in 2005.

Species	Post-capture behavior and mortality of important bycatch species	Ultrasonic camera examinations of interactions between groundfish and fishing gear	Northwest Fisheries Science Center to conduct a pre-recruit hake survey	Northwest Fisheries Science Center annual bottom trawl survey	U.S. – Canada Joint Pacific Hake Echo Integration Trawl Survey	Northwest Fisheries Science Center integrated study of the ecology of pre-recruit fish	International Pacific Halibut Commission - Pacific Halibut Longline Survey	Pacific Coast Groundfish Conservation Trust - Canary Rockfish Survey	Total (mt)
ROUNDFISH:									
Lingcod			0.00	4.00	0.01		0.22	0.20	**4.54**
Pacific Cod				0.21	0.00		0.02		**0.23**
Pacific Whiting		1.77	0.06	15.41	43.58	0.00	0.05		**60.86**
Sablefish N. of 36° N. lat.	0.00	0.76	0.00	7.56			7.24		**15.56**
Sablefish S. of 36° N. lat.				2.17					**2.17**
Cabezon			0.00	0.00					**0.00**
FLATFISH:									
Dover Sole		1.71		28.12	0.00				**29.83**
English Sole	0.00			4.39					**4.39**
Petrale Sole				3.51					**3.51**
Arrowtooth Flounder		0.52		5.47	0.01		0.05	0.00	**6.05**
Other Flatfish	0.01	0.17	0.00	13.28		0.01	0.01		**13.48**
ROCKFISH:									
Pacific Ocean Perch		0.02		1.26	0.56				**1.84**
Shortbelly			0.00	8.20	0.01				**8.21**
Widow			0.00	0.19	0.85	0.00		0.00	**1.11**
Canary			0.00	1.47	0.01	0.00	0.02	0.79	**2.32**
Chilipepper (South)			0.00	13.07	0.19				**13.37**
Bocaccio (South)				0.40	0.00			0.01	**1.69**
Splitnose (South)				2.68	1.63				**4.31**
Yellowtail (North)			0.00	3.23	1.35		0.01	0.14	**4.73**
Shortspine Thornyhead		0.87		3.81			0.01		**4.68**
Longspine Thornyhead N. of 36° N. lat.				9.40					**9.40**
Longspine Thornyhead S. of 36° N. lat.				0.94					**0.94**
Cowcod - Conception				0.01					**0.08**
Cowcod - Monterey				0.02					**0.02**
Darkblotched		0.02	0.00	2.05	0.01	0.00	0.00		**2.08**
Yelloweye				0.07			0.47	0.11	**0.64**
Black Rockfish			0.00	0.00	0.01		0.00	0.00	**0.01**

Table 2-4. Summary of total catch (mt) data from scientific fishing in 2005 (continued).

Species	Post-capture behavior and mortality of important bycatch species	Ultrasonic camera examinations of interactions between groundfish and fishing gear	Northwest Fisheries Science Center to conduct a pre-recruit hake survey	Northwest Fisheries Science Center annual bottom trawl survey	U.S. – Canada Joint Pacific Hake Echo Integration Trawl Survey	Northwest Fisheries Science Center integrated study of the ecology of pre-recruit fish	International Pacific Halibut Commission - Pacific Halibut Longline Survey	Pacific Coast Groundfish Conservation Trust - Canary Rockfish Survey	Total (mt)
MINOR ROCKFISH NORTH				10.68	0.03				**10.71**
Remaining Rockfish North				6.61					**6.61**
Bocaccio			0.00	0.02	0.02		0.00	0.02	**0.07**
Chilipepper				1.12	0.05				**1.18**
Redstripe		0.00		0.06	0.10	0.00		0.01	**0.17**
Sharpchin			0.00	3.04					**3.04**
Silvergrey				0.10	0.03		0.00		**0.13**
Splitnose		0.53		2.24					**2.77**
Yellowmouth				0.04	0.57		0.00		**0.60**
Other Rockfish North		0.17	0.00	4.06			0.22	0.05	**4.50**
MINOR ROCKFISH SOUTH				8.11					**10.38**
Remaining Rockfish South				0.35					**0.53**
Bank				0.02					**0.06**
Blackgill				0.26					**0.27**
Sharpchin				0.00					**0.00**
Yellowtail				0.07				0.24	**0.44**
Other Rockfish South				7.76					**9.66**
Unidentifiable Rockfish						0.01			**0.01**
SHARKS/SKATES/RATFISH/GRENADIERS/KELP GREENLING									
Kelp Greenling				0.02					**0.02**
Spiny Dogfish		0.01	0.00	8.71	0.61	0.00	5.47		**14.81**
Other Groundfish		0.11		15.96	0.44		2.27	0.10	**18.88**

2.2.2 New Management Lines

New management lines being considered for 2007-08 include a 10 fm line in Washington to manage recreational fisheries, a 20 fm line in Washington and Oregon for managing recreational and nearshore commercial fisheries[10], a 25 fm line in Washington Marine Areas 1 and 2 (from the Oregon/Washington border to the Queets River) for managing the Washington recreational fishery, a 180 fm line modified for petrale sole fishing areas in California (south of 42º N latitude to US/Mexico border) to provide for winter petrale fishing, a 250 fm line south of 38º N latitude for use in managing commercial slope fisheries, and an accompanying 250 fm line modified for petrale sole fishing areas south of 38º N latitude.

The Oregon Department of Fish and Wildlife is proposing a 25 fm Rockfish Conservation Area (RCA) line for Council adoption. This line would replace the current 27 fm RCA line in regulation. Due to the geography of the coast, and the methods by which these lines were drawn, there is little difference in area between the 25 fm RCA line and the 27 fm RCA line. This would, however, provide consistency in groundfish regulations between Washington and Oregon, as there would be a continuous 25 fm RCA line beginning at the Queets River and continuing to the Oregon/California border, thus simplifying regulations and providing RCA line consistency to the fishing community.

Additionally, the GMT intends to review the existing petrale sole fishing areas used to manage limited entry trawl fisheries during periods 1 and 6 and may recommend modifications to the boundaries defining these Groundfish Fishing Areas. Any coordinates defining new management lines are anticipated to be provided at the June 2006 Council meeting in Foster City, California.

2.2.3 Description of the Management Measure Alternatives

2.2.3.1 The No Action Alternative

The No Action Alternative is described by the 2005 and 2006 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 2006 in reaction to problems that arose in managing the 2005 fishery. While 2005 management measures, including inseason adjustments, will be described in detail, the 2006 management measures and projected impacts will be 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 2-5.

[10] The new 20 fm line in Washington and Oregon is expected to be formally defined with waypoints for 2007-08 to better enforce any 20 fm depth restriction that might be implemented. California has been managing their recreational and nearshore commercial fisheries with a 20 fm depth restriction regionally, but this regulation is specified referencing depth contours rather than a defined line using latitude/longitude coordinates or waypoints. This was adopted because the majority of the 20 fm depth contour is within state waters, with the exception of an area off of San Francisco over sandy habitat where depleted rockfish (e.g., bocaccio) are not expected to be encountered. This nearshore depth contour winds along a rugged coastline and is considered by CDFG enforcement to be more successfully enforced as a depth contour. Therefore, CDFG intends to continue managing the 20 fm depth restriction by contours.

Table 2-5. Projected mortality (mt) of depleted groundfish species by fishing sector in 2006.

Fishery	Bocaccio a/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting	47.4	7.8	**2.7**	160.3	63.3	1.0	0.3
Limited Entry Trawl- Whiting							
At-sea whiting motherships				4.7	1.0		0.0
At-sea whiting cat-proc		4.7		6.3	2.9	200.0	0.0
Shoreside whiting				5.2	1.8		0.0
Tribal whiting		1.6		0.0	0.6	6.1	0.0
Tribal							
Midwater Trawl		1.8		0.0	0.0	40.0	0.0
Bottom Trawl		0.8		0.0	3.7	0.0	0.0
Troll		0.5		0.0	0.0		0.0
Fixed gear		0.3		0.0	0.0	0.0	2.3
Limited Entry Fixed Gear	13.4	1.2	0.1	1.3	0.4	0.5	2.9
Open Access: Directed Groundfish	10.6	3.0	0.1	0.2	0.1	0.1	3.0
Open Access: Incidental Groundfish							
CA Halibut	0.1	0.1		0.0	0.0		
CA Gillnet b/	0.5			0.0	0.0	0.0	
CA Sheephead b/				0.0	0.0	0.0	0.0
CPS- wetfish b/	0.3						
CPS- squid c/							
Dungeness crab b/	0.0		0.0	0.0	0.0		
HMS b/		0.0	0.0	0.0			
Pacific Halibut b/	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pink shrimp	0.1	0.1	0.0	0.0	0.0	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	1.6	0.0	0.0	0.0	0.3	0.2
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)							
Recreational Groundfish d/							
WA		8.5					6.7
OR						1.4	
CA	60.0	9.3	0.4			7.0	3.7
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.							
	2.0	3.0	0.1	3.8	3.6	0.9	1.0
Non-EFP Total	134.7	44.3	3.4	181.9	77.4	257.3	20.3
EFPs e/							
CA early season whiting S. of 40°10'	0.3	0.1	0.0	0.2	0.0	0.4	0.0
EFP Subtotal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	134.7	44.3	3.4	181.9	77.4	257.3	20.3
2006 OY	**309**	**47.0**	**4.2**	**200**	**447**	**289**	**27**
Difference	174.3	2.7	0.8	18.2	369.6	31.7	6.7
Percent of OY	43.6%	94.2%	81.0%	90.9%	16.5%	89.0%	75.1%
Key	(shaded)	= either not applicable; trace amount (<0.01 mt); or not reported in available data sources.					

a/ South of 40°10' N. lat.

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

c/ Bycatch amounts by species unavailable, but bocaccio occurred in 0.1 percent of all port samples and other rockfish in another 0.1 percent of all port samples (and squid fisheries usually land their whole catch). In 2001, out of 84,000 mt total landings 1 mt was groundfish. This suggests that total bocaccio was caught in trace amounts.

d/ Values for canary and yelloweye rockfish represent specified harvest guidelines.

e/ Values are proposed EFP bycatch caps, not estimates of total mortality. The EFP is terminated inseason if the cap is projected to be attained early.

2.2.3.1.1 Limited Entry Trawl Fisheries

Non-Whiting Trawl Fishery

The 2006 trawl trip limits and seasonal RCA configurations (as of May 2006) describe the No Action Alternative and are shown in Tables 2-6a (north of 40°10' N latitude) and 2-6b (south of 40°10' N latitude).

A new management measure implemented in 2005 mandated the use of selective flatfish trawls shoreward of the trawl RCA north of 40°10' N latitude. 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.

In 2005 the non-whiting bottom trawl fishery was constrained with lower slope rockfish trip limits and a larger RCA with a seaward boundary of 200 fm north of 40°10' N latitude in response to a problem with early attainment of the darkblotched rockfish OY in 2004. The period 6 opportunity to harvest petrale sole was also lost in 2004 when the fishery was closed out to 250 fm to minimize further darkblotched rockfish impacts. One consequence of these 2004 management actions was a pent-up demand for petrale sole when the fishery re-opened in 2005. Coupled with this market demand, there was fair winter weather in the north and an abnormal distribution of petrale sole in 2005, which led to an early attainment and exceedance of the petrale sole OY. In response, there was a trip limit imposed on petrale sole in period 1 of 2006, which, in previous years, had been unlimited in periods 1 and 6. The more conservative slope rockfish trip limits and trawl RCA configuration were also re-specified for 2006 to avoid the darkblotched rockfish impacts observed in 2004. And, in a good faith effort to respond to the Ninth Circuit Court of Appeals ruling in a challenge to the darkblotched rockfish rebuilding plan (see section 1.3.1), the Council and NMFS adopted a lower 200 mt darkblotched rockfish OY for 2006 in an emergency rulemaking. This compares to the previously specified darkblotched rockfish OY of 294 mt.

Another change in limited entry trawl management measures from 2005 was the specification of cumulative trip limits for Pacific cod and spiny dogfish beginning in March 2006 (period 2). The Pacific cod ABC of 3,200 mt was based on historical landings since the stock has not been formally assessed. The Pacific cod OY was reduced by half from the ABC beginning in 2005 based on the GMT's recommendation and in accordance with the precautionary policy for unassessed stocks (Restrepo, *et al.* 1998see FMP §4.6.2). In 2004, prior to the precautionary OY reduction, the total mortality of Pacific cod was greater than the current OY of 1,600 mt. Therefore, the Council and NMFS adopted a Pacific cod trip limit beginning in 2006 (Tables 2-6a and 2-6b); previously allowable landings were unlimited. A spiny dogfish trip limit was also specified beginning in 2006 to address conservation concerns and the depleted species' bycatch implications associated with targeting this stock in the open access fishery (see section 2.2.3.1.3 below for more details). Tables 2-6a and 2-6b depict the 2006 spiny dogfish trip limits.

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 2-3).

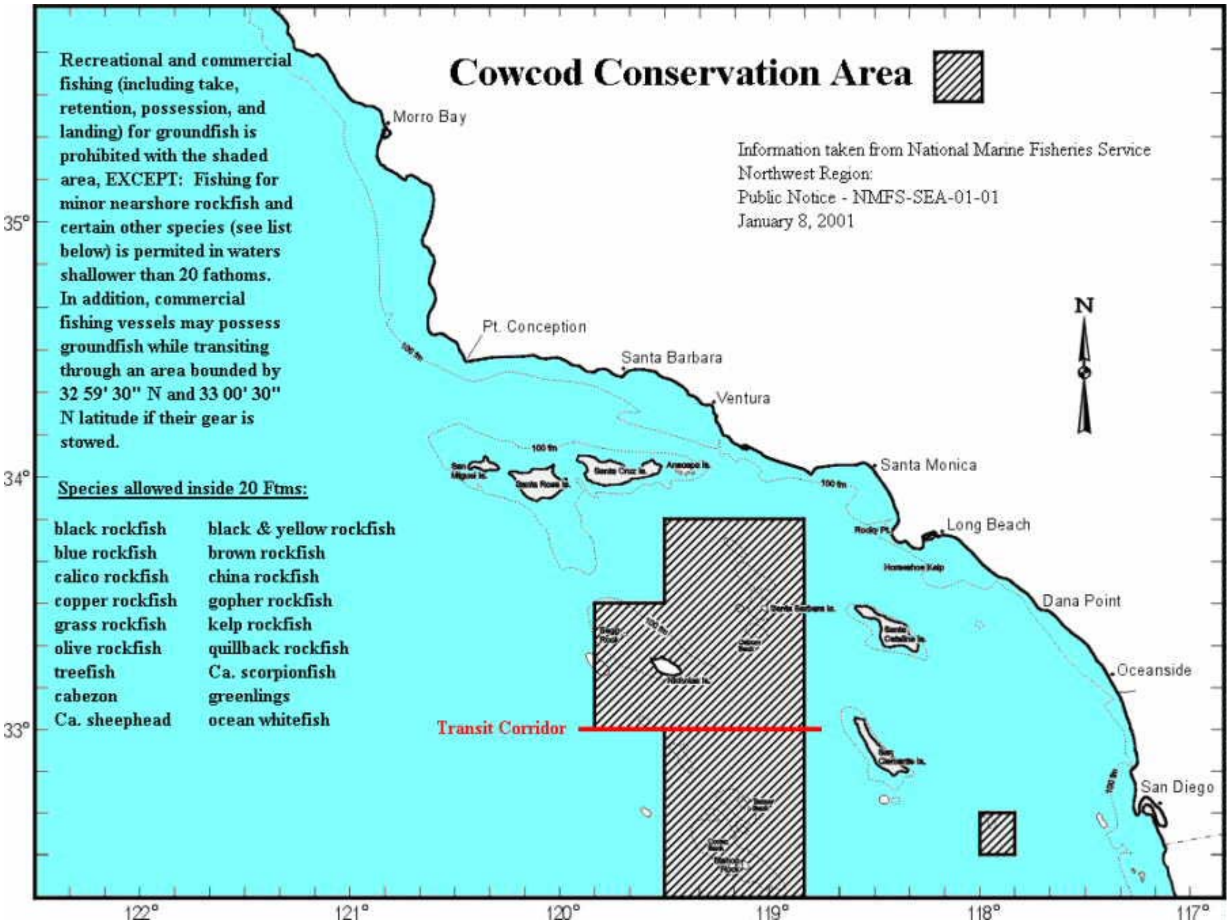


Figure 2-3. The current Cowcod Conservation Areas located in the Southern California Bight.

Whiting Trawl Fishery

The Pacific whiting OY of 269,069 mt, used to manage the 2005 and 2006 West Coast whiting fisheries, forms the basis for the No Action Alternative. The specific 2006 whiting harvest specifications are a coastwide (U.S. + Canada) ABC of 661,680 mt, a coastwide (U.S. + Canada) OY of 364,842 mt, and a U.S. OY of 269,069 mt. The U.S. OY of 269,069 mt is divided by first setting aside the tribal allocation

Table 2-6a. 2006 Trip limits for limited entry trawl gears north of 40°10' N latitude.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table

		JAN	FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA) 6/: North of 40°10' N. lat.	75 fm - modified 200 fm 7/		75 - 200 fm		100 - 200 fm	75 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. 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 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, and Cordell Banks).							
	State trip limits may be more restrictive than federal trip limits, particularly in waters off Oregon and California.							
1	**Minor slope rockfish** 2/ **& Darkblotched rockfish**	2,000 lb/ month		4,000 lb/ 2 months				
2	**Pacific ocean perch**	1,500 lb/ month		3,000 lb/ 2 months				
3	**DTS complex**							
4	Sablefish							
5	large & small footrope gear	7,000 lb/ month		14,000 lb/ 2 months	20,000 lb/ 2 months			14,000 lb/ 2 months
6	selective flatfish trawl gear	2,500 lb/ month		7,000 lb/ 2 months	13,500 lb/ 2 months		7,000 lb/ 2 months	5,000 lb/ 2 months
7	multiple bottom trawl gear 8/	2,500 lb/ month		7,000 lb/ 2 months	13,500 lb/ 2 months		7,000 lb/ 2 months	5,000 lb/ 2 months
8	Longspine thornyhead							
9	large & small footrope gear	7,500 lb/ month		15,000 lb/ 2 months	23,000 lb/ 2 months			15,000 lb/ 2 months
10	selective flatfish trawl gear	1,500 lb/ month		3,000 lb/ 2 months				
11	multiple bottom trawl gear 8/	1,500 lb/ month		3,000 lb/ 2 months				
12	Shortspine thornyhead							
13	large & small footrope gear	2,000 lb/ month		4,000 lb/ 2 months	5,800 lb/ 2 months			4,000 lb/ 2 months
14	selective flatfish trawl gear	1,500 lb/ month		3,000 lb/ 2 months				
15	multiple bottom trawl gear 8/	1,500 lb/ month		3,000 lb/ 2 months				
16	Dover sole							
17	large & small footrope gear	25,000 lb/ month		50,000 lb/ 2 months	35,000 lb/ 2 months			
18	selective flatfish trawl gear	10,000 lb/ month		28,000 lb/ 2 months				20,000 lb/ 2 months
19	multiple bottom trawl gear 8/	10,000 lb/ month		28,000 lb/ 2 months				20,000 lb/ 2 months

Table 2-6a. 2006 Trip limits for limited entry trawl gears north of 40°10' N latitude (continued).

		JAN	FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[6]: North of 40°10' N. lat.	75 fm - modified 200 fm [7]		75 - 200 fm		100 - 200 fm	75 fm - 200 fm	75 fm - modified 200 fm [7]
20	**Flatfish** (except Dover sole)							
21	Other flatfish [3], English sole & Petrale sole							
22	large & small footrope gear for Other flatfish[3] & English sole	55,000 lb/ month		110,000 lb/ 2 months, no more than 30,000 lb/ 2 months of which may be petrale sole.				110,000 lb/ 2 months
23	large & small footrope gear for Petrale sole	30,000 lb/ month						60,000 lb/ 2 months
24	selective flatfish trawl gear for Other flatfish[3] & English sole	45,000 lb/ month		90,000 lb/ 2 months, no more than 25,000 lb/ 2 months of which may be petrale sole.	90,000 lb/ 2 months, no more than 28,000 lb/ 2 months of which may be petrale sole.			90,000 lb/ 2 months
25	selective flatfish trawl gear for Petrale sole	12,500 lb/ month						25,000 lb/ 2 months
26	multiple bottom trawl gear [8]	Other flatfish[3] and English sole: 45,000 lb/ month Petrale sole: 12,500 lb/ month		90,000 lb/ 2 months, no more than 25,000 lb/ 2 months of which may be petrale sole.	90,000 lb/ 2 months, no more than 28,000 lb/ 2 months of which may be petrale sole.			Other flatfish[3] and English sole: 90,000 lb/ 2 months Petrale sole: 25,000 lb/ 2 months
27	Arrowtooth flounder							
28	large & small footrope gear	50,000 lb/ month		100,000 lb/ 2 months				
29	selective flatfish trawl gear	40,000 lb/ month		80,000 lb/ 2 months				
30	multiple bottom trawl gear [8]	40,000 lb/ month		80,000 lb/ 2 months				
31	**Whiting**							
32	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						
33	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						
34	**Minor shelf rockfish[1], Shortbelly, Widow & Yelloweye rockfish**							
35	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						
36	large & small footrope gear	150 lb/ month		300 lb/ 2 months				
37	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
38	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 2-6a. 2006 Trip limits for limited entry trawl gears north of 40°10' N latitude (continued).

		JAN	FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA) [6/]**:** North of 40°10' N. lat.	75 fm - modified 200 fm [7/]		75 - 200 fm		100 - 200 fm	75 fm - 200 fm	75 fm - modified 200 fm [7/]
39	**Canary rockfish**							
40	large & small footrope gear	CLOSED						
41	selective flatfish trawl gear	100 lb/ month			300 lb/ month		100 lb/ month	
42	multiple bottom trawl gear [8/]	CLOSED						
43	**Yellowtail**							
44	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						
45	large & small footrope gear	150 lb/ month		300 lb/ 2 months				
46	selective flatfish trawl gear	1,000 lb/ month		2,000 lb/ 2 months				
47	multiple bottom trawl gear [8/]	150 lb/ month		300 lb/ 2 months				
48	**Minor nearshore rockfish & Black rockfish**							
49	large & small footrope gear	CLOSED						
50	selective flatfish trawl gear	300 lb/ month						
51	multiple bottom trawl gear [8/]	CLOSED						
52	**Lingcod** [4/]							
53	large & small footrope gear	600 lb/ month		1,200 lb/ 2 months				
54	selective flatfish trawl gear							
55	multiple bottom trawl gear [8/]							
56	**Pacific cod**	Not limited		30,000 lb/ 2 months	70,000 lb/ 2 months			30,000 lb/ 2 months
57	**Spiny dogfish**	Not limited		200,000 lb/ 2 months	150,000 lb/ 2 months	100,000 lb/ 2 months		
58	**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, sand sole, and starry flounder.
4/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
5/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling. Cabezon is included in the trip limits for "other fish."
6/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at § 660.390.
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 2-6b. 2006 Trip limits for limited entry trawl gears south of 40°10' N latitude.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table

		JAN	FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[6/]:							
	40°10' - 38° N. lat.	75 fm - 150 fm		100 fm - 150 fm				75 fm - 150 fm
	38° - 34°27' N. lat.	75 fm - 150 fm		100 fm - 150 fm				75 fm - 150 fm
	South of 34°27' N. lat.	75 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands		100 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands				75 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands
	Small footrope gear is required shoreward of the RCA; all trawl gear (large footrope, midwater trawl, and small footrope gear) is permitted seaward of the RCA.							
	See § 660.370 and § 660.381 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, and Cordell Banks).							
	State trip limits may be more restrictive than federal trip limits, particularly in waters off Oregon and California.							
1	**Minor slope rockfish[2/] & Darkblotched rockfish**							
2	40°10' - 38° N. lat.	4,000 lb/ month		8,000 lb/ 2 months				
3	South of 38° N. lat.	20,000 lb/ month		40,000 lb/ 2 months				
4	**Splitnose**							
5	40°10' - 38° N. lat.	4,000 lb/ month		8,000 lb/ 2 months				
6	South of 38° N. lat.	20,000 lb/ month		40,000 lb/ 2 months				
7	**DTS complex**							
8	Sablefish	8,500 lb/ month		17,000 lb/ 2 months				
9	Longspine thornyhead	9,500 lb / month		19,000 lb/ 2 months				
10	Shortspine thornyhead	2,450 lb/ month		4,900 lb/ 2 months				
11	Dover sole	25,000 lb/ month		50,000 lb/ 2 months	35,000 lb/ 2 months			
12	**Flatfish** (except Dover sole)							
13	Other flatfish[3/] & English sole							
14	40°10' - 38° N. lat.	55,000 lb/ month		Other flatfish, English sole & Petrale sole: 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	South of 38° N. lat.							
16	Petrale sole	30,000 lb/ month						60,000 lb/ 2 months

Table 2-6b. 2006 Trip limits for limited entry trawl gears south of 40°10' N latitude (continued).

		JAN	FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[6/]:							
	$40^{\circ}10'$ - 38° N. lat.	75 fm - 150 fm		100 fm - 150 fm				75 fm - 150 fm
	38° - $34^{\circ}27'$ N. lat.	75 fm - 150 fm		100 fm - 150 fm				75 fm - 150 fm
	South of $34^{\circ}27'$ N. lat.	75 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands		100 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands				75 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands
17	Arrowtooth flounder							
18	$40^{\circ}10'$ - 38° N. lat.	5,000 lb/ month		10,000 lb/ 2 months				
19	South of 38° N. lat.							
20	**Whiting**							
21	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						
22	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						
23	**Minor shelf rockfish[1/], Chilipepper, Shortbelly, Widow, & Yelloweye rockfish**							
24	large footrope or midwater trawl for Minor shelf rockfish & Shortbelly	300 lb/ month						
25	large footrope or midwater trawl for Chilipepper	1,000 lb/ months		2,000 lb/ 2 months	12,000 lb/ 2 months		8,000 lb/ 2 months	
26	large footrope or midwater trawl for Widow & Yelloweye	CLOSED						
27	small footrope trawl for Minor Shelf, Shortbelly, Widow & Yelloweye	300 lb/ month			300 lb/ month			
28	small footrope trawl for Chilipepper				500 lb/ month			
29	**Bocaccio**							
30	large footrope or midwater trawl	150 lb/ month		300 lb/ 2 months				
31	small footrope trawl	CLOSED						
32	**Canary rockfish**							
33	large footrope or midwater trawl	CLOSED						
34	small footrope trawl	100 lb/ month			300 lb/ month		100 lb/ month	
35	**Cowcod**	CLOSED						
36	**Minor nearshore rockfish & Black rockfish**							
37	large footrope or midwater trawl	CLOSED						
38	small footrope trawl	300 lb/ month						
39	**Lingcod[4/]**							
40	large footrope or midwater trawl	600 lb/ month		1,200 lb/ 2 months				
41	small footrope trawl							
42	**Pacific cod**	Not limited		30,000 lb/ 2 months	70,000 lb/ 2 months			30,000 lb/ 2 months
43	**Spiny dogfish**	Not limited		200,000 lb/ 2 months	150,000 lb/ 2 months	100,000 lb/ 2 months		
44	**Other Fish[5/] & Cabezon**	Not limited						

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, sand sole, and starry flounder.
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 § 660.390.
7/ The "modified 200 fm" line is modified to exclude certain petrale sole areas from the RCA.

of 35,000 mt, and then setting aside 1,800 mt for incidental bycatch in non-whiting fisheries and 200 mt for research catch. The resulting yield is then allocated between factory trawlers or catcher-processors (34 percent), vessels delivering to at-sea processors or motherships (24 percent), and vessels delivering to shore-based processing plants (42 percent). Table 2-7 indicates the set asides and allocations for 2006 fisheries.

Table 2-7. Pacific whiting set-asides and allocations by fishing sector specified in 2006.

Sector	Set-aside or allocation (mt)
Tribal whiting	35,000
Non-whiting fisheries	1,800
Research	200
Catcher-processors	78,903
Motherships	55,697
Shore-based whiting	97,469
Total	269,069

The GMT recommended exploring overfished species' bycatch implications in the Pacific whiting fishery using a 4-year weighted average bycatch model (the years 2001-2004 were used to project 2005 impacts and the years 2002-2005 were used to project 2006 impacts- see chapter 4 for more details). The rates used to project 2006 whiting fishery impacts were applied to the 2006 OY under this alternative (these same rates are used to explore bycatch implications in 2007 and 2008 Pacific whiting fisheries- see below). The Council again specified bycatch caps for stocks that could potentially constrain opportunities in the Pacific whiting and other West Coast fishing sectors in 2006. The two overfished West Coast groundfish stocks that are incidentally caught in the whiting-directed trawl fishery and for which bycatch caps have been specified in 2006 regulations are canary and widow rockfish. The Council and NMFS decided to set aside 4.7 mt of canary rockfish and 200 mt of widow rockfish for the 2006 non-tribal whiting-directed fisheries. The non-tribal sectors of the whiting fishery would close prior to reaching their whiting allocations if these caps were reached inseason. However, the Council reserved the ability to change these caps inseason if there was unused yield available and it was needed to keep whiting fisheries open.

2.2.3.1.2 Limited Entry Fixed Gear Fisheries

Limited entry fixed gear trip limits and the nontrawl RCA configuration as of May 2006 describe the No Action Alternative and are shown in Tables 2-8a (north of 40°10' N latitude) and 2-8b (south of 40°10' N latitude). Under the No Action Alternative, the nontrawl RCA is defined by management lines specified with waypoints at roughly 30 fm to 100 fm in waters off northern California (north of 40°10' N latitude) and Oregon; and zero fm to 100 fm in waters off Washington. The nontrawl 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 during periods 1, 2, 5, and 6 and 20 fm to 150 fm during periods 3 and 4. There is an additional closure between zero fm and 10 fm around the Farallon Islands to reduce impacts on shallow nearshore rockfish in that area. The nontrawl RCA south of 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

Table 2-8a. 2006 Trip limits for limited entry fixed gears north of 40°10' N latitude.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table

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

1/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, sand sole, and starry flounder.
2/ Bocaccio, chilipepper and cowcod are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.
3/ For black rockfish north of Cape Alava (48°09.50' N. lat.), and between Destruction Is. (47°40' N. lat.) and Leadbetter Pnt. (46°38.17' N. lat.), there is an additional limit of 100 lb or 30 percent by weight of all fish on board, whichever is greater, per vessel, per fishing trip.
4/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
5/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling. Cabezon is included in the trip limits for "other fish."
6/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at § 660.390.
To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

Table 2-8b. 2006 Trip limits for limited entry fixed gears south of 40°10' N latitude.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[5/]:						
	40°10' - 34°27' N. lat.	30 fm - 150 fm		20 fm - 150 fm		30 fm - 150 fm	
	South of 34°27' N. lat.	60 fm - 150 fm (also applies around islands)					
	See § 660.370 and § 660.382 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, and Cordell Banks).						
	State trip limits may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
1	**Minor slope rockfish[2/] & Darkblotched rockfish**	40,000 lb/ 2 months					
2	**Splitnose**	40,000 lb/ 2 months					
3	**Sablefish**						
4	40°10' - 36° N. lat.	300 lb/ day, or 1 landing per week of up to 1,000 lb, not to exceed 5,000 lb/ 2 months					
5	South of 36° N. lat.	350 lb/ day, or 1 landing per week of up to 1,050 lb					
6	**Longspine thornyhead**	10,000 lb / 2 months					
7	**Shortspine thornyhead**	2,000 lb/ 2 months					
8	**Dover sole**	5,000 lb/ month 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 1 lb (0.45 kg) of weight per line are not subject to the RCAs.		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.			
9	**Arrowtooth flounder**						
10	**Petrale sole**						
11	**English sole**						
12	**Other flatfish[1/]**						
13	**Whiting**	10,000 lb/ trip					
14	**Minor shelf rockfish[2/], Shortbelly, & Widow rockfish**						
15	40°10' - 34°27' N. lat.	300 lb/ 2 months	CLOSED	200 lb/ 2 months		300 lb/ 2 months	
16	South of 34°27' N. lat.	3,000 lb/ 2 months					
17	**Chilipepper rockfish**	2,000 lb/ 2 months, this opportunity only available seaward of the nontrawl RCA					
18	**Canary rockfish**	CLOSED					
19	**Yelloweye rockfish**	CLOSED					
20	**Cowcod**	CLOSED					
21	**Bocaccio**						
22	40°10' - 34°27' N. lat.	200 lb/ 2 months	CLOSED	100 lb/ 2 months	300 lb/ 2 months		
23	South of 34°27' N. lat.	300 lb/ 2 months		300 lb/ 2 months			
24	**Minor nearshore rockfish & Black rockfish**						
25	Shallow nearshore	300 lb/ 2 months	CLOSED	500 lb/ 2 months	600 lb/ 2 months	500 lb/ 2 months	300 lb/ 2 months
26	Deeper nearshore						
27	40°10' - 34°27' N. lat.	500 lb/ 2 months	CLOSED	500 lb/ 2 months		400 lb/ 2 months	500 lb/ 2 months
28	South of 34°27' N. lat.			600 lb/ 2 months			400 lb/ 2 months
29	California scorpionfish	300 lb/ 2 months	CLOSED	300 lb/ 2 months	400 lb/ 2 months		300 lb/ 2 months

Table 2-8b. 2006 Trip limits for limited entry fixed gears south of 40°10' N latitude (continued).

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[5/]:						
	40°10' - 34°27' N. lat.	30 fm - 150 fm		20 fm - 150 fm		30 fm - 150 fm	
	South of 34°27' N. lat.	60 fm - 150 fm (also applies around islands)					
30	**Lingcod[3/]**	CLOSED		800 lb/ 2 months			CLOSED
31	**Pacific cod**	Not limited	1,000 lb/ 2 months				
32	**Spiny dogfish**	Not limited	200,000 lb/ 2 months	150,000 lb/ 2 months	100,000 lb/ 2 months		
33	**Other fish[4/] & Cabezon**	Not limited					

1/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, sand sole, and starry flounder.
2/ POP is included in the trip limits for minor slope rockfish. Yellowtail is included in the trip limits for minor shelf rockfish.
3/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
4/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling.
5/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at § 660.390.
To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

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 2006 sablefish limits are as follows: tier 1 = 62,700 lb, tier 2 = 28,500 lb, and tier 3 = 16,300 lb.

The Council and NMFS adopted a similar change in cumulative trip limits for Pacific cod and spiny dogfish for limited entry fixed gear fisheries as they did for limited entry trawl fisheries beginning in March 2006 (period 2). While the spiny dogfish limits for limited entry fixed gear fisheries were the same for spiny dogfish as in the limited entry trawl fishery, the Pacific cod limits were much lower since Pacific cod are less frequently caught by fixed gears. Tables 2-7a and 2-7b depict the 2006 Pacific cod and spiny dogfish trip limits for limited entry fixed gear fisheries.

Limited entry fixed gears are not allowed to be fished in the Cowcod Conservation Areas (CCAs) (Figure 2-3) under the No Action Alternative, except for some nearshore commercial fishing opportunities described in section 2.2.3.1.4.

2.2.3.1.3 Open Access Fisheries

Open access fisheries are those West Coast commercial fisheries comprised of vessels without a Federal limited entry trawl or limited entry fixed gear permit that catch groundfish either as target species (directed groundfish fisheries) or incidentally while targeting non-groundfish species (incidental groundfish fisheries).

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 2-3) under the No Action Alternative, except for some nearshore commercial fishing opportunities described in section 2.2.3.1.4.

Directed Groundfish Fisheries

There are directed groundfish fisheries that target nearshore species (see the following section 2.2.3.1.4) and those operating on the shelf and slope primarily targeting sablefish (daily-trip-limit fishery) and slope rockfish species. This section describes the No Action management measures associated with the latter category of open access vessels targeting groundfish offshore in Federal waters.

Open access trip limits and estimated impacts of 2006 management measures as of May 2006 describe the No Action Alternative and are shown in Tables 2-9a (north of 40°10' N latitude) and 2-9b (south of 40°10' N latitude). The same nontrawl RCA described for limited entry fixed gears under the No Action

Table 2-9a. 2006 trip limits for open access gears north of 40°10' N latitude.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table

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

Table 2-9a. 2006 trip limits for open access gears north of 40°10' N latitude (continued).

21	**PINK SHRIMP NON-GROUNDFISH TRAWL** *(not subject to RCAs)*	
22	North	**Effective April 1 - October 31:** groundfish 500 lb/day, multiplied by the number of days of the trip, not to exceed 1,500 lb/trip. The following sublimits also apply and are counted toward the overall 500 lb/day and 1,500 lb/trip groundfish limits: lingcod 300 lb/month (minimum 24 inch size limit); sablefish 2,000 lb/month; canary, thornyheads and yelloweye rockfish are PROHIBITED. All other groundfish species taken are managed under the overall 500 lb/day and 1,500 lb/trip groundfish limits. Landings of these species count toward the per day and per trip groundfish limits and do not have species-specific limits. The amount of groundfish landed may not exceed the amount of pink shrimp landed.
23	**SALMON TROLL**	
24	North	Salmon trollers may retain and land up to 1 lb of yellowtail rockfish for every 2 lbs of salmon landed, with a cumulative limit of 200 lb/month, both within and outside of the RCA. This limit is within the 200 lb per month combined limit for minor shelf rockfish, widow rockfish and yellowtail rockfish, and not in addition to that limit. All groundfish species are subject to the open access limits, seasons and RCA restrictions listed in the table above.

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, sand sole, and starry flounder.
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 size limit for lingcod is 24 inches (61 cm) total length.
5/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling.
Cabezon is included in the trip limits for "other fish."
6/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at § 660.390.
To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

Table 2-9b. 2006 trip limits for open access gears south of 40°10' N latitude.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[5/]:						
	40°10' - 34°27' N. lat.	30 fm - 150 fm		20 fm - 150 fm		30 fm - 150 fm	
	South of 34°27' N. lat.	60 fm - 150 fm (also applies around islands)					
	See § 660.370 and § 660.383 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, and Cordell Banks).						
	State trip limits may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
1	**Minor slope rockfish[1/] & Darkblotched rockfish**						
2	40°10' - 38° N. lat.	Per trip, no more than 25% of weight of the sablefish landed					
3	South of 38° N. lat.	10,000 lb/ 2 months					
4	**Splitnose**	200 lb/ month					
5	**Sablefish**						
6	40°10' - 36° N. lat.	300 lb/ day, or 1 landing per week of up to 1,000 lb, not to exceed 5,000 lb/ 2 months		300 lb/ day, or 1 landing per week of up to 1,000 lb, not to exceed 3,000 lb/ 2 months			
7	South of 36° N. lat.	350 lb/ day, or 1 landing per week of up to 1,050 lb					
8	**Thornyheads**						
9	40°10' - 34°27' N. lat.	CLOSED					
10	South of 34°27' N. lat.	50 lb/ day, no more than 1,000 lb/ 2 months					
11	**Dover sole**	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs. 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 1 lb (0.45 kg) of weight per line are not subject to the RCAs.		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.			
12	**Arrowtooth flounder**						
13	**Petrale sole**						
14	**English sole**						
15	**Other flatfish[2/]**						
16	**Whiting**	300 lb/ month					
17	**Minor shelf rockfish[1/], Shortbelly, Widow & Chilipepper rockfish**						
18	40°10' - 34°27' N. lat.	300 lb/ 2 months	CLOSED	200 lb/ 2 months		300 lb/ 2 months	
19	South of 34°27' N. lat.	750 lb/ 2 months					
20	**Canary rockfish**	CLOSED					
21	**Yelloweye rockfish**	CLOSED					
22	**Cowcod**	CLOSED					
23	**Bocaccio**						
24	40°10' - 34°27' N. lat.	200 lb/ 2 months	CLOSED	100 lb/ 2 months		200 lb/ 2 months	
25	South of 34°27' N. lat.	100 lb/ 2 months	CLOSED	100 lb/ 2 months			

Table 2-9b. 2006 trip limits for open access gears south of 40°10' N latitude (continued).

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[5/]**:**						
	40°10' - 34°27' N. lat.	30 fm - 150 fm		20 fm - 150 fm		30 fm - 150 fm	
	South of 34°27' N. lat.	60 fm - 150 fm (also applies around islands)					
26	**Minor nearshore rockfish & Black rockfish**						
27	Shallow nearshore	300 lb/ 2 months	CLOSED	500 lb/ 2 months	600 lb/ 2 months	500 lb/ 2 months	300 lb/ 2 months
28	Deeper nearshore						
29	40°10' - 34°27' N. lat.	500 lb/ 2 months	CLOSED	500 lb/ 2 months		400 lb/ 2 months	500 lb/ 2 months
30	South of 34°27' N. lat.			600 lb/ 2 months			400 lb/ 2 months
31	California scorpionfish	300 lb/ 2 months	CLOSED	300 lb/ 2 months	400 lb/ 2 months		300 lb/ 2 months
32	**Lingcod**[3/]	CLOSED		300 lb/ month, when nearshore open			CLOSED
33	**Pacific cod**	Not limited	1,000 lb/ 2 months				
34	**Spiny dogfish**	Not limited	200,000 lb/ 2 months	150,000 lb/ 2 months	100,000 lb/ 2 months		
35	**Other Fish**[4/] **& Cabezon**	Not limited					

Alternative above would also apply for those open access fisheries not exempt from the RCA restrictions.

In 2005, a factory longliner from Alaska announced plans to target spiny dogfish in West Coast waters under the open access limits, which were unlimited for species such as spiny dogfish in the Other Fish complex. Fixed gear fisheries targeting spiny dogfish are known to incidentally catch canary and yelloweye rockfish. This unanticipated entrant to the open access fishery was of particular concern since the volume of dogfish that could be landed could incur a significant bycatch of canary and yelloweye rockfish, especially for vessel operators unfamiliar with the West Coast distribution of these species and the techniques employed to avoid them. Therefore, on May 2, 2005, NMFS implemented an emergency rule to specify canary and yelloweye rockfish bycatch caps for the directed open access fishery of 1.0 mt and 0.6 mt, respectively. All directed open access fisheries (those fisheries targeting groundfish species) would close if any of these caps were projected to be attained early in the fishing season. The Council and NMFS increased these caps to 3.0 mt for each of the species later in the year (implemented on July 1) based on increased availability of canary and yelloweye rockfish. While the factory longliner never did implement its plans to target spiny dogfish on the West Coast, the Council and NMFS changed the spiny dogfish limits for limited entry and open access fisheries from unlimited to specified bimonthly trip limits for the open access fishery beginning in March 2006 (Tables 2-9a and 2-9b). While this action did not wholly address the particular vulnerability of lack of effort controls in the open access fishery, it did address bycatch concerns for targeting spiny dogfish in open access (and limited entry) fisheries.

The same 2006 change in Pacific cod management measures adopted for the limited entry fixed gear fishery was made for open access fisheries by adopting new bimonthly trip limits for this stock in March 2006 (Tables 2-9a and 2-9b).

The sablefish daily-trip-limit (DTL) fishery north of 36° N latitude has caught less than their allocation in recent years. In 2005, the DTL limits for January-September were 300 pounds per day, or one landing per week up to 900 pounds, not to exceed 3,600 pounds per two months. These DTL limits were increased for October through December to 500 pounds per day, or one landing per week up to 1,500 pounds, not to exceed 9,000 pounds per two months. The Council recommended maintaining the previously scheduled daily limit of 300 pounds per day, raising the weekly limit to 1,000 pounds, and raising the two month limit to 5,000 pounds for December 2005. The Council considered a more liberal increase in daily and weekly DTL limits, but was concerned with the inability to control effort in this fishery and therefore recommended a cautious approach to liberalizing this fishery. In April 2006, the Council addressed an increased interest in the DTL sablefish fishery and was especially concerned given the reduced salmon fishing opportunities available. The concern was the open access sablefish quota may be attained early in 2006 without an effective open access effort control mechanism. Therefore, the Council adopted a decreased DTL bimonthly limit for sablefish of 3,000 pounds and tasked the GMT to review effort shifts into this fishery and consider increased DTL limits in June.

Incidental Groundfish Fisheries

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.

2.2.3.1.4 Nearshore Commercial Fisheries

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 (see sections 2.1.4.1 and 2.1.4.2 for the lists of nearshore rockfish species targeted in nearshore commercial fisheries north and south of 40°10' N latitude). 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 (Tables 2-10 and 2-11) 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.

Table 2-10. Nearshore groundfish species' harvest limits, including harvest targets, OYs, and harvest guidelines by West Coast region, 2002-2006.

	2002			2003		
Species Group	Recreational	Commercial	Total	Recreational	Commercial	Total
	North of Cape Mendocino					
Minor Nearshore Rockfish North[1,4]	663	**324**	**987**	740	**188**	**928**
	Oregon/California Border to Cape Mendocino					
Black and Blue Rockfish	-----	-----	-----	36.8	58.5	95.3
Other Nearshore Rockfish	-----	-----	-----	3.7	10.1	13.8
Total Minor NS RF	-----	-----	-----	40.5	68.6	109
	Cape Mendocino to California/Mexico Border					
Shallow Nearshore Rockfish South	-----	-----	-----	66	38.8	105
Deeper Nearshore Rockfish South[3]	-----	-----	-----	303.1	48	351
California Scorpionfish	-----	-----	-----	63.9	21	84.9
Total Minor Nearshore RF South	532	**130**	**662**	433	**108**	**541**

	2004			2005			2006		
Species Group	Recreational	Commercial	Total	Recreational	Commercial	Total	Recreational	Commercial	Total
	North of Cape Mendocino								
Minor Nearshore Rockfish North	68	**54**	**122**	68	**54**	**122**	68	**54**	**122**
	Statewide								
Black Rockfish[5]	186	140	**326**	175	141	**316**	170	139	**309**
	Oregon/California Border to Cape Mendocino								
Black Rockfish[5]	72	123	194	74	116	190	72	113	185
Other Nearshore Rockfish North	6.6	14.8	21.4	6.6	14.8	21.4	6.6	14.8	21.4
	Cape Mendocino to California/Mexico Border								
Minor Nearshore Rockfish South[2]	375	**97**	**494**	383	**97**	**494**	383	**97**	**494**
Shallow Nearshore Rockfish South	66	38.8	105	-----	-----	-----	-----	-----	-----
Deeper Nearshore Rockfish South [3]	245.1	37.2	282	-----	-----	-----	-----	-----	-----
California Scorpionfish	63.9	21	84.9	-----	-----	-----	-----	-----	-----
Black Rockfish[5]	114	17	131	101	25	126	99	25	124

1/ Non-bolded numbers are harvest targets; bolded numbers are either OYs or harvest guidelines

2/ Minor Nearshore Rockfish includes a reserve of 22 mt in 2004, 14 mt in 2005, and 14 mt in 2006; 2004 OY corrected from 615 mt (in 2004 Fed. Reg.) to 494 mt so does not include the 121 mt that was removed from this group in 2003 when the OY was calculated as 50 percent of recent landings; the confusion exists because the 121 mt was kept as a reserve in the overall Minor Rockfish OY and was accidentally added back into the NS RF OY in 2004.

3/ Starting in 2004, Deeper Nearshore does not include black rockfish.

4/ Black Rockfish north of 40º 30' to 43º 00' had an ABC of 500 mt in 2003.

5/ The black rockfish OY south of 46º16' N Lat. is subdivided with separate HGs being set for the area north (58 percent of OY) and south (42 percent of OY) of 42º N Lat. For the area south of 42º N Lat., 60 percent of the HG is to be applied to the area north of 40º10' N Lat. and 40 percent applied to the area south of 40º10' N Lat.

Table 2-11. State and Federal harvest guidelines specified for state-managed groundfish fisheries in California in 2006.

Species or Species complex	Sector	Harvest guideline in mt (or pounds)
Canary Rockfish	Rec.	9.3
Yelloweye Rockfish	Rec.	3.7
Black Rockfish	NS Comm.	139
	Rec.	170
	Total	309
Minor Nearshore Rockfish	NS Comm.	97
	Rec.	383
	Total	480
Cabezon	NS Comm.	42.1 (92,800)
	Rec.	26.9 (59,300)
	Total	69 (152,100)
Greenlings	NS Comm.	1.5 (3,400)
	Rec.	15.5 (34,200)
	Total	17.1 (37,600)
Lingcod	Rec.	422

Nearshore Commercial Fisheries North of 40°10' N latitude

There are nearshore commercial fisheries north of 40°10' N latitude to the Oregon-Washington border at 46°10' N latitude; Washington does not allow nearshore commercial fisheries in their state waters. A depiction of the season duration for northern nearshore commercial fisheries and predicted black, canary, and yelloweye rockfish impacts under the No Action and action alternatives is provided in Table 2-12a.

Table 2-12a. Season structure and expected yelloweye rockfish and canary rockfish impacts under the 2007-08 No Action and action alternatives for nearshore commercial fisheries north of 40°10' N latitude.

Alternative	Season Duration	Black Rockfish Reduction (%)	Shoreward RCA (fm)	Estimated Impact (mt) to Yelloweye Rockfish	Estimated Impact (mt) to Canary Rockfish
No Action	12 month season	0	30	2.1	1.7
1	<6 month season	60	20	0.8	0.7
2	12 month season	10	20	1.3	1.2
3a	12 month season	0	20	1.4	1.3
3b	12 month season	0	30	2.1	1.7

Under the No Action Alternative, the nontrawl RCA is defined by management lines specified with waypoints at roughly 30 fm to 100 fm in waters off northern California (north of 40°10' N latitude) and Oregon; and zero fm to 100 fm 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.

The 2006 Federal trip limit for nearshore species north of 40°10' N latitude to 42° N latitude is 6,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish. The 2006 Federal trip limit for nearshore species north of 42° N latitude is 5,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish. This listed limit has been superseded by the more conservative Oregon state limits for the last several years.

Nearshore Commercial Fisheries South of 40°10' N latitude

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 (Table 2-8b).

A depiction of the season duration for southern nearshore commercial fisheries and predicted nearshore rockfish, canary, and yelloweye rockfish impacts under the No Action and action alternatives is provided in Table 2-12b for the area between 40°10’ N latitude and 34°27’ N latitude.

Table 2-12b. Season structure and expected yelloweye rockfish and canary rockfish impacts under the 2007-08 No Action and action alternatives for nearshore commercial fisheries south of 40°10' N latitude to 34°27’ N latitude.

Alternative	Season Duration	Nearshore Rockfish Reduction (%)	Shoreward RCA (fm)	Estimated Impact (mt) to Yelloweye Rockfish	Estimated Impact (mt) to Canary Rockfish
No Action	10 month season	0	30 (Jan-Apr, Sep-Dec) 20 (May-Aug)	0.0	0.33
1	8 month season	15	20	0.0	0.26
2	10 month season	5	20	0.0	0.30
3a	10 month season	5	30	0.0	0.31
3b	10 month season	0	30	0.0	0.33

Under the No Action Alternative, the nontrawl 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 during periods 1, 2, 5, and 6 and at 20 fm to 150 fm during periods 3 and 4. There is an additional closure between zero fm and 10 fm around the Farallon Islands to reduce impacts on shallow nearshore rockfish in that area. The nontrawl RCA south of 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. Status quo management is proposed south of Point Conception under action alternatives 2 and 3 due to the low incidence rate of overfished species; a nontrawl RCA line of 40 fm is proposed under action alternative 1 due to impacts to bocaccio rockfish. 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.

Trip limits for shallow nearshore rockfish, deeper nearshore rockfish, and California scorpionfish vary by period (Table 2-8b). However, period 2 is closed for these species north and south of Point Conception, and shelf rockfish is closed at this time to minimize discard of nearshore species during the closed period. There is also a small and variable trip limit for bocaccio during the open nearshore periods to allow some incidental bycatch to be landed rather than discarded dead at sea. Species' harvest guidelines for California nearshore commercial fisheries are depicted in Table 2-11.

There is some nearshore commercial fishing allowed in the CCAs (Figure 2-3) in depths shallower than 20 fm under the No Action Alternative. Only southern Minor Nearshore Rockfish, (both shallow and deeper nearshore rockfish- see section 2.1.4.1 for the list of species in this complex), California scorpionfish, cabezon, greenlings, California sheephead, and ocean whitefish are allowed to be retained in depths <20 fm in the CCAs.

2.2.3.1.5 Tribal Fisheries

The Washington coastal tribes (Makah, Quileute, Hoh, and Quinault) conducted their groundfish fisheries in 2005-06 with the following allocations and trip limits. The 2006 sablefish allocation was 10 percent of the total catch OY (for the portion of the stock north of 36° N latitude) of 7,363 mt. This provided an allocation of 736.3 mt of sablefish, which is further reduced after deducting an assumed 2.3 percent discard mortality for a landed catch allocation of 719.4 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. Thornyheads were subject to a 300 lb trip limit as were canary rockfish. 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. A full rockfish retention program, where all overfished and marketable rockfishes are retained, as well as a tribal 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. 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 Pacific cod, 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 in 2006 was 35,000 mt based on the sliding scale allocation formula that specifies 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 2006, or proposing a whiting-directed fishery for 2007-08.

2.2.3.1.6 Washington Recreational Fisheries

In 2005 and 2006, the Washington recreational fishery was open year round for groundfish except lingcod, which was open from the Saturday closest to March 15 through the Saturday closest to October 15 in Marine Areas 1-3 (from the Oregon/Washington border at 46º16' N latitude north to Cape Alava at 48º10' N latitude), and from April 15 through the Saturday closest to October 15 or October 15, whichever date is earlier, in Marine Area 4 (Cape Alava to the U.S./Canada border). In 2005, Marine Areas 1-3 were open from March 12 through October 15, and Marine Area 4 was open from April 15 through October 15. In 2006, Marine Areas 1-3 are open from March 17 through October 14, and Marine Area 4 is open from April 15 through October 14.

Under the No Action Alternative, in 2007 and 2008, the following lingcod seasons would apply:

- Marine Areas 1-3: Open the Saturday closest to March 15 (which is March 17 in 2007 and March 15 in 2008) through the Saturday closest to October 15 (which is October 13 in 2007 and October 18 in 2008).

- Marine Area 4: Open April 15 through October 13 in 2007 and open April 15 through October 15 in 2008.

Washington has a recreational groundfish bag limit of 15 fish per day including rockfish and lingcod. Of the 15 recreational groundfish allowed to be landed per day, only 10 could be rockfish, with no retention of canary or yelloweye rockfish, and a sublimit of two lingcod with a 24-inch minimum size during the open lingcod season.

Recreational groundfish and recreational halibut fishing is prohibited within the "C-shaped" Yelloweye Rockfish Conservation Area (YRCA) (Figure 2-4). Coordinates defining the YRCA are provided in Federal regulations at 50 CFR 660.390.

Washington and Oregon prosecuted their 2005 and 2006 recreational fisheries with shared harvest guidelines for canary rockfish, lingcod, and yelloweye rockfish. If the recreational harvest guideline for canary rockfish, lingcod, or yelloweye specified for the Washington/Oregon area was projected to be exceeded inseason, the Washington Department of Fish and Wildlife (WDFW) would consult with the Oregon Department of Fish and Wildlife (ODFW) and take action inseason to close all or portions of the recreational fishery deeper than 30 fm or adjust seasons, bag limits, or size limits, as needed. In 2005, the shared Washington and Oregon harvest guidelines for recreational fisheries were 8.5 mt, 234 mt, and 6.7 mt for canary rockfish, lingcod, and yelloweye rockfish, respectively. In 2006, the shared recreational harvest guidelines for canary and yelloweye remain the same, and lingcod is increased to 271 mt.

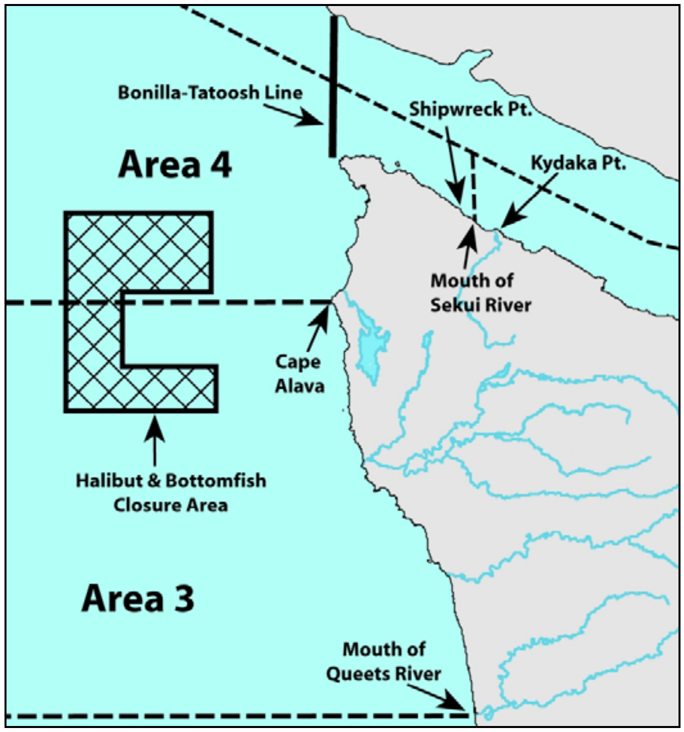


Figure 2-4. The current "C-shaped" Yelloweye Rockfish Conservation Area in waters off northern Washington where recreational groundfish and Pacific halibut fishing is prohibited.

The Washington portion of the shared canary rockfish harvest guideline was 1.7 mt and its portion of the shared yelloweye harvest guideline was 3.5 mt. These total catch amounts or harvest targets, if projected to be attained inseason by the Washington recreational fishery, were the triggers to consult with ODFW and consider an inseason action to slow or eliminate further canary or yelloweye rockfish mortality in this fishery. In 2005, WDFW projected that the yelloweye harvest target would be attained prematurely prompting such a consultation. That consultation indicated the shared yelloweye harvest guideline would be attained early, resulting in a WDFW action implemented on August 5 to close the recreational groundfish fishery outside of 30 fm in waters off Washington north of Leadbetter Pt. at 46º38'10" N latitude. The Council and NMFS adopted conforming Federal regulations that were implemented on October 1, 2005.

New Washington recreational management measures were adopted for 2006 to avoid early canary and yelloweye rockfish harvest guideline attainment problems. To reduce the catch of yelloweye rockfish to stay within the Washington recreational harvest target, WDFW proposed, and the Council and NMFS adopted, the following modifications to the 2006 Washington recreational fishery:

- Prohibition of retention of rockfish and lingcod seaward of a line approximating the 20 fm depth contour from May 22, 2006, through September 30, 2006, in Marine Areas 3 and 4 (waters off Washington north of the Queets River at 47º31'42" N latitude where canary and yelloweye catches are highest) on days that halibut fishing is closed.

- Prohibition of retention of rockfish and lingcod seaward of a line approximating the 30 fm depth contour from March 18, 2006, through June 15, 2006, in Marine Area 2 (waters off Washington between Leadbetter Pt. and the Queets River).

Because the 20 fm line had not been previously analyzed, the following modification was made: where the line approximating the 20 fm depth contour extends beyond state waters and into the EEZ, the line will follow the seaward boundary of the state coastal waters.

Halibut fishery regulations for the 2006 Washington fishery became effective March 5, 2006. Therefore, it was necessary to modify the recreational groundfish regulations to conform to the new halibut regulations:

- South of Leadbetter Point to the Washington/Oregon border, when Pacific halibut are onboard the vessel, groundfish may not be taken and retained, possessed or landed, except sablefish and Pacific cod.

2.2.3.1.7 Oregon Recreational Fisheries

In 2005 (and 2006), the Oregon recreational groundfish fishery was (or is expected to be in 2006) open year round with no depth restrictions except during June through September when the fishery was open only inside 40 fm. Catches at the onset of 2005 were also managed using an 8 marine fish daily-bag-limit[11] including rockfish, greenling (*Hexagrammos* spp.), cabezon, and other groundfish species, but excluding salmon, lingcod, Pacific halibut, perch species, sturgeon, sanddabs, striped bass, tuna, and baitfish. There was no retention of canary and yelloweye rockfish. There was an additional daily-bag-limit of 25 Pacific sanddabs. Anglers could keep two lingcod with a 24 inch minimum size. Additionally, there was a minimum size limit of 16 inches for cabezon and a 10 inch minimum size limit for greenling species.

The Oregon recreational fishery was managed in 2005 and 2006 with harvest guidelines for black rockfish and widow rockfish, state harvest caps for other nearshore rockfish (including vermilion and tiger rockfish), greenlings, combined black and blue rockfish, and cabezon; and the shared Washington and Oregon harvest guidelines for canary rockfish, lingcod, and yelloweye rockfish discussed above in section 2.2.3.1.5 (Table 2-10). The state harvest caps were set using 2000 harvest as a proxy, and have only ocean boat landings applied against the harvest cap. The black rockfish harvest guideline was shared with Oregon nearshore commercial fisheries; the state allocated the guideline to these sectors as part of their authority. The Oregon black rockfish harvest guidelines for the recreational fishery was 332 mt in 2005 and 324.5 mt in 2006. The state harvest cap for cabezon was 15.8 mt in both 2005 and 2006. ODFW used their Oregon Recreational Boat Survey (ORBS) Program to monitor groundfish catches inseason. If the shared Washington and Oregon recreational harvest guideline for canary, yelloweye, or lingcod was projected to be exceeded, ODFW would consult with WDFW, and consider inseason action to close all or portions of the recreational fishery deeper than 20 fm or 30 fm or adjust seasons, bag limits, or size limits, as needed. Similar actions were considered to manage the black rockfish harvest guideline.

The Oregon Fish and Wildlife Commission (OFWC) also adopted 2005 regulations to prohibit retention of all marine fish (except sablefish, herring, anchovy, smelt, sardine, striped bass, hybrid bass, and offshore pelagic species) when Pacific halibut is retained by the vessel during open days for the all-depth sport fishery for Pacific halibut in the area between lines extending west of Oregon-Washington border and Humbug Mountain, Oregon at 42º40'30" N latitude to the EEZ boundary. This management measure adjustment was expected to provide additional harvest reduction of overfished species and other species with harvest guidelines such as black rockfish by discouraging secondary targeting of such species. This

[11] The Council originally adopted a 10 marine fish daily-bag-limit for Oregon recreational fisheries. However, subsequent to the Council's final decision on 2005 and 2006 management measures in June 2004, but prior to January 1, 2005, the Oregon Fish and Wildlife Commission adopted an 8 marine fish daily-bag-limit. The Council and NMFS adopted conforming Federal regulations that were implemented on April 1, 2005.

provision also applied during all-depth halibut days in June through September when groundfish retention was prohibited seaward of the RCA boundary approximating the 40 fm depth contour.

In July 2005, ODFW took action to reduce the marine fish daily-bag-limit from 8 marine fish to 5 marine fish for the remainder of the year to slow the harvest of black rockfish. ODFW took additional action in August 2005 to prohibit retention of cabezon in the recreational ocean boat fishery, due to attainment of the annual state harvest cap for cabezon, and again in October 2005 to close the ocean boat groundfish fishery in waters shoreward of the 40 fathom RCA line, and prohibit retention of black rockfish, as the black rockfish harvest guideline was projected to be attained.

In December 2005, the OFWC refined management measures for the 2006 Oregon recreational groundfish fishery, based on the angler effort patterns observed in 2005. Because there was a significant increase in angler effort targeting groundfish in 2005, due primarily to the poor salmon season in the waters off Oregon, the OFWC adopted a marine fish bag limit of 6 fish in aggregate. The reduced bag limit was necessary to keep the fishery within the 2006 Oregon harvest guideline for black rockfish and to provide a 12 month fishing season. All other management measures (i.e., length restrictions for lingcod, cabezon, and kelp greenling, >40 fm closure during June-September) remain as they were specified for 2005. If the Federal and state harvest guidelines are approached in 2006, ODFW would take inseason actions similar in nature to those taken in 2005. Federal conforming regulations were implemented on April 1, 2006.

In 2005 and 2006, ODFW closed the high relief areas of Stonewall Banks to the Pacific halibut fishery during the all-depth Pacific halibut season. Targeting and retention of Pacific halibut was prohibited in the area, and vessels that have retained Pacific halibut while fishing another area, were then prohibited from targeting any species within the closed area. The coordinates for the Stonewall Banks closure implemented in the Pacific halibut fishery are as follows:

1	44º37.46 N latitude	124º24.92 W longitude
2	44º37.46 N latitude	124º23.63 W longitude
3	44º28.71 N latitude	124º21.80 W longitude
4	44º28.71 N latitude	124º24.10 W longitude
5	44º31.42 N latitude	124º25.47 W longitude

Returning to the first point (Figure 2-5).

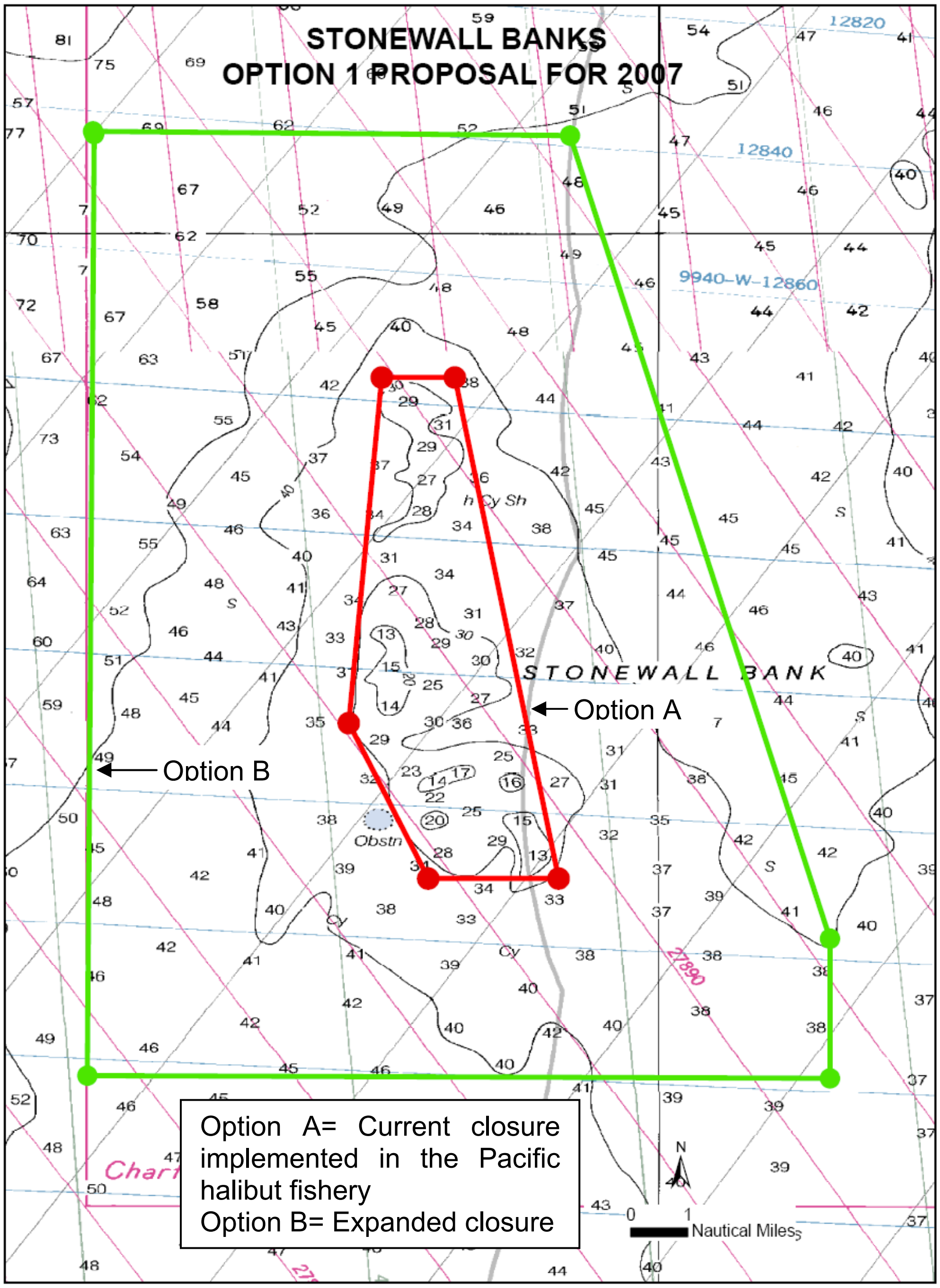


Figure 2-5. The current area closure on Stonewall Banks off the Oregon coast where Pacific halibut retention is prohibited during the all-depth fishery under the No Action Alternative and the Council-preferred Alternative (denoted Option A in figure) and the expanded closed area under Action Alternatives 1 and 3 (denoted Option B in figure).

Halibut regulations for the 2006 fishery became effective March 5, 2006. Therefore it was necessary to modify the recreational groundfish regulations to conform to the new halibut regulations:

- South of the Washington/Oregon border to Cape Falcon, OR, when Pacific halibut are onboard the vessel, groundfish may not be taken and retained, possessed or landed, except sablefish and Pacific cod.
- South of the Cape Falcon, OR, to Humbug Mountain, OR, when Pacific halibut are onboard the vessel, groundfish may not be taken and retained, possessed or landed, except sablefish, during days open to the Oregon Central Coast "all-depth" sport halibut fishery.

2.2.3.1.8 California Recreational Fisheries

For management of California's nearshore recreational groundfish fishery in 2005 and 2006, the California Fish and Game Department (CDFG) divided the coastline into five regional areas, although some regions had the same management measures and were therefore managed as a larger combined region. The five management areas, termed Rockfish/Lingcod Management Areas (RLMAs), are as follows: 1) Southern RLMA (U.S./Mexico Border to Point Conception at 34°27' N latitude), 2) Southern South-Central RLMA (Point Conception to Lopez Point at 36° N latitude), 3) Northern South-Central RLMA (Lopez Point to Pigeon Point at 37º11' N latitude), 4) Northern Central RLMA (Pigeon Point to Cape Mendocino at 40°10' N latitude), and 5) Northern RLMA (Cape Mendocino to the California/Oregon Border at 42° N latitude). The RLMAs between Lopez Point and Cape Mendocino were combined in 2005-06 management with the intent to specify separate management measures in each of these RLMAs as needed to stay within state and Federal harvest guidelines.

The Council and NMFS adopted 2005-06 California recreational management measures as follows:

- Regulations apply to groundfish (with sanddab fishery exception) and associated state-managed species (rock greenling, California sheephead, and ocean whitefish).
- The sport fishery for sanddabs, using gear specified in Federal and state regulations (size #2 hooks or smaller), is exempt from the season closures and depth restrictions placed on other Federally-managed groundfish.
- Retention of species in the Other Flatfish complex is allowed when fishing with size #2 hooks or smaller (≤ 11 mm from point to shank) for Pacific sanddabs.
- Lingcod size limit of 24 inches with a daily-bag-limit of two fish.
- Within a general bag limit of 20 fish, 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*[12].
- A two-fish bag limit for bocaccio in the northern RLMA (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.
- Notwithstanding other fishing opportunities for groundfish, lingcod may not be retained during January, February, March, and December.
- All divers (use of boats is 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

[12] The cabezon daily bag sublimit was changed from three fish to one fish and the greenling daily bag sublimit was changed from 2 fish to 1 fish in a California Fish and Game Commission action in October 2004 subsequent to the Council's final decision in June 2004. The Council and NMFS adopted conforming Federal regulations that were implemented on April 1, 2005.

restrictions for rockfish, greenlings, California scorpionfish, California sheephead, and ocean whitefish.

The California recreational fishery was managed with Federal and state harvest guideline for various groundfish species. Federal annual harvest guidelines were specified for canary rockfish (9.3 mt), yelloweye rockfish (3.7 mt), black rockfish (316 mt for recreational and nearshore commercial fisheries combined in 2005, of which 175 mt were allocated to the recreational fishery by CDFG; in 2006, the combined harvest guideline was 309 mt and the recreational harvest guideline was 170 mt), and lingcod (422 mt) (Table 2-11). State harvest guidelines were specified by CDFG for cabezon, greenlings, and Minor Nearshore Rockfish (both shallow and deeper nearshore rockfish species; see section 2.1.4.1 for the list of species in these complexes). If the recreational harvest guideline for canary rockfish, yelloweye rockfish, or lingcod specified for California was projected to be exceeded, or if the state harvest guideline for black rockfish was projected to be exceeded when combining recreational harvest projections and annual commercial projections, CDFG and/or the Council and NMFS would take action to close all or part of the recreational fishery in all or part of the state regions in all or part of the remainder of the year. Any closure may pertain to closure of specific groundfish species or specific depths in different regions to achieve catch limitation. In the northern RLMA (north of 40°10' N latitude to the Oregon/California border at 42° N latitude), CDFG would take action to close all or part of the recreational fishery deeper than the 30 fm management line if the canary or yelloweye rockfish harvest guideline was attained early in the season.

The 2005 and 2006 adopted management measures included depth bands where fishing for rockfish and associated species was allowed only between 20 and 40 fm (Southern South-Central RLMA) or 30 to 60 fm (Southern RLMA). California took inseason action in 2005 to remove the shoreward boundaries of these depth bands and allow boat-based fishing inside the seaward boundaries originally adopted in the Southern and Southern South-Central RLMAs. These actions were initiated to address concerns related to the ability to enforce fishing restrictions shoreward of adopted depth bands. In addition, final 2004 recreational CRFS projections of impacts showed that additional opportunity could be allowed shoreward of the adopted boundaries, as well as in additional months in the North, North-Central and Northern South-Central RLMAs that would not be likely to exceed harvest guidelines for overfished species targets.

The 2005-06 seasons and depth restrictions by California management region (Table 2-13) were as follows:

Table 2-13. Summary of 2006 California recreational groundfish seasons and depth restrictions by region under the No Action Alternative.

RCG SEASON BY REGION

<table>
<tr><th>Region</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>North region</td><td>---</td><td>---</td><td>---</td><td>---</td><td colspan="8">> 30fm Closed</td></tr>
<tr><td>North Central</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td colspan="6">> 20fm Closed</td></tr>
<tr><td>South Central - Monterey</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td colspan="6">> 20fm Closed</td></tr>
<tr><td>South Central - Morro Bay</td><td>---</td><td>---</td><td>---</td><td>---</td><td colspan="5">> 40fm Closed</td><td>---</td><td>---</td><td>---</td></tr>
<tr><td>South Region</td><td>---</td><td>---</td><td colspan="6">> 60fm Closed</td><td colspan="2">>30 fm Closed</td><td colspan="2">> 60fm Closed</td></tr>
</table>

NOTES AND KEY:

Shore fishing allowed in all waters in all months

RCG = Rockfish, cabezon, greenlings

--- = Closed to boat-based fishing for RCG

LINGCOD SEASON IS OPEN **ONLY** WHEN RCG IS OPEN, EXCEPT CLOSED DEC, JAN, FEB, MAR FOR SPAWNING

Southern RLMA (U.S./Mexico Border to Point Conception at 34°27' N latitude)

The California recreational groundfish fishery regulations south of Point Conception under the No Action Alternative were the same as described above except for the following changes:

- Groundfish other than California scorpionfish, but including select nongroundfish species (California sheephead and ocean whitefish) open March through August and November through December shoreward of 60 fm; open September through October shoreward of 30 fm; and closed January and February.
- California scorpionfish can only be retained during October and November shoreward of 40 fm and December shoreward of 20 fm (closed January through September).
- Fishing is allowed within the CCAs (Figure 2-3) shoreward of the 20 fm line when fishing is open for groundfish other than California scorpionfish, but including select nongroundfish species (California sheephead and ocean whitefish).

Southern South-Central RLMA (Point Conception to Lopez Point at 36° N latitude)

The California recreational groundfish fishery regulations for the area between Point Conception and Lopez Point under the No Action Alternative would be the same as described above except for the following changes:

- Groundfish including select nongroundfish species (California sheephead and ocean whitefish) open May through September shoreward of 40 fm (closed January through April and October through December).

Northern South-Central RLMA (Lopez Point to Pigeon Point at 37°11' N latitude)

The California recreational groundfish fishery regulations for the area between Lopez Point and Cape Mendocino under the No Action Alternative would be the same as described above except for the following changes:

- Groundfish including select nongroundfish species (California sheephead and ocean whitefish) open July through December shoreward of 20 fm (closed January through June).

Northern Central RLMA (Pigeon Point to Cape Mendocino at 40°10' N latitude)

The California recreational groundfish fishery regulations for the area between Pigeon Point and Cape Mendocino under the No Action Alternative would be the same as that described under the Northern South-Central RLMA, except:

- Recreational fishing for groundfish prohibited between the shoreline and the 10 fm (18 m) depth contour around the Farallon Islands and Noonday Rock.
- Waters of Cordell Bank less than 100 fm in depth are closed to fishing at all times.

Northern RLMA (Cape Mendocino to the California/Oregon Border at 42° N latitude)

The California recreational groundfish fishery regulations for the area between Cape Mendocino and the California/Oregon border under the No Action Alternative would be the same as described above except for the following changes:

- Groundfish and ocean whitefish open in May through December shoreward of 40 fm (closed January through April).
-

2.2.3.2 Action Alternative 1

Action Alternative 1 describes the suite of 2007-08 management measures adopted by the Council for analysis in April 2006 which are the most conservative analyzed in this EIS and therefore tend to constrain fishing opportunities more than the other action alternatives analyzed. They are designed to stay within the Preferred Low OY Alternative for depleted groundfish species (see section 2.1.1.1). Table 2-14 depicts the impacts to depleted groundfish species by sector in 2007 and 2008 associated with the suite of management measures under Action Alternative 1.

Table 2-14. Projected mortality (mt) of depleted groundfish species by fishing sector under Action Alternative 1.

Fishery	Bocaccio a/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting	9.1	3.7	0.2	66.7	32.4	0.1	0.1
Limited Entry Trawl- Whiting							0
At-sea whiting motherships		1.8		2.5	0.5	15.3	0.0
At-sea whiting cat-proc		0.4		3.3	1.6	26.5	0.0
Shoreside whiting		0.7		2.8	0.9	22.6	0.0
Tribal whiting		1.6		0.0	0.6	6.1	0.0
Tribal							
Midwater Trawl		1.8		0.0	0.0	40.0	0.0
Bottom Trawl		0.8		0.0	3.7	0.0	0.0
Troll		0.5		0.0	0.0		0.0
Fixed gear		0.3		0.0	0.0	0.0	2.3
Limited Entry Fixed Gear							
Sablefish	0.2	0.1	0.1	1.0	0.2	0.0	0.4
Non-Sablefish	5.2	0.0		0.4	0.4	0.5	0.2
Open Access: Directed Groundfish							
Sablefish DTL	0.0	0.0	0.1	0.2	0.1	0.0	0.1
Nearshore (North of 40°10' N. lat.)	0.0	0.7		0.0	0.0	0.1	0.8
Nearshore (South of 40°10' N. lat.)	0.0	0.3		0.0	0.0		0.0
Other	4.1	0.0		0.0	0.0	0.0	0.0
Open Access: Incidental Groundfish							
CA Halibut	0.1	0.1		0.0	0.0		
CA Gillnet b/	0.5			0.0	0.0	0.0	
CA Sheephead b/				0.0	0.0	0.0	0.0
CPS- wetfish b/	0.3						
CPS- squid c/							
Dungeness crab b/	0.0		0.0	0.0	0.0		
HMS b/		0.0	0.0	0.0			
Pacific Halibut b/	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pink shrimp	0.1	0.1	0.0	0.0	0.0	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	2.0	0.0	0.0	0.0	0.3	0.5
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)							
Recreational Groundfish							
WA		0.7					1.5
OR		1.6				0.1	1.6
CA	16.0	4.8	0.0			1.6	1.2
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.							
	3.0	3.0	0.1	3.8	3.6	3.0	2.0
TOTAL	38.9	25.0	0.5	80.8	44.0	116.3	10.9
Low OY Alt	**40**	**32.0**	**4.0**	**130**	**44**	**120**	**12.6**
Difference	1.1	7.0	3.5	49.3	0.0	3.8	1.7
Percent of OY	97.3%	78.1%	12.5%	62.1%	100.1%	96.9%	86.6%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data sources.					

a/ South of 40°10' N. lat.

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

c/ Bycatch amounts by species unavailable, but bocaccio occurred in 0.1 percent of all port samples and other rockfish in another 0.1 percent of all port samples (and squid fisheries usually land their whole catch). In 2001, out of 84,000 mt total landings 1 mt was groundfish. This suggests that total bocaccio was caught in trace amounts.

2.2.3.2.1 Limited Entry Trawl Fisheries

Table 2-15 depicts the 2007-08 limited entry trawl management measures under Action Alternative 1. Under this alternative, the trawl RCA is the largest considered for 2007-08 extending out to the 250 fm in the north and 200 fm in the south (north of 38º N latitude) to stay within the Low Preferred OYs for darkblotched rockfish and Pacific ocean perch. The shoreward RCA line is also extended in to 75 fm in the north and 60-75 fm in the south to reduce mortalities on depleted shelf rockfish, such as bocaccio and canary rockfish, which is responsive to the Low Preferred OYs for those species.

Table 2-15. Cumulative bimonthly limits and RCA configurations by area and species for the West Coast limited entry trawl fishery in 2007-08 under Action Alternative 1.

SUBAREA	Period	RCA Configurations		Cumulative Limits							
		INLINE	OUTLINE	SABLEFISH	LONGSPN	SHORTSPN	DOVER	OTHER FLAT	PETRALE	ARROWTH	SLOPE ROCK
North seaward limits	1	75	250*	10,000	4,000	3,000	50,000	25,000	50,000	5,000	2,000
	2	75	250	10,000	4,000	3,000	10,000	25,000	25,000	5,000	2,000
	3	75	250	10,000	4,000	3,000	10,000	25,000	25,000	5,000	2,000
	4	75	250	10,000	4,000	3,000	10,000	25,000	25,000	5,000	2,000
	5	75	250	10,000	4,000	3,000	10,000	25,000	25,000	5,000	2,000
	6	75	250*	10,000	4,000	3,000	50,000	25,000	50,000	5,000	2,000
North shoreward limits	1	75	250*	7,000	3,000	3,000	20,000	30,000	15,000	5,000	2,000
	2	75	250	7,000	3,000	3,000	10,000	20,000	15,000	5,000	2,000
	3	75	250	8,000	3,000	3,000	10,000	20,000	15,000	5,000	2,000
	4	75	250	8,000	3,000	3,000	10,000	20,000	15,000	5,000	2,000
	5	75	250	7,000	3,000	3,000	10,000	20,000	15,000	5,000	2,000
	6	75	250*	7,000	3,000	3,000	20,000	30,000	15,000	5,000	2,000
38 - 40 10	1	60	200*	12,000	10,000	5,000	50,000	52,000	50,000	5,000	4,000
	2	60	200	12,000	10,000	5,000	10,000	52,000	25,000	5,000	4,000
	3	75	200	12,000	10,000	5,000	10,000	52,000	25,000	5,000	4,000
	4	60	200	12,000	10,000	5,000	10,000	52,000	25,000	5,000	4,000
	5	60	200	12,000	10,000	5,000	10,000	52,000	25,000	5,000	4,000
	6	60	200*	12,000	10,000	5,000	50,000	52,000	50,000	5,000	4,000
S 38	1	60	150	12,000	10,000	5,000	50,000	52,000	50,000	5,000	40,000
	2	60	150	12,000	10,000	5,000	10,000	52,000	25,000	5,000	40,000
	3	75	150	12,000	10,000	5,000	10,000	52,000	25,000	5,000	40,000
	4	60	150	12,000	10,000	5,000	10,000	52,000	25,000	5,000	40,000
	5	60	150	12,000	10,000	5,000	10,000	52,000	25,000	5,000	40,000
	6	60	150	12,000	10,000	5,000	50,000	52,000	50,000	5,000	40,000

note: splitnose limits are the same as slope rock limits south of 40º10' N latitude.

* indicates petrale areas.

Action Alternative 1 would reduce the lingcod minimum size limit from 24 inches to 20 inches north of 40°10' N latitude under this alternative.

Under Action Alternative 1, Yelloweye RCAs would be added, which would be closed to limited entry trawl fisheries, including midwater trawl, as defined by the following coordinates:

Washington Extension to the "C-Shaped" YRCA

Washington Department of Fish and Wildlife is proposing an extension to the status quo "C-Shaped" YRCA in waters off northern Washington, which is described as follows:

Beginning at 48°00.00' N latitude, 125°16.00' W longitude;
Then to 48°06.00' N latitude, 125°16.00' W longitude;
Then to 48°00.00' N latitude, 124°54.00' W longitude;
Then to 48°06.00' N latitude, 124°54.00' W longitude;
Then to 48°00.00' N latitude, 125°16.00' W longitude;
and back to the point of origin (Figure 2-6).

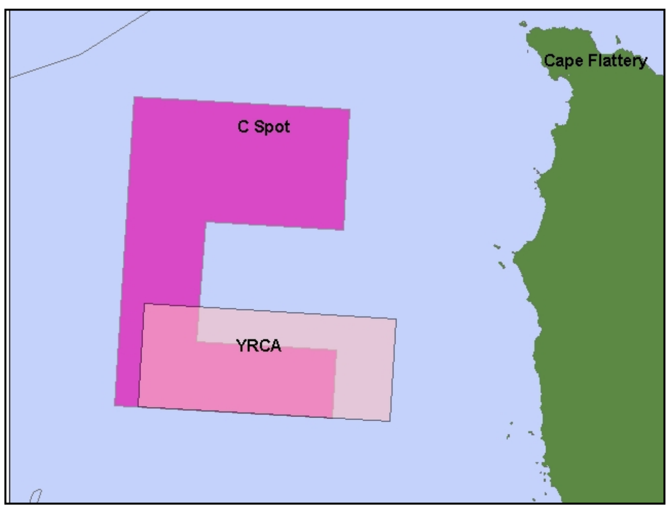


Figure 2-6. A proposed extension to the status quo Yelloweye Rockfish Conservation Area in waters off the Washington north coast where all fishing would be prohibited in 2007-08 under Action Alternatives 1-3.

WA North Coast A

Beginning at 48°02.23’ N latitude; 125°17.87’ W longitude
Then to 48°01.42’ N latitude; 125°15.89’ W longitude
Then to 47°59.11’ N latitude; 125°18.03’ W longitude
Then to 47°59.97’ N latitude; 125°19.92’ W longitude
and back to the point of origin (Figure 2-7).

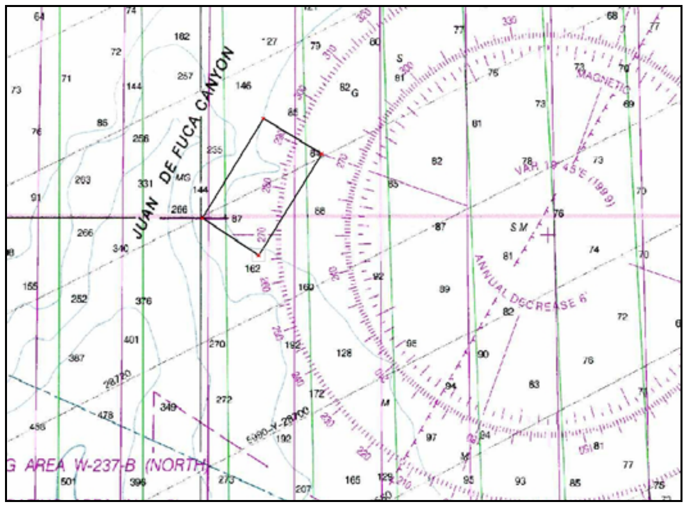


Figure 2-7. A proposed Yelloweye Rockfish Conservation Area (WA North Coast A) in waters off the Washington north coast where all fishing would be prohibited in 2007-08 under Action Alternatives 1-3.

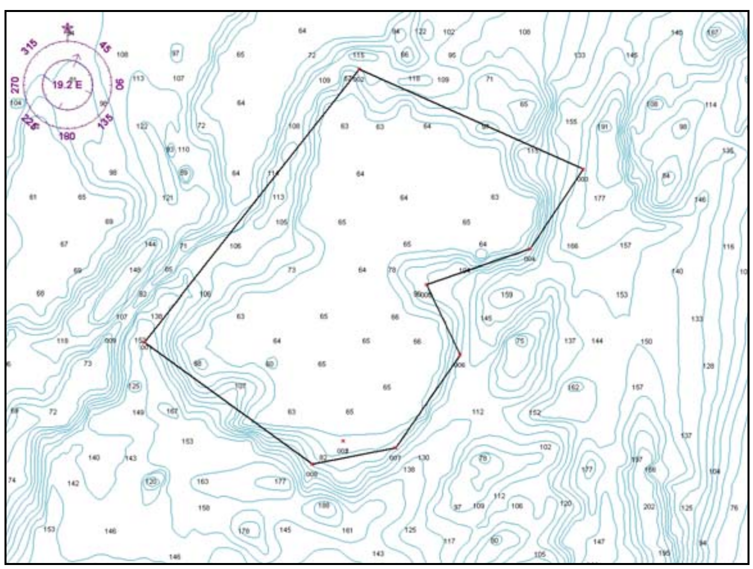


Figure 2-8. A proposed Yelloweye Rockfish Conservation Area (WA North Coast B) in waters off the Washington north coast where all fishing would be prohibited in 2007-08 under Action Alternatives 1-3 and the Council-preferred Alternative.

WA North Coast B

Beginning at 48º11.77’ N latitude by 125º13.03’ W longitude
Then to 48º16.43’ N latitude by 125º07.55’ W longitude
Then to 48º14.72’ N latitude by 125º01.84’ W longitude
Then to 48º13.36’ N latitude by 125º03.20’ W longitude
Then to 48º12.74’ N latitude by 125º05.83’ W longitude
Then to 48º11.55’ N latitude by 125º04.99’ W longitude
Then to 48º09.96’ N latitude by 125º06.63’ W longitude
Then to 48º09.68’ N latitude by 125º08.75’ W longitude
and back to the point of origin (Figure 2-8).

WA South Coast A

Beginning at 47°05.00’ N latitude; 124°46.50’ W longitude
Then to 47°04.00’ N latitude; 124°46.50’ W longitude
Then to 47°05.00’ N latitude; 124°48.00’ W longitude
and back to the point of origin (Figure 2-9).

WA South Coast B

Beginning at 46°58.00’ N latitude; 124°48.00’ W longitude
Then to 46°55.00’ N latitude; 124°48.00’ W longitude
Then to 46°58.00’ N latitude; 124°49.00’ W longitude
and back to the point of origin (Figure 2-9).

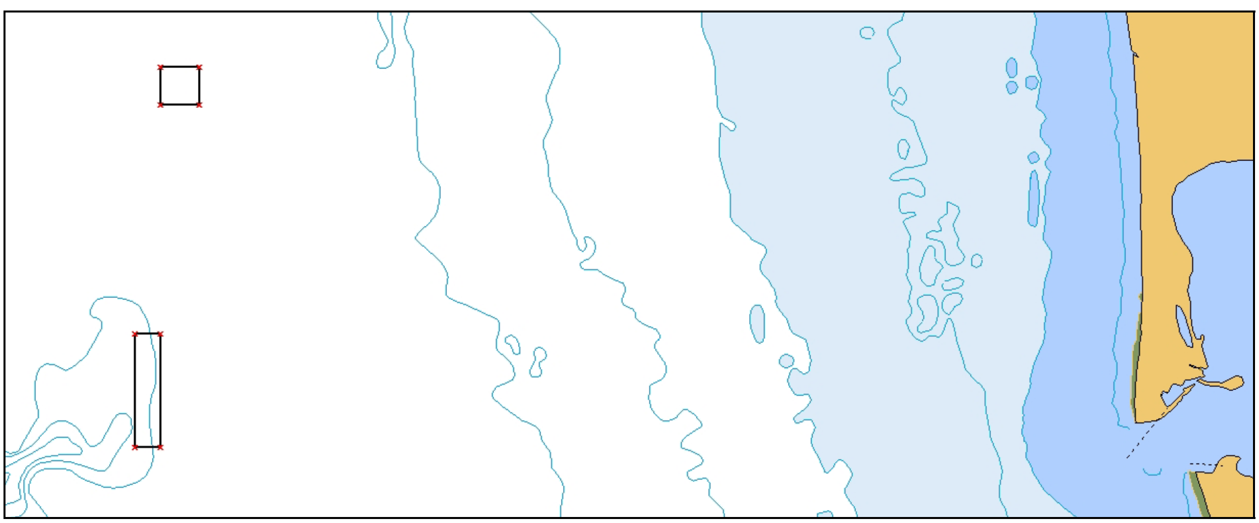


Figure 2-9. Two proposed Yelloweye Rockfish Conservation Areas (WA South Coast A and B) in waters off the Washington south coast where all fishing would be prohibited in 2007-08 under Action Alternatives 1-3. WA South Coast B is proposed under the Council-preferred Alternative.

Non-Whiting Trawl Fishery

There are no additional management measures than those described above for non-whiting trawl fisheries in 2007 and 2008 under Action Alternative 1.

Whiting Trawl Fishery

Predicted impacts to depleted groundfish species in 2007-08 whiting-directed fisheries under Action Alternatives 1-3 are depicted in Table 2-16. Higher whiting OYs are not possible given the bycatch constraints imposed by depleted groundfish species under the preferred OYs. However, it is important to note that an alternative strategy for managing 2007-08 whiting fisheries would be to impose bycatch caps for these species and allow the fleet flexibility to avoid these species while attempting to attain their whiting quotas. This has been the strategy for managing impacts of depleted species of concern in the whiting fishery since 2004.

Table 2-16. Predicted impacts to depleted groundfish species using a weighted average of observed bycatch rates in 2002-2005, sector whiting allocations, and estimated exvessel revenues for the 2007-08 whiting fishery under Action Alternatives 1-3.

Action Alternatives	US Catch	Fathom Line	Sector	Allocation	Canary	Darkblotched	POP	Widow	Yelloweye	Exvessel Rev
Alt. 3	260,000	none	Tribal	35,000	1.6	0.0	0.6	6.0	-	$4,089,570.1
			Mothership	53,520	3.2	4.5	0.9	27.7	0.0	$6,253,536.9
			CP	75,820	0.7	6.0	2.8	48.1	0.0	$8,859,177.3
			Shoreside	93,660	1.3	5.0	1.7	41.0	0.0	$10,943,689.6
			Total		6.8	15.5	6.1	122.8	0.0	$30,145,973.9
Alt. 2	200,000	none	Tribal	27,500	1.2	0.0	0.5	4.8	-	$3,213,233.7
			Mothership	40,920	2.5	3.4	0.7	21.2	0.0	$4,781,291.7
			CP	57,970	0.5	4.6	2.2	36.8	0.0	$6,773,496.5
			Shoreside	71,610	1.0	3.8	1.3	31.3	0.0	$8,367,260.4
			Total		5.2	11.9	4.7	94.0	0.0	$23,135,282.3
Alt. 1	150,000	none	Tribal	25,000	1.1	0.0	0.5	4.3	-	$2,921,121.5
			Mothership	29,520	1.8	2.5	0.5	15.3	0.0	$3,449,260.3
			CP	41,820	0.4	3.3	1.6	26.5	0.0	$4,886,452.0
			Shoreside	51,660	0.7	2.8	0.9	22.6	0.0	$6,036,205.5
			Total		4.0	8.6	3.5	68.7	0.0	$17,293,039.3

2.2.3.2.2 Limited Entry Fixed Gear Fisheries

Under Action Alternative 1, the seaward line of the non-trawl RCA is extended out to 150 fm north of Pt. Conception at 34°27' N latitude to the U.S.-Canada border to provide additional canary and yelloweye rockfish protection. The proposed yelloweye RCAs off the Washington coast would also be closed to limited entry fixed gear fisheries under this alternative (Figures 2-5, 2-6, 2-7, and 2-8).

South of Pt. Conception, the non-trawl RCA would be extended shoreward to 40 fm and seaward to 180 fm to reduce canary, cowcod, yelloweye, and particularly bocaccio mortality under this alternative.

The seaward boundary of the western CCA would be modified under this alternative to allow limited entry fixed gear vessels access to fish in four distinct Groundfish Fishing Areas (GFAs) deeper than 175 fm (Figure 2-10).

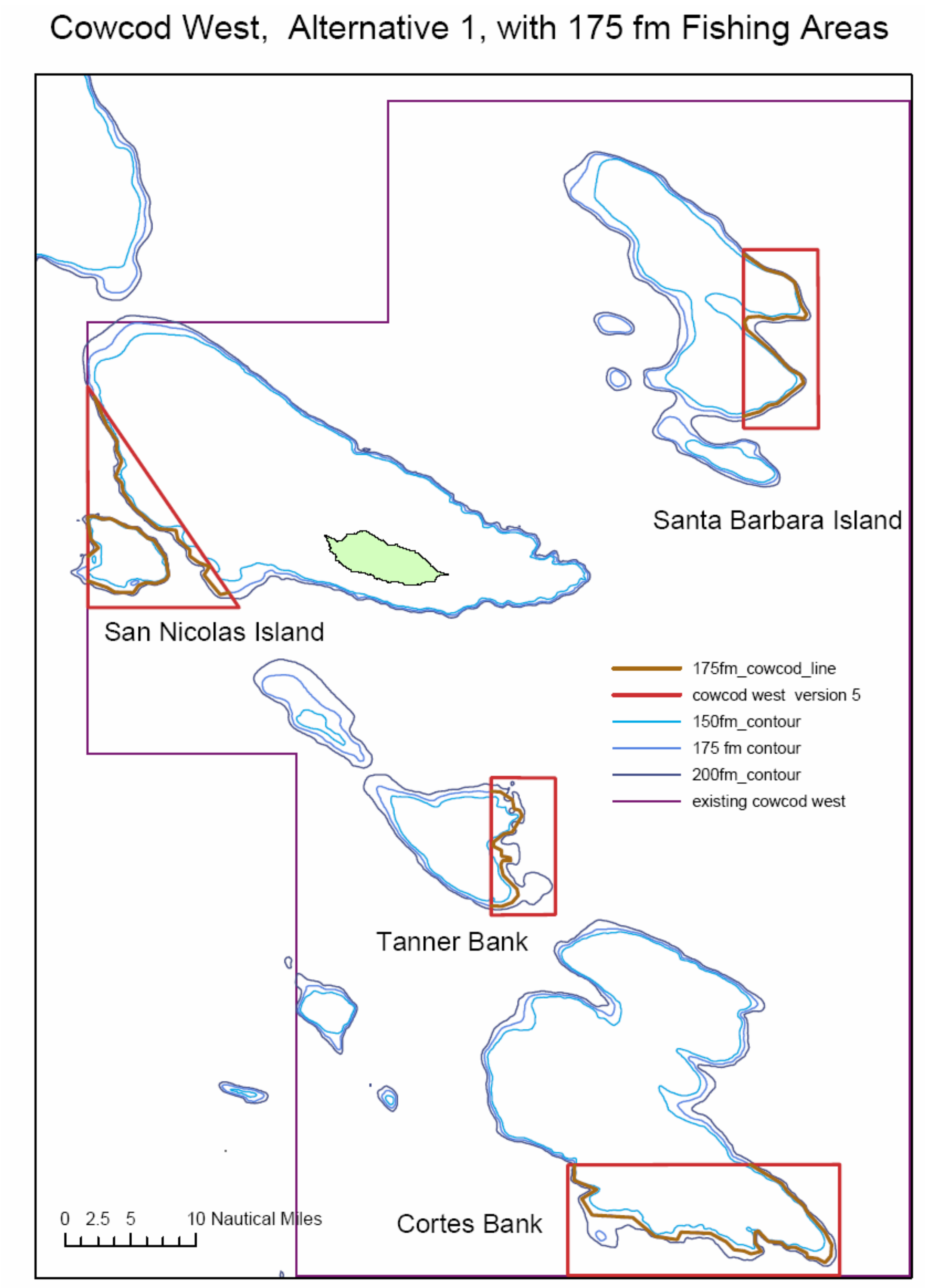


Figure 2-10. Modifications proposed for the western Cowcod Conservation Area in the Southern California Bight under Action Alternative 1 to allow limited entry fixed gear and open access fishing in four distinct Groundfish Fishing Areas (inside red polygons) in depths greater than 175 fm (brown contour).

2.2.3.2.3 Open Access Fisheries

Under Action Alternative 1, the seaward line of the non-trawl RCA is extended out to 150 fm north of Pt. Conception at 34°27' N latitude to the U.S.-Canada border to provide additional canary and yelloweye rockfish protection. The proposed yelloweye RCAs off the Washington coast would also be closed to open access fisheries under this alternative (Figures 2-5, 2-6, 2-7, and 2-8).

South of Pt. Conception, the non-trawl RCA would be extended shoreward to 40 fm and seaward to 180 fm to reduce canary, cowcod, yelloweye, and particularly bocaccio mortality under this alternative.

Directed Groundfish Fisheries

The seaward boundary of the western CCA would be modified under this alternative to allow open access vessels targeting groundfish using fixed gears access to fish in four distinct Groundfish Fishing Areas (GFAs) deeper than 175 fm (Figure 2-10).

Incidental Groundfish Fisheries

An additional yelloweye RCA is considered under Action Alternative 1 (as well as Action Alternatives 2 and 3) where commercial salmon trolling would be prohibited (Figure 2-11). This salmon troll RCA is defined by the following coordinates:

Beginning at 48°00.00’ N latitude by 125°14.00’ W longitude
Then to 48°02.00’ N latitude by 125°14.00’ W longitude
Then to 48°00.00’ N latitude by 125°16.50’ W longitude
and back to the point of origin.

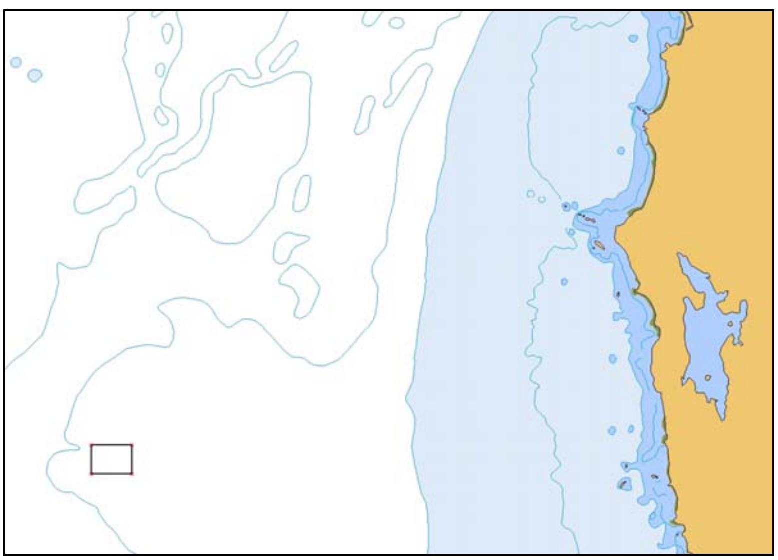


Figure 2-11. A yelloweye RCA off the north Washington coast where commercial salmon trolling would be prohibited under Action Alternatives 1-3 and the Council-preferred Alternative.

Under Action Alternative 1, the following management measures would also apply to the commercial salmon troll fishery north of 40°10' N latitude:

- Consistent with the salmon troll regulations off Oregon, allow the retention of lingcod in the salmon troll fishery when fishing shoreward of a line approximating 30 fm.

- As a canary rockfish bycatch reduction measure, prohibit the use of "hoochies" on the bottom spread.

2.2.3.2.4 Nearshore Commercial Fisheries

Nearshore Commercial Fisheries North of 40°10' N latitude

Under Action Alternative 1, the shoreward non-trawl RCA boundary is adjusted from 30 fm (status quo) to 20 fm from 40°10' N latitude to the Oregon-Washington border at 46°16' N latitude (Table 2-12). In addition, the harvestable amount of black rockfish available to this fishery is reduced from status quo levels by 60 percent. As current trip limits are at the minimum level deemed viable by the fishery participants, a 60 percent reduction in target catch would result in a 60 percent reduction in season duration (less than a 6 month season). The same magnitude of reduced catch may also be attained by utilizing one, or a combination of, the following options: 1) restricting the fishery to waters shoreward of 10 or 15 fm; 2) reducing the duration of the fishery, resulting in a very short season; 3) a fishery closure in some or all areas; and/or 4) reduced harvest of target species.

Nearshore Commercial Fisheries South of 40°10' N latitude

Under Action Alternative 1 from 40°10' N latitude 34°27' N latitude, the shoreward non-trawl RCA boundary is adjusted from 30 fm during periods 1, 2, 5, and 6 and 20 fm during periods 3 and 4 (status quo) to 20 fm during all periods (Table 2-12b). In addition, the harvestable amount of shallow and deeper nearshore rockfish available to this fishery is reduced from status quo levels by 15 percent. As current trip limits are at the minimum level deemed viable by the fishery participants, a 15 percent reduction in target catch would result in a 15 percent reduction in season duration (i.e., an 8 month season). The same magnitude of reduced catch may also be attained by utilizing one, or a combination of, the following options: 1) restricting the fishery to waters shoreward of 10 or 15 fm; 2) reducing the duration of the fishery, resulting in a very short season; 3) a fishery closure in some or all areas; and/or 4) further reduced harvest of target species. Under Action Alternative 1 from 34°27' N latitude to the U.S./Mexico border, the shoreward non-trawl RCA boundary is adjusted from 60 fm (status quo) to 40 fm. The same magnitude of reduced catch may also be attained by utilizing one, or a combination of, the following options: 1) restricting the fishery to waters shoreward of 30 or 20 fm; 2) reducing the duration of the fishery, resulting in a very short season; 3) a fishery closure in some or all areas; and/or 4) reduced harvest of target species.

2.2.3.2.5 Tribal Fisheries

Under all the action alternatives, the following regulations will apply to 2007-08 tribal groundfish fisheries.

Black Rockfish - The 2007 and 2008 tribal harvest guidelines will be set at 20,000 pounds for the management area between the US/Canada border and Cape Alava, and 10,000 pounds for the management area located between Destruction Island and Leadbetter Point. No tribal harvest restrictions are proposed for the management area between Cape Alava and Destruction Island.

Sablefish - The 2007 and 2008 tribal set asides for sablefish will be set at 10 percent of the Monterey through Vancouver area OY minus 1.9 percent to account for estimated discard mortality. Allocations among tribes and among gear types, if any, will be determined by the tribes.

Pacific cod - The tribes will be subject to a 400 mt harvest guideline for 2007 and 2008.

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

Thornyheads - Tribal fisheries will be restricted to the Limited Entry trip limits in place at the beginning of the year for both shortspine and longspine thornyheads.

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

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

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

Lingcod - Tribal fisheries will be restricted to 600 pound per day and 1,800 pound per week limits for all tribal fisheries except for the treaty troll fishery which would be limited to 1,000 pounds per day and 4,000 pounds per week.

Spiny Dogfish - The Makah Tribe is proposing a directed longline fishery for spiny dogfish for 2007 and 2008. The fishery would be restricted to the Limited Entry trip limits. Increased landings of dogfish by treaty fishermen in 2007 and 2008 would be dependent on successful targeting in 2006 while staying within current estimates of impacts on overfished species.

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

Tribal Proposals Regarding Makah Trawl fisheries for 2007 and 2008

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

Bottom Trawl Fishery - Treaty fishermen using bottom trawl gear will be subject to the trip limits applicable to the limited entry fishery for Dover sole, English sole, rex sole, arrowtooth flounder, and other flatfish. For Dover sole 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 ½ 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 2006.

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

2.2.3.2.6 Washington Recreational Fisheries

Under Action Alternative 1, WDFW is not proposing any changes to the bottomfish bag limit, minimum size limits, or lingcod season dates described under the No Action Alternative. However, the proposed yelloweye RCAs off the Washington coast would also be closed to Washington recreational fisheries under this alternative (Figures 2-5, 2-6, 2-7, and 2-8). These additional yelloweye RCAs would require a change to the Pacific Halibut Catch Sharing Plan. Other new management measures are considered under Action Alternative 1 as follows:

Management Measures for Marine Areas 3 and 4 (Queets River to the U.S./Canada border)

Under Action Alternative 1, WDFW would prohibit retention of rockfish and lingcod seaward of a line approximating 10 fm during the months of May, August, and September; close the North Coast to halibut fishing, except in Area 4B; and prohibit retention of rockfish and lingcod seaward of a line approximating 20 fm from June 1 through July 31. This alternative would require a change to the Pacific Halibut Catch Sharing Plan.

Management Measures for Marine Area 2 (Leadbetter Pt. to the Queets River)

Under Action Alternative 1, WDFW would prohibit retention of rockfish and lingcod seaward of a line approximating 30 fm from lingcod opening day through July 31; prohibit retention of rockfish and lingcod seaward of a line approximating 20 fm from August 1 through September 30.

Management Measures for Marine Area 1 (Oregon/Washington border to Leadbetter Pt.)

There is very little yelloweye and canary rockfish (0.03 mt and 0.02 mt, respectively, in 2005) caught in Marine Area 1; therefore, WDFW proposes to keep the status quo (No Action) bottomfish fishing regulations in place through 2007 and 2008.

2.2.3.2.7 Oregon Recreational Fisheries

Under Action Alternative 1a (there are two suboptions for the 2007-08 Oregon recreational fishery under Action Alternative 1), the Oregon recreational groundfish fishery would only be open in depths ≤20 fm from July 1 through Labor Day. The minimum size limit for lingcod would be 20-inches, and anglers would be allowed to retain 3 lingcod per day. Minimum size limits for cabezon and greenling species would be the same as for the No Action Alternative. However, under this alternative the marine fish daily-bag-limit would increase to 10 marine fish, with all other regulations the same as in the No Action Alternative, except for the following expansion of the Stonewall Banks closure in the Pacific halibut fishery. The additional closure, designed to reduce yelloweye rockfish mortality and hence termed a yelloweye RCA (YRCA), is defined by the following coordinates:

1	44º41.71 N latitude	124º29.99 W longitude
2	44º41.68 N latitude	124º21.60 W longitude
3	44º27.66 N latitude	124º17.01 W longitude
4	44º25.22 N latitude	124º17.01 W longitude
5	44º25.27 N latitude	124º30.11 W longitude

Returning to the first point (Figure 2-5).

This expanded Stonewall Banks closure would only apply to the Pacific halibut fishery since this area is seaward of the 20 fm line and, under this alternative, all groundfish retention is prohibited seaward of the 20 fm line.

Under Action Alternative 1b, the Oregon recreational groundfish fishery would be open from April through September shoreward of the 20 fm line. A 30 percent reduction in yelloweye rockfish impacts would be achieved by reducing Pacific halibut quota and time on the water in that fishery. The marine fish daily-bag-limit would be the same as under the No Action Alternative, or 6 marine fish daily. The minimum size limit for lingcod would be 20 inches, and anglers would be allowed to retain 3 lingcod per day. All other groundfish regulations would be the same as under the No Action Alternative except for the expansion of the Stonewall Banks closure in the Pacific halibut fishery described under Action Alternative 1a.

Predicted yelloweye rockfish impacts under both alternatives 1a and 1b are similar (see section 4.3.1.7).

2.2.3.2.8 California Recreational Fisheries

Under Action Alternative 1, the five RLMAs described under the No Action Alternative will be used to manage 2007-08 California recreational groundfish fisheries. The status quo (No Action) California recreational management measures under Action Alternative 1 include the following:

- Regulations apply to groundfish (with sanddab fishery exception) and associated state-managed species (rock greenling, California sheephead, and ocean whitefish).
- The sport fishery for sanddabs, using gear specified in Federal and state regulations (size #2 hooks or smaller), is exempt from the season closures and depth restrictions placed on other Federally-managed groundfish.
- Retention of species in the Other Flatfish complex is allowed when fishing with size #2 hooks or smaller (≤ 11 mm from point to shank) for Pacific sanddabs.
- Within a general bag limit of 20 fish, 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*.
- No retention of cowcod, canary, or yelloweye rockfish.
- 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.
- 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, 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 groundfish other than California scorpionfish, but including select nongroundfish species (California sheephead and ocean whitefish).

California recreational groundfish management measures that differ from status quo under Action Alternative 1 include the following:

- A statewide one-fish bocaccio sublimit is included in the 10-fish RCG daily-bag-limit.
- Lingcod daily-bag-limit of 1 fish, but with a minimum size limit of 22 inches.

Additionally, seasons and depth restrictions by RLMA under Action Alternative 1 are described below and summarized in Table 2-17.

Table 2-17. Summary of 2007-08 California recreational groundfish seasons and depth restrictions by region under Action Alternative 1.

RCG SEASON BY REGION:

<table>
<tr><th>Region</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>North region</td><td>---</td><td>---</td><td>---</td><td>---</td><td colspan="8">> 20fm Closed</td></tr>
<tr><td>North Central</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td colspan="3">> 20fm Closed</td><td>---</td><td colspan="2">> 20fm Closed</td></tr>
<tr><td>South Central - Monterey</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td colspan="6">> 20fm Closed</td></tr>
<tr><td>South Central - Morro Bay</td><td>---</td><td>---</td><td>---</td><td>---</td><td colspan="5">> 20fm Closed</td><td>---</td><td>---</td><td>---</td></tr>
<tr><td>South Region*</td><td>---</td><td>---</td><td colspan="10">> 30fm Closed</td></tr>
</table>

NOTES AND KEY:

Shore fishing allowed in all waters in all months

RCG = Rockfish, cabezon, greenlings

--- = Closed to boat-based fishing for RCG

LINGCOD SEASON IS OPEN **ONLY** WHEN RCG IS OPEN, EXCEPT CLOSED DEC, JAN, FEB, MAR FOR SPAWNING

*In the South Region, CA scorpionfish is open 12 months: 0-40 fm in January-February and 0-30 fm March-December.

Southern RLMA (U.S./Mexico Border to Point Conception)

The California recreational groundfish fishery regulations south of Point Conception under Action Alternative 1 are the same as described above except for the following changes:

- Groundfish other than California scorpionfish, but including select nongroundfish species (California sheephead and ocean whitefish) open March through December shoreward of the 30 fm line and otherwise closed.
- California scorpionfish is open year-round, but restricted to depths ≤40 fm during January and February, and ≤30 fm during March through December.
-

Southern South-Central RLMA (Point Conception to Lopez Point)

The California recreational groundfish fishery regulations for the area between Point Conception and Lopez Point under Action Alternative 1 would be the same as described above except for the following changes:

- Groundfish including select nongroundfish species (California sheephead and ocean whitefish) open May through September shoreward of the 20 fm line and otherwise closed.

Northern South--Central RLMA (Lopez Point to Pigeon Point)

The California recreational groundfish fishery regulations for the area between Lopez Point and Pigeon Point under the Action Alternative 1 would be the same as described above except for the following changes:

- Groundfish including select nongroundfish species (California sheephead and ocean whitefish) open July through December shoreward of 20 fm and otherwise closed.

Northern Central RLMA (Pigeon Point to Cape Mendocino)

The California recreational groundfish fishery regulations for the area between Pigeon Point and Cape Mendocino under the Action Alternative 1 would be the same as described above except for the following changes:

- Groundfish including select nongroundfish species (California sheephead and ocean whitefish) open July through September and November through December shoreward of 20 fm and otherwise closed.

Northern RLMA (Cape Mendocino to the California/Oregon Border)

The California recreational groundfish fishery regulations for the area between Cape Mendocino and the California/Oregon border under the Action Alternative 1 would be the same as described above except for the following changes:

- Groundfish and ocean whitefish open in May through December shoreward of 20 fm and otherwise closed.
-

2.2.3.3 Action Alternative 2

Action Alternative 2 is intermediate to Action Alternatives 1 and 3 in constraints to 2007 and 2008 fishing opportunities and intermediate in terms of impacts to depleted and target groundfish species. Table 2-18 depicts the impacts to depleted groundfish species by sector in 2007 and 2008 associated with the suite of management measures under Action Alternative 2.

2.2.3.3.1 Limited Entry Trawl Fisheries

Table 2-19 depicts the 2007-08 limited entry trawl management measures under Action Alternative 2. The proposed yelloweye RCAs off the Washington coast would also be closed to limited entry trawl fisheries under this alternative (Figures 2-4, 2-6, 2-7, and 2-8).

Action Alternative 2 would reduce the lingcod minimum size limit from 24 inches to 22 inches north of 40°10' N latitude under this alternative.

Table 2-18. Projected mortality (mt) of depleted groundfish species by fishing sector under Action Alternative 2.

Fishery	Bocaccio a/	Canary	Cowcod	Dkbl	POP	Widow	Y'eye '07	Y'eye '08
Limited Entry Trawl- Non-whiting	50.5	7.5	2.9	179.6	85.6	1.0	0.2	0.2
Limited Entry Trawl- Whiting								
At-sea whiting motherships		2.5		3.4	0.7	21.2	0.0	0.0
At-sea whiting cat-proc		0.5		4.6	2.2	36.8	0.0	0.0
Shoreside whiting		1.0		3.8	1.3	31.3	0.0	0.0
Tribal whiting		1.6		0.0	0.6	6.1	0.0	0.0
Tribal								
Midwater Trawl		1.8		0.0	0.0	40.0	0.0	0.0
Bottom Trawl		0.8		0.0	3.7	0.0	0.0	0.0
Troll		0.5		0.0	0.0		0.0	0.0
Fixed gear		0.3		0.0	0.0	0.0	2.3	2.3
Limited Entry Fixed Gear								
Sablefish	13.4	0.3	0.1	0.7	0.3	0.0	0.8	0.8
Non-Sablefish		0.2		0.4	0.4	0.5	0.6	0.6
Open Access: Directed Groundfish								
Sablefish DTL	0.0	0.1	0.1	0.2	0.1	0.0	0.2	0.2
Nearshore (North of 40°10' N. lat.)	0.0	1.2		0.0	0.0	0.1	1.3	1.3
Nearshore (South of 40°10' N. lat.)	0.0	0.3		0.0	0.0		0.0	0.0
Other	10.6	0.0		0.0	0.0	0.0	0.0	0.0
Open Access: Incidental Groundfish								
CA Halibut	0.1	0.1		0.0	0.0			
CA Gillnet b/	0.5			0.0	0.0	0.0		
CA Sheephead b/				0.0	0.0	0.0	0.0	0.0
CPS- wetfish b/	0.3							
CPS- squid c/								
Dungeness crab b/	0.0		0.0	0.0	0.0			
HMS b/		0.0	0.0	0.0				
Pacific Halibut b/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pink shrimp	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	2.0	0.0	0.0	0.0	0.3	0.5	0.5
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)								
Recreational Groundfish								
WA		0.8					1.8	1.8
OR		2.6				0.1	1.9	1.9
CA	31.7	5.9	0.1			3.2	1.5	1.5
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.								
	3.0	3.0	0.1	3.8	3.6	3.0	3.0	3.0
TOTAL	110.5	33.1	3.3	196.6	98.5	143.7	14.3	14.3
High OY Alt	**218**	**44.0**	**8.0**	**229**	**100**	**368**	**23**	**20**
Difference	107.5	10.9	4.7	32.5	1.5	224.4	8.7	5.7
Percent of OY	50.7%	75.2%	41.3%	85.8%	98.5%	39.0%	62.0%	71.3%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data sources.						

a/ South of 40°10' N. lat.

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

c/ Bycatch amounts by species unavailable, but bocaccio occurred in 0.1 percent of all port samples and other rockfish in another 0.1 percent of all port samples (and squid fisheries usually land their whole catch). In 2001, out of 84,000 mt total landings 1 mt was groundfish. This suggests that total bocaccio are caught in trace amounts.

Table 2-19. Cumulative bimonthly limits and RCA configurations by area and species for the West Coast limited entry trawl fishery in 2007-08 under Action Alternative 2.

SUBAREA	Period	RCA Configurations		Cumulative Limits							
		INLINE	OUTLINE	SABLEFISH	LONGSPN	SHORTSPN	DOVER	OTHER FLAT	PETRALE	ARROWTH	SLOPE ROCK
North seaward limits	1	75	200*	14,000	12,000	6,000	60,000	110,000	80,000	100,000	4,000
	2	75	200	14,000	12,000	6,000	60,000	110,000	30,000	100,000	4,000
	3	75	250	16,000	12,000	6,000	60,000	110,000	30,000	100,000	4,000
	4	75	250	16,000	12,000	6,000	60,000	110,000	30,000	100,000	4,000
	5	75	200	16,000	12,000	6,000	60,000	110,000	30,000	100,000	4,000
	6	75	200*	14,000	12,000	6,000	60,000	110,000	80,000	100,000	4,000
North shoreward limits	1	75	200*	5,000	3,000	3,000	40,000	80,000	16,000	80,000	4,000
	2	75	200	9,000	3,000	3,000	40,000	80,000	25,000	80,000	4,000
	3	75	250	11,000	3,000	3,000	40,000	80,000	25,000	80,000	4,000
	4	75	250	11,000	3,000	3,000	40,000	80,000	25,000	80,000	4,000
	5	75	200	9,000	3,000	3,000	40,000	80,000	25,000	80,000	4,000
	6	75	200*	5,000	3,000	3,000	40,000	80,000	16,000	80,000	4,000
38 - 40 10	1	100	150	15,000	22,000	7,000	60,000	110,000	80,000	10,000	15,000
	2	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	15,000
	3	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	15,000
	4	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	15,000
	5	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	15,000
	6	100	150	15,000	22,000	7,000	60,000	110,000	80,000	10,000	15,000
S 38	1	100	150	15,000	22,000	7,000	60,000	110,000	80,000	10,000	40,000
	2	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	40,000
	3	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	40,000
	4	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	40,000
	5	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	40,000
	6	100	150	15,000	22,000	7,000	60,000	110,000	80,000	10,000	40,000

note: splitnose limits are the same as slope rock limits south of 40º10' N latitude.

* indicates petrale areas.

Non-Whiting Trawl Fishery

There are no additional management measures than those described above for non-whiting trawl fisheries in 2007 and 2008 under Action Alternative 2.

Whiting Trawl Fishery

Predicted impacts to depleted groundfish species in 2007-08 whiting-directed fisheries under Action Alternatives 1-3 are depicted in Table 2-16. Higher whiting OYs are not possible given the bycatch constraints imposed by depleted groundfish species under the preferred OYs. However, it is important to note that an alternative strategy for managing 2007-08 whiting fisheries would be to impose bycatch caps for these species and allow the fleet flexibility to avoid these species while attempting to attain their whiting quotas.

2.2.3.3.2 Limited Entry Fixed Gear Fisheries

Under Action Alternative 2, the seaward line of the non-trawl RCA is extended out to 125 fm north of Cape Mendocino at 40°10' N latitude to the U.S.-Canada border to provide additional canary and yelloweye rockfish protection relative to status quo management measures. The proposed yelloweye RCAs off the Washington coast would also be closed to limited entry fixed gear fisheries under this alternative (Figures 2-5, 2-6, 2-7, and 2-8).

The seaward boundary of the western Cowcod Conservation Area would be modified under this alternative to allow limited entry fixed gear vessels access to fish in depths deeper than 175 fm (Figure 2-12).

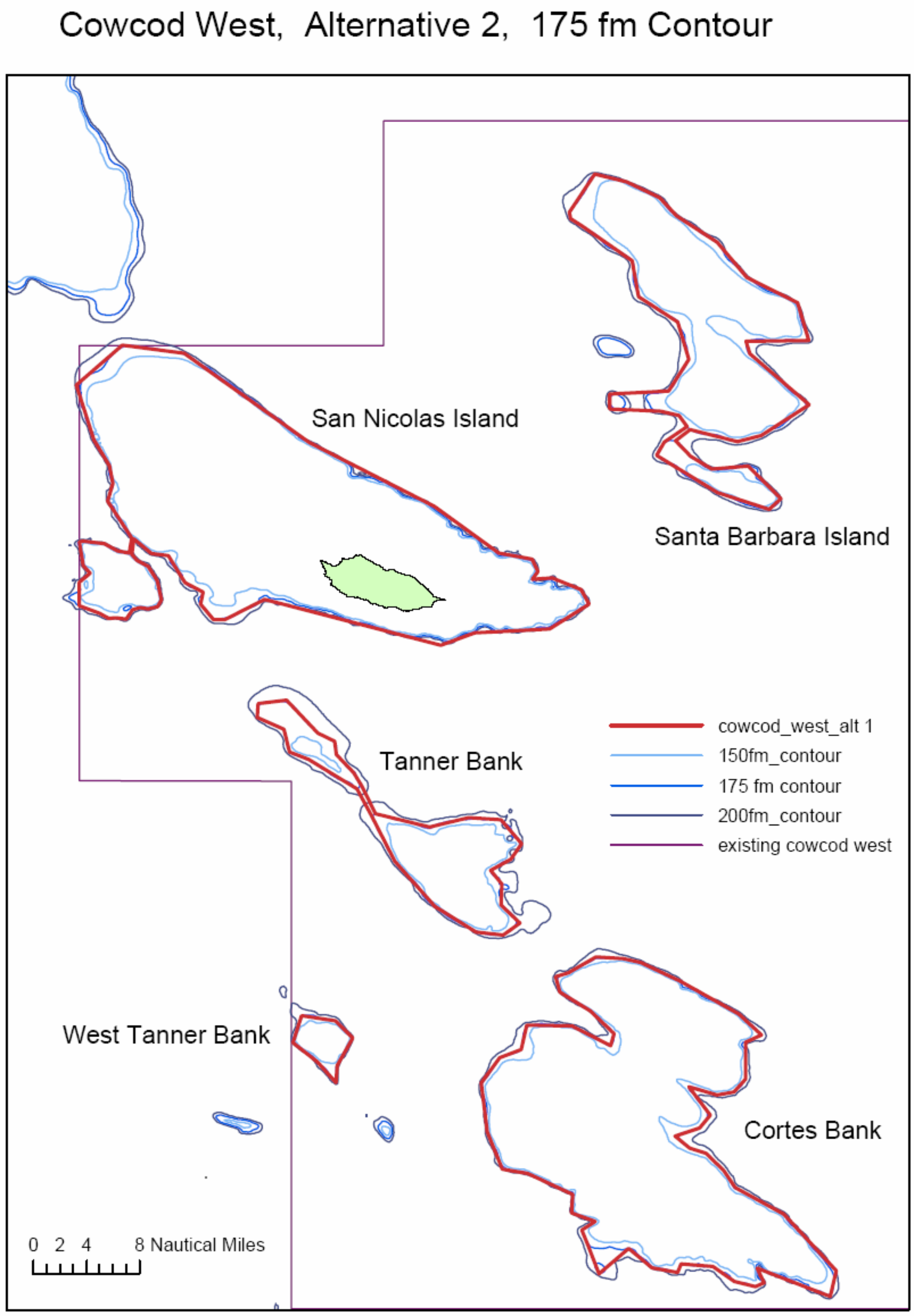


Figure 2-12. Modifications proposed for the western Cowcod Conservation Area in the Southern California Bight under Action Alternative 2 and the Council-preferred Alternative to allow limited entry fixed gear and open access fishing in depths greater than 175 fm (red contour).

2.2.3.3.3 Open Access Fisheries

Under Action Alternative 2, the seaward line of the non-trawl RCA is extended out to 125 fm north of Cape Mendocino at 40°10' N latitude to the U.S.-Canada border to provide additional canary and yelloweye rockfish protection relative to status quo management measures. The proposed yelloweye RCAs off the Washington coast would also be closed to open access fisheries under this alternative (Figures 2-5, 2-6, 2-7, and 2-8).

Directed Groundfish Fisheries

The seaward boundary of the western CCA would be modified under this alternative to allow open access vessels targeting groundfish using fixed gears access to fish in depths deeper than 175 fm (Figure 2-12).

Incidental Groundfish Fisheries

Additional management measures to those described above considered for open access fisheries that incidentally catch groundfish species under this alternative apply to the commercial salmon troll fishery north of 40°10' N latitude as follows:
Under Action Alternative 2, the following management measures would also apply to the commercial salmon troll fishery north of 40°10' N latitude:

- Prohibit commercial salmon trolling in the proposed yelloweye RCA in waters off northern Washington described under Action Alternative 1 (Figure 2-11).
- Prohibit the retention of lingcod in the salmon troll fishery shoreward of the non-trawl RCA seaward boundary (e.g., shoreward of 100 fm north of 40°10' N latitude, under status quo).
- As a canary rockfish bycatch reduction measure, prohibit the use of "hoochies" on the bottom spread.

2.2.3.3.4 Nearshore Commercial Fisheries

Nearshore Commercial Fisheries North of 40°10' N latitude

Under Action Alternative 2, the shoreward RCA boundary is adjusted from 30 fm (status quo) to 20 fm from 40°10' N latitude to the Oregon-Washington border at 46°16' N latitude (Table 2-12). In addition, the harvestable amount of black rockfish available to this fishery is reduced from status quo levels by 10 percent. The same amount of savings may occur by further adjustment of the shoreward RCA boundary (i.e. 15 fm), resulting in status quo harvest of target species.

Nearshore Commercial Fisheries South of 40°10' N latitude

Under Action Alternative 2, from 40°10' N latitude 34°27' N latitude, the shoreward non-trawl RCA boundary is adjusted from 30 fm during periods 1, 2, 5, and 6 and 20 fm during periods 3 and 4 (status quo) to 20 fm during all periods (Table 2-12b). In addition, the harvestable amount of shallow and deeper nearshore rockfish available to this fishery is reduced from status quo levels by 5 percent. The same amount of savings may occur by further adjustment of the shoreward RCA boundary (i.e. 15 fm), or reducing the season duration (9 months), resulting in status quo harvest of target species. Action Alternative 2 from 34°27' N latitude to the US/Mexico border represents status quo management. CDFG would have the ability to manage harvest at more conservative levels, if deemed appropriate by the Director of CDFG or by the California Fish and Game Commission. Catches would be monitored, and the fishery managed to ensure harvest impacts of both target species and associated overfished rockfish did not exceed adopted levels.

2.2.3.3.5 Tribal Fisheries

Groundfish management measures are the same as described for tribal fisheries under Action Alternative 1. The tribes proposed only one action alternative for analysis.

2.2.3.3.6 Washington Recreational Fisheries

Under Action Alternative 2, WDFW is not proposing any changes to the bottomfish bag limit, minimum size limits, or lingcod season dates described under the No Action Alternative. However, the proposed yelloweye RCAs off the Washington coast would also be closed to Washington recreational fisheries under this alternative (Figures 2-5, 2-6, 2-7, and 2-8). These additional yelloweye RCAs would require a change to the Pacific Halibut Catch Sharing Plan. Other new management measures are considered under Action Alternative 2 as follows:

Management Measures for Marine Areas 3 and 4 (Queets River to the U.S./Canada border)

Under Action Alternative 2, WDFW would prohibit retention of rockfish and lingcod seaward of a line approximating 10 fm during the months of May and September; close the North Coast to halibut fishing, except in Area 4B; and prohibit retention of rockfish and lingcod seaward of a line approximating 20 fm from June 1 through August 31. This alternative would require a change to the Pacific Halibut Catch Sharing Plan.

Management Measures for Marine Area 2 (Leadbetter Pt. to the Queets River)

Under Action Alternative 2, WDFW would prohibit retention of rockfish and lingcod seaward of a line approximating 30 fm from lingcod opening day through August 31.

Management Measures for Marine Area 1 (Oregon/Washington border to Leadbetter Pt.)

There is very little yelloweye and canary rockfish (0.03 mt and 0.02 mt, respectively, in 2005) caught in Marine Area 1; therefore, WDFW proposes to keep the status quo (No Action) bottomfish fishing regulations in place through 2007 and 2008.

2.2.3.3.7 Oregon Recreational Fisheries

Under Action Alternative 2, the Oregon recreational groundfish fishery would be open all year shoreward of the 20 fm line. The marine fish daily-bag-limit would be reduced to 5 marine fish. Other changes to status quo (No Action) management measures under this alternative include a decrease in the lingcod minimum size limit to 22 inches. All other management measures, including the current Stonewall Banks closure for the Pacific halibut fishery under this alternative are the same as under the No Action Alternative. The additional YRCA contemplated under Action Alternative 1 would not apply to the directed recreational groundfish fishery under this alternative since the proposed closed area is seaward of the 20 fm line.

2.2.3.3.8 California Recreational Fisheries

Under Action Alternative 2, the five RLMAs described under the No Action Alternative will be used to manage 2007-08 California recreational groundfish fisheries. The status quo (No Action) California recreational management measures under Action Alternative 2 include the following:

- Regulations apply to groundfish (with sanddab fishery exception) and associated state-managed species (rock greenling, California sheephead, and ocean whitefish).
- The sport fishery for sanddabs, using gear specified in Federal and state regulations (size #2 hooks or smaller), is exempt from the season closures and depth restrictions placed on other Federally-managed groundfish.
- Retention of species in the Other Flatfish complex is allowed when fishing with size #2 hooks or smaller (≤ 11 mm from point to shank) for Pacific sanddabs.
- Combined rockfish + cabezon + greenling (RCG) complex daily-bag-limit of 10 fish.
- No retention of cowcod, canary, or yelloweye rockfish.
- Lingcod size limit of 24 inches with a daily-bag-limit of two fish.
- A two-fish bag limit for bocaccio in the northern RLMA (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.
- 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.
- 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, 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 groundfish other than California scorpionfish, but including select nongroundfish species (California sheephead and ocean whitefish).

California recreational groundfish management measures that differ from status quo under Action Alternative 2 include the following:

- One cabezon and two greenling of the genus *Hexagrammos* sublimit is included in the 10-fish RCG daily-bag-limit.

Additionally, seasons and depth restrictions by RLMA under Action Alternative 2 are described below and summarized in Table 2-20.

Table 2-20. Summary of 2007-08 California recreational groundfish seasons and depth restrictions by region under Action Alternative 2.

RCG SEASON BY REGION

Region	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
North region	---	---	---	---	>30fm Closed							
North Central	---	---	---	---	---	---	> 20fm Closed					
South Central - Monterey	---	---	---	---	---	---	> 20fm Closed					
South Central - Morro Bay	---	---	---	> 20fm Closed						---	---	---
South Region*	---	---	> 40fm Closed						> 30fm Closed		> 60fm Closed	

NOTES AND KEY:

Shore fishing allowed in all waters in all months

RCG = Rockfish, cabezon, greenlings

--- = Closed to boat-based fishing for RCG

LINGCOD SEASON IS OPEN **ONLY** WHEN RCG IS OPEN, EXCEPT CLOSED DEC, JAN, FEB, MAR FOR SPAWNING

*In the South Region, CA scorpionfish is open 12 months: 0-40 fm in January-August, 0-30 fm September-October and 0-60 fm November-December.

Southern RLMA (U.S./Mexico Border to Point Conception)

The California recreational groundfish fishery regulations south of Point Conception under Action Alternative 2 are the same as described above except for the following changes:

- Groundfish other than California scorpionfish, but including select nongroundfish species (California sheephead and ocean whitefish) open March through August shoreward of the 40 fm line, September through October shoreward of the 30 fm line, November and December shoreward of the 60 fm line, and otherwise closed.
- California scorpionfish is open year-round, but restricted to depths ≤40 fm during January-August, ≤30 fm during September and October, and ≤60 fm during November and December.

Southern South-Central RLMA (Point Conception to Lopez Point)

The California recreational groundfish fishery regulations for the area between Point Conception and Lopez Point under Action Alternative 2 would be the same as described above except for the following changes:

- Groundfish including select nongroundfish species (California sheephead and ocean whitefish) open April through September shoreward of the 20 fm line and otherwise closed.

Northern South--Central RLMA (Lopez Point to Pigeon Point)

The California recreational groundfish fishery regulations for the area between Lopez Point and Cape Mendocino under the Action Alternative 2 would be the same as described above except for the following changes:

- Groundfish including select nongroundfish species (California sheephead and ocean whitefish) open July through December shoreward of 20 fm and otherwise closed.

Northern Central RLMA (Pigeon Point to Cape Mendocino)

The California recreational groundfish fishery regulations for the area between Pigeon Point and Cape Mendocino under the Action Alternative 2 would be the same as described above except for the following changes:

- Groundfish including select nongroundfish species (California sheephead and ocean whitefish) open July through December shoreward of 20 fm and otherwise closed.

Northern RLMA (Cape Mendocino to the California/Oregon Border)

The California recreational groundfish fishery regulations for the area between Cape Mendocino and the California/Oregon border under the Action Alternative 2 would be the same as described above except for the following changes:

- Groundfish and ocean whitefish open in May through December shoreward of 30 fm and otherwise closed.

2.2.3.4 Action Alternative 3

Action Alternative 3 is the most liberal action alternative analyzed in this EIS. More fishing opportunities, and hence greater impacts to groundfish species, are predicted under this alternative. The only other alternative analyzed that may be less constraining to 2007-08 fishing opportunities may be the No Action Alternative, if those management measures were implemented in the next management cycle. Table 2-21 depicts the impacts to depleted groundfish species by sector in 2007 and 2008 associated with the suite of management measures under Action Alternative 3.

Table 2-21. Projected mortality (mt) of depleted groundfish species by fishing sector under Action Alternative 3.

Fishery	Bocaccio a/	Canary	Cowcod	Dkbl	POP	Widow	Y'eye '07	Y'eye '08
Limited Entry Trawl- Non-whiting	50.5	8.5	2.9	181.1	85.9	1.0	0.2	0.2
Limited Entry Trawl- Whiting								
At-sea whiting motherships		3.4		4.7	0.9	28.8	0.0	0.0
At-sea whiting cat-proc		0.7		6.3	2.8	50.0	0.0	0.0
Shoreside whiting		1.4		5.2	1.7	42.6	0.0	0.0
Tribal whiting		1.6		0.0	0.6	6.1	0.0	0.0
Tribal								
Midwater Trawl		1.8		0.0	0.0	40.0	0.0	0.0
Bottom Trawl		0.8		0.0	3.7	0.0	0.0	0.0
Troll		0.5		0.0	0.0		0.0	0.0
Fixed gear		0.3		0.0	0.0	0.0	2.3	2.3
Limited Entry Fixed Gear								
Sablefish	13.4	0.5	0.1	0.6	0.2	0.0	1.0	1.0
Non-Sablefish		0.4		0.5	0.4	0.5	1.3	1.3
Open Access: Directed Groundfish								
Sablefish DTL	0.0	0.1	0.1	0.2	0.1	0.0	0.3	0.3
Nearshore (North of 40°10' N. lat.) b/	0.0	1.7		0.0	0.0	0.1	2.1	2.1
Nearshore (South of 40°10' N. lat.)	0.0	0.3		0.0	0.0		0.0	0.0
Other	10.6	0.0		0.0	0.0	0.0	0.0	0.0
Open Access: Incidental Groundfish								
CA Halibut	0.1	0.1		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	0.0
CPS- wetfish c/	0.3							
CPS- squid d/								
Dungeness crab c/	0.0		0.0	0.0	0.0			
HMS c/		0.0	0.0	0.0				
Pacific Halibut c/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pink shrimp	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	2.0	0.0	0.0	0.0	0.3	0.5	0.5
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)								
Recreational Groundfish								
WA		1.4					3.1	3.1
OR		4.0				0.6	2.9	2.9
CA	106.8	8.6	0.3			18.3	1.3	1.3
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.								
	3.0	3.0	0.1	3.8	3.6	3.0	3.0	3.0
TOTAL	185.6	41.1	3.5	202.5	100.0	191.4	18.1	18.1
High OY Alt	**218**	**44.0**	**8.0**	**229**	**100**	**368**	**23**	**20**
Difference	32.4	2.9	4.5	26.6	0.0	176.6	4.9	1.9
Percent of OY	85.1%	93.5%	43.8%	88.4%	100.0%	52.0%	78.8%	90.7%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data sources.						

a/ South of 40°10' N. lat.
b/ Point estimates for Nearshore (North of 40°10' N. lat.) impacts to canary rockfish and yelloweye rockfish correspond to Action Alternative 3b. Impact estimates for Action Alternative 3b are lower: 1.3 mt of canary rockfish and 1.4 mt of yelloweye rockfish.
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 percent of all port samples and other rockfish in another 0.1 percent of all port samples (and squid fisheries usually land their whole catch). In 2001, out of 84,000 mt total landings 1 mt was groundfish. This suggests that total bocaccio are caught in trace amounts.

2.2.3.4.1 Limited Entry Trawl Fisheries

Table 2-22 depicts the 2007-08 limited entry trawl management measures under Action Alternative 3. The proposed yelloweye RCAs off the Washington coast would also be closed to limited entry trawl fisheries under this alternative (Figures 2-4, 2-6, 2-7, and 2-8).

Under Action Alternative 3, the boundaries of the CCAs in the Southern California Bight would be eliminated and the depth-based RCAs specified for south of Pt. Conception would instead be implemented in this area.

Non-Whiting Trawl Fishery

There are no additional management measures than those described above for non-whiting trawl fisheries in 2007 and 2008 under Action Alternative 3.

Whiting Trawl Fishery

Predicted impacts to depleted groundfish species in 2007-08 whiting-directed fisheries under Action Alternatives 1-3 are depicted in Table 2-16. Higher whiting OYs are not possible given the bycatch constraints imposed by depleted groundfish species under the preferred OYs. However, it is important to note that an alternative strategy for managing 2007-08 whiting fisheries would be to impose bycatch caps for these species and allow the fleet flexibility to avoid these species while attempting to attain their whiting quotas.

Table 2-22. Cumulative bimonthly limits and RCA configurations by area and species for the West Coast limited entry trawl fishery in 2007-08 under Action Alternative 3.

SUBAREA	Period	RCA Configurations		Cumulative Limits							
		INLINE	OUTLINE	SABLEFISH	LONGSPN	SHORTSPN	DOVER	OTHER FLAT	PETRALE	ARROWTH	SLOPE ROCK
North seaward limits	1	75	200*	14,000	12,000	6,000	60,000	110,000	80,000	100,000	4,000
	2	75	200	14,000	12,000	6,000	60,000	110,000	30,000	100,000	4,000
	3	100	250	16,000	12,000	6,000	60,000	110,000	30,000	100,000	4,000
	4	100	250	16,000	12,000	6,000	60,000	110,000	30,000	100,000	4,000
	5	75	200	16,000	12,000	6,000	60,000	110,000	30,000	100,000	4,000
	6	75	200*	14,000	12,000	6,000	60,000	110,000	80,000	100,000	4,000
North shoreward limits	1	75	200*	5,000	3,000	3,000	40,000	90,000	16,000	90,000	4,000
	2	100	200	9,000	3,000	3,000	40,000	90,000	25,000	90,000	4,000
	3	100	250	11,000	3,000	3,000	40,000	90,000	25,000	90,000	4,000
	4	100	250	11,000	3,000	3,000	40,000	90,000	25,000	90,000	4,000
	5	100	200	9,000	3,000	3,000	40,000	90,000	25,000	90,000	4,000
	6	100	200*	5,000	3,000	3,000	40,000	90,000	16,000	90,000	4,000
38 - 40 10	1	100	150	15,000	22,000	7,000	60,000	110,000	80,000	10,000	15,000
	2	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	15,000
	3	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	15,000
	4	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	15,000
	5	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	15,000
	6	100	150	15,000	22,000	7,000	60,000	110,000	80,000	10,000	15,000
S 38	1	100	150	15,000	22,000	7,000	60,000	110,000	80,000	10,000	40,000
	2	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	40,000
	3	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	40,000
	4	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	40,000
	5	100	150	15,000	22,000	7,000	60,000	110,000	30,000	10,000	40,000
	6	100	150	15,000	22,000	7,000	60,000	110,000	80,000	10,000	40,000

note: splitnose limits are the same as slope rock limits south of 40º10’ N latitude.

* indicates petrale areas.

2.2.3.4.2 Limited Entry Fixed Gear Fisheries

Status quo management measures are specified for limited entry fixed gear fisheries under this alternative, except the proposed yelloweye RCAs off the Washington coast would also be closed to limited entry fixed gear fisheries under this alternative (Figures 2-5, 2-6, 2-7, and 2-8).

Under Action Alternative 3, the boundaries of the CCAs in the Southern California Bight would be eliminated and the depth-based RCAs specified for south of Pt. Conception would instead be implemented in this area.

2.2.3.4.3 Open Access Fisheries

Status quo management measures are specified for open access fisheries under this alternative, except the proposed yelloweye RCAs off the Washington coast would also be closed to open access fisheries under this alternative (Figures 2-5, 2-6, 2-7, and 2-8) and the following:

Under Action Alternative 3, the boundaries of the CCAs in the Southern California Bight would be eliminated and the depth-based RCAs specified for south of Pt. Conception would instead be implemented in this area.

Directed Groundfish Fisheries

There are no additional management measures considered for open access fisheries targeting groundfish species than those described above under this alternative.

Incidental Groundfish Fisheries

Additional management measures to those described above considered for open access fisheries that incidentally catch groundfish species under this alternative apply to the commercial salmon troll fishery north of 40°10' N latitude as follows:

- Prohibit commercial salmon trolling in the proposed yelloweye RCA in waters off northern Washington described under Action Alternative 1 (Figure 2-11).
- Allow the retention of lingcod in the salmon troll fishery, subject to an incidental landing ratio of one lingcod per ten Chinook salmon (Option 3a), or
- Allow the retention of lingcod in the salmon troll fishery, subject to an incidental landing ratio of one lingcod per ten Chinook salmon, north of the Oregon/Washington border at 46°16.00' N latitude (Option 3b).
- As a canary rockfish bycatch reduction measure, prohibit the use of "hoochies" on the bottom spread.

2.2.3.4.4 Nearshore Commercial Fisheries

Nearshore Commercial Fisheries North of 40°10' N latitude

There are two suboptions (Action Alternatives 3a and 3b) for nearshore commercial fisheries from 40°10' N latitude to the Oregon-Washington border at 46°16' N latitude.

Under Action Alternative 3a, the shoreward RCA boundary is adjusted from 30 fm (status quo) to 20 fm with no reduction to the amount of target catch (Table 2-12). Target species harvest levels would be set at levels consistent with adopted ABC/OY levels for those species. ODFW would have the ability to manage harvest at more conservative levels, if deemed appropriate by the Oregon Fish and Wildlife Commission. Catches would be monitored, and the fishery managed to ensure harvest impacts of both target species and associated overfished rockfish did not exceed adopted levels.

Action Alternative 3b represents a near status quo fishery (Table 2-12). The shoreward RCA boundary is established at 30 fm (status quo). Target species harvest levels would be set at levels consistent with adopted ABC/OY levels for those species. ODFW would have the ability to manage harvest at more conservative levels, if deemed appropriate by the Oregon Fish and Wildlife Commission. Catches would be monitored, and the fishery managed to ensure harvest impacts of both target species and associated overfished rockfish did not exceed adopted levels.

Nearshore Commercial Fisheries South of 40°10' N latitude

There are two suboptions (Action Alternatives 3a and 3b) for nearshore commercial fisheries from 40°10' N latitude to 34°27' N latitude.

Under Action Alternative 3a, the shoreward RCA boundary is adjusted from 30 fm during periods 1, 2, 5, and 6 and 20 fm during periods 3 and 4 (status quo) to 30 fm during all periods. In addition, the harvestable amount of shallow and deeper nearshore rockfish available to this fishery is reduced from status quo levels by 5 percent (Table 2-12b). This represents near-status quo impacts to canary rockfish.

Under Action Alternative 3b, from 40°10' N latitude 34°27’ N latitude, the shoreward non-trawl RCA boundary is adjusted from 30 fm during periods 1, 2, 5, and 6 and 20 fm during periods 3 and 4 (status quo) to 30 fm during all periods (Table 2-12b). Target species harvest levels would be set at levels consistent with adopted ABC/OY levels for those species.

In both cases, CDFG would have the ability to manage harvest at more conservative levels, if deemed appropriate by the Director of CDFG or by the California Fish and Game Commission. Catches would be monitored, and the fishery managed to ensure harvest impacts of both target species and associated overfished rockfish did not exceed adopted levels.

Action Alternative 3 from 34°27’ N latitude to the US/Mexico border represents status quo management. CDFG would have the ability to manage harvest at more conservative levels, if deemed appropriate by the Director of CDFG or by the California Fish and Game Commission. Catches would be monitored, and the fishery managed to ensure harvest impacts of both target species and associated overfished rockfish did not exceed adopted levels.

2.2.3.4.5 Tribal Fisheries

Groundfish management measures are the same as described for tribal fisheries under Action Alternative 1. The tribes proposed only one action alternative for analysis.

2.2.3.4.6 Washington Recreational Fisheries

Under Action Alternative 3, WDFW is not proposing any changes to the bottomfish bag limit, minimum size limits, or lingcod season dates described under the No Action Alternative. Under this alternative, WDFW would reduce the lingcod minimum size limit to 20 inches in Marine Areas 1-4. The proposed yelloweye RCAs off the Washington coast would also be closed to Washington recreational fisheries under this alternative (Figures 2-5, 2-6, 2-7, and 2-8). These additional yelloweye RCAs would require a change to the Pacific Halibut Catch Sharing Plan. Other new management measures are considered under Action Alternative 3 as follows:

Management Measures for Marine Areas 3 and 4 (Queets River to the U.S./Canada border)

Under Action Alternative 3, WDFW would prohibit retention of rockfish and lingcod seaward of a line approximating 20 fm from May 1 through June 30, except on days that halibut fishing is open, and from August 1 through September 30; and prohibit retention of rockfish and lingcod seaward of a line approximating 10 fm during the month of July.

Management Measures for Marine Area 2 (Leadbetter Pt. to the Queets River)

Under Action Alternative 3, WDFW would prohibit retention of rockfish and lingcod seaward of a line approximating 30 fm from the lingcod opening day through July 31.

Management Measures for Marine Area 1 (Oregon/Washington border to Leadbetter Pt.)

There is very little yelloweye and canary rockfish (0.03 mt and 0.02 mt, respectively, in 2005) caught in Marine Area 1; therefore, WDFW proposes to keep the status quo (No Action) bottomfish fishing regulations in place through 2007 and 2008.

2.2.3.4.7 Oregon Recreational Fisheries

Under Action Alternative 3a (there are two suboptions for the 2007-08 Oregon recreational fishery under Action Alternative 3), the Oregon recreational groundfish fishery would be open all year, but restricted to depths shoreward of the 40 fm line from January 1 through May 31 and September 1 through December 31, and shoreward of the 25 fm line from June 1 through August 31. The marine fish daily-bag-limit would be reduced to 5 marine fish; however flatfish, including Pacific sanddabs, would be managed under a separate 25 fish daily-bag-limit for all flatfish species. Other changes to status quo (No Action) management measures under this alternative include a decrease in the lingcod minimum size limit to 22 inches and the expanded Stonewall Banks closure described under Action Alternative 1 would apply to the recreational Pacific halibut fishery, restricting targeting of Pacific halibut in this area. Additionally, retention of groundfish would be prohibited in this area, regardless of trip target. All other management measures under this alternative are the same as under the No Action Alternative.

Under Action Alternative 3b, the Oregon recreational groundfish fishery would be open all year shoreward of the 40 fm line. The marine fish daily-bag-limit would be reduced to 5 marine fish; however flatfish, including Pacific sanddabs, would be managed under a separate 25 fish daily-bag-limit for all flatfish species. Other changes to status quo (No Action) management measures under this alternative include a decrease in the lingcod minimum size limit to 22 inches and the expanded Stonewall Banks closure described under Action Alternative 1 would apply to the recreational Pacific halibut fishery, restricting targeting of Pacific halibut in this area. Additionally, retention of groundfish would be prohibited in this area, regardless of trip target. All other management measures under this alternative are the same as under the No Action Alternative.

2.2.3.4.8 California Recreational Fisheries

Under Action Alternative 3, the five RLMAs described under the No Action Alternative will be used to manage 2007-08 California recreational groundfish fisheries. The status quo (No Action) California recreational management measures under Action Alternative 3 include the following:

- Regulations apply to groundfish (with sanddab fishery exception) and associated state-managed species (rock greenling, California sheephead, and ocean whitefish).
- The sport fishery for sanddabs, using gear specified in Federal and state regulations (size #2 hooks or smaller), is exempt from the season closures and depth restrictions placed on other Federally-managed groundfish.
- Retention of species in the Other Flatfish complex is allowed when fishing with size #2 hooks or smaller (≤ 11 mm from point to shank) for Pacific sanddabs.
- No retention of cowcod, canary, or yelloweye rockfish.

- Lingcod size limit of 24 inches with a daily-bag-limit of two fish.
- 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.
- 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, 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 groundfish other than California scorpionfish, but including select nongroundfish species (California sheephead and ocean whitefish).

California recreational groundfish management measures that differ from status quo under Action Alternative 3 include the following:

- Combined rockfish + cabezon + greenling (RCG) complex daily-bag-limit of 10 fish, of which one can be a cabezon and two can be a greenling of the genus *Hexagrammos*.
- A two-fish bocaccio sublimit is included in the 10-fish RCG daily-bag-limit.
- Notwithstanding other fishing opportunities for groundfish, lingcod may not be retained during January, February, and March.

Additionally, seasons and depth restrictions by RLMA under Action Alternative 3 are described below and summarized in Table 2-23.

Table 2-23. Summary of 2007-08 California recreational groundfish seasons and depth restrictions by region under Action Alternative 3.

RCG SEASON BY REGION

<table>
<tr><th>Region</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>North region</td><td>---</td><td>---</td><td>---</td><td>---</td><td colspan="8">> 40fm Closed</td></tr>
<tr><td>North Central</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td></td><td colspan="6">> 40fm Closed</td></tr>
<tr><td>South Central - Monterey</td><td>---</td><td>---</td><td>---</td><td>---</td><td colspan="8">> 40fm Closed</td></tr>
<tr><td>South Central - Morro Bay</td><td>---</td><td>---</td><td>---</td><td colspan="6">> 40fm Closed</td><td></td><td>---</td><td>---</td></tr>
<tr><td>South Region*</td><td>---</td><td>---</td><td colspan="10">> 60fm Closed</td></tr>
</table>

NOTES AND KEY:

Shore fishing allowed in all waters in all months

RCG = Rockfish, cabezon, greenlings

--- = Closed to boat-based fishing for RCG

Only half of month is open

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

Southern RLMA (U.S./Mexico Border to Point Conception)

The California recreational groundfish fishery regulations south of Point Conception under Action Alternative 3 are the same as described above except for the following changes:

- Groundfish other than California scorpionfish, but including select nongroundfish species (California sheephead and ocean whitefish) open March through December shoreward of the 60 fm line and otherwise closed.
- California scorpionfish open year-round, but restricted to depths ≤40 fm in January and February, and ≤60 fm during March through December.

Southern South-Central RLMA (Point Conception to Lopez Point)

The California recreational groundfish fishery regulations for the area between Point Conception and Lopez Point under Action Alternative 3 would be the same as described above except for the following changes:

- Groundfish including select nongroundfish species (California sheephead and ocean whitefish) open April through mid-October shoreward of the 40 fm line and otherwise closed.

Northern South--Central RLMA (Lopez Point to Pigeon Point)

The California recreational groundfish fishery regulations for the area between Lopez Point and Pigeon Point under the Action Alternative 3 would be the same as described above except for the following changes:

- Groundfish including select nongroundfish species (California sheephead and ocean whitefish) open May through December shoreward of 40 fm and otherwise closed.

Northern Central RLMA (Pigeon Point to Cape Mendocino)

The California recreational groundfish fishery regulations for the area between Pigeon Point and Cape Mendocino under the Action Alternative 3 would be the same as described above except for the following changes:

- Groundfish including select nongroundfish species (California sheephead and ocean whitefish) open mid-June through December shoreward of 40 fm and otherwise closed.

Northern RLMA (Cape Mendocino to the California/Oregon Border)

The California recreational groundfish fishery regulations for the area between Cape Mendocino and the California/Oregon border under the Action Alternative 3 would be the same as described above except for the following changes:

- Groundfish and ocean whitefish open in May through December shoreward of 40 fm and otherwise closed.

2.2.3.5 The Final Council-Preferred Action Alternative

At the June 2006 meeting in Foster City, CA, the Council identified its final Council-preferred Action Alternative. The final Council-preferred Action Alternative describes the suite of 2007-08 management measures that were selected in order to stay within the Council-Preferred OY Alternatives. Table 2-24 depicts the impacts to depleted groundfish species by sector in 2007 and 2008 associated with the suite of management measures under the final Council-preferred Action Alternative.

Table 2-24. Projected mortality (mt) of depleted groundfish species by fishing sector under the final Council-preferred Action Alternative.

Fishery	Bocaccio a/	Canary	Cowcod	Dkbl '07	Dkbl '08	POP	Widow	Y'eye '07	Y'eye '08
Limited Entry Trawl- Non-whiting	48.0	7.9	2.8	233.1	233.1	101.1	0.7	0.1	0.1
Limited Entry Trawl- Whiting									
At-sea whiting motherships						0.9		0.0	0.0
At-sea whiting cat-proc		4.7		25.0	25.0	2.8	200.0	0.0	0.0
Shoreside whiting						1.7		0.0	0.0
Tribal whiting		1.6		0.0	0.0	0.6	6.1	0.0	0.0
Tribal									
Midwater Trawl		1.8		0.0	0.0	0.0	40.0	0.0	0.0
Bottom Trawl		0.8		0.0	0.0	3.7	0.0	0.0	0.0
Troll		0.5		0.0	0.0	0.0		0.0	0.0
Fixed gear		0.3		0.0	0.0	0.0	0.0	2.3	2.3
Limited Entry Fixed Gear									
Sablefish	13.4	0.5	0.0	0.6	0.6	0.2	0.0	1.0	1.0
Non-Sablefish		0.4	0.1	0.5	0.5	0.4	0.5	1.3	1.3
Open Access: Directed Groundfish									
Sablefish DTL	0.0	0.1		0.2	0.2	0.1	0.0	0.3	0.3
Nearshore (North of 40°10' N. lat.)	0.0	1.7	0.1	0.0	0.0	0.0	0.1	2.1	2.1
Nearshore (South of 40°10' N. lat.)	0.0	0.3		0.0	0.0	0.0		0.0	0.0
Other	10.6	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Open Access: Incidental Groundfish									
CA Halibut	0.1	0.1		0.0	0.0	0.0			
CA Gillnet b/	0.5			0.0	0.0	0.0	0.0		
CA Sheephead b/				0.0	0.0	0.0	0.0	0.0	0.0
CPS- wetfish b/	0.3								
CPS- squid c/									
Dungeness crab b/	0.0		0.0	0.0	0.0	0.0			
HMS b/		0.0	0.0	0.0	0.0				
Pacific Halibut b/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pink shrimp	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	2.0	0.0	0.0	0.0	0.0	0.3	0.5	0.5
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)									
Recreational Groundfish d/									
WA		8.2						6.8	6.8
OR							1.1		
CA	66.3	9.0	0.3				8.3	2.1	2.1
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.									
	3.0	3.0	0.1	3.8	3.8	3.6	3.0	3.0	3.0
Non-EFP Total	142.6	43.0	3.4	263.3	263.3	115.1	260.2	19.7	19.7
EFPs e/	6.9	0.4	0.1	0.4	0.4	0.0	3.6	0.1	
TOTAL	149.5	43.4	3.5	263.7	263.7	115.1	263.8	19.8	19.7
Preferred OY alternative	**218**	**44.0**	**4.0**	**290**	**330**	**150**	**368**	**23**	**20**
Difference	68.5	0.6	0.5	26.3	66.3	34.9	104.2	3.2	0.3
Percent of OY	68.6%	98.6%	86.5%	90.9%	79.9%	76.8%	71.7%	86.1%	98.5%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data sources.							

a/ South of 40°10' N. lat. **b/** Mortality estimates are not hard numbers; based on the GMT's best professional judgment.
c/ Bycatch amounts by species unavailable, but bocaccio occurred in 0.1 percent of all port samples and other rockfish in another 0.1 percent of all port samples (and squid fisheries usually land their whole catch). In 2001, out of 84,000 mt total landings 1 mt was groundfish. This suggests that total bocaccio is caught in trace amounts. **d/** Values for canary rockfish and yelloweye rockfish represent specified harvest guidelines..
e/ Values are proposed EFP bycatch caps, not estimates of total mortality. The EFP is terminated inseason if the cap is projected to be attained early. There is no EFP set-aside for yelloweye rockfish in 2008.

2.2.3.5.1 Limited Entry Trawl Fisheries

Table 2-25 depicts the 2007-08 seasonal limited entry trawl RCA configurations and cumulative trip limits under the final Council-preferred Action Alternative.

Table 2-25. Cumulative bimonthly limits and RCA configurations by area and species for the West Coast limited entry trawl fishery in 2007-08 under the final Council-preferred Action Alternative.

Subarea	Period	RCA Boundaries		Two Month Limits							
		Inline	Outline	Sablefish	Longspine	Shortspine	Dover	Other Flat	Petrale	Arrowtooth	Slope Rock
North 40 10 Large Footrope Limit	1	75	250*	13,000	22,000	7,500	80,000	110,000	80,000	100,000	4,000
	2	75	250	13,000	22,000	7,500	80,000	110,000	30,000	100,000	4,000
	3	75	200	15,000	22,000	7,500	60,000	110,000	30,000	100,000	4,000
	4	100	200	15,000	22,000	7,500	60,000	110,000	30,000	100,000	4,000
	5	75	200	15,000	22,000	7,500	60,000	110,000	30,000	100,000	4,000
	6	75	250*	13,000	22,000	7,500	80,000	110,000	80,000	100,000	4,000
North 40 10 Select Flatfish Trawl Limit	1	75	250*	5,000	3,000	3,000	40,000	90,000	16,000	90,000	4,000
	2	75	250	8,000	3,000	3,000	40,000	90,000	25,000	90,000	4,000
	3	75	200	8,000	3,000	3,000	40,000	90,000	25,000	90,000	4,000
	4	100	200	8,000	3,000	3,000	40,000	90,000	25,000	90,000	4,000
	5	75	200	8,000	3,000	3,000	40,000	90,000	25,000	90,000	4,000
	6	75	250*	5,000	3,000	3,000	40,000	90,000	16,000	90,000	4,000
38 - 40 10	1	100	200*	14,000	22,000	7,500	70,000	110,000	80,000	10,000	15,000
	2	100	150	14,000	22,000	7,500	70,000	110,000	30,000	10,000	15,000
	3	100	150	14,000	22,000	7,500	70,000	110,000	30,000	10,000	15,000
	4	100	150	14,000	22,000	7,500	70,000	110,000	30,000	10,000	10,000
	5	100	150	14,000	22,000	7,500	70,000	110,000	30,000	10,000	10,000
	6	100	200*	14,000	22,000	7,500	70,000	110,000	80,000	10,000	15,000
S 38	1	100	150	14,000	22,000	7,500	70,000	110,000	80,000	10,000	40,000
	2	100	150	14,000	22,000	7,500	70,000	110,000	30,000	10,000	40,000
	3	100	150	14,000	22,000	7,500	70,000	110,000	30,000	10,000	40,000
	4	100	150	14,000	22,000	7,500	70,000	110,000	30,000	10,000	40,000
	5	100	150	14,000	22,000	7,500	70,000	110,000	30,000	10,000	40,000
	6	100	150	14,000	22,000	7,500	70,000	110,000	80,000	10,000	40,000

Note: - A "*" indicates petrale limits are in regulations during the period.
- Splitnose limits are equivalent to slope rockfish limits.

Non-Whiting Trawl Fishery

One yelloweye RCA off the Washington coast, South Coast Area B (Figure 2-9) would be a voluntary "area to be avoided" for commercial groundfish fisheries; no other YRCAs established or maintained under the final Council-preferred Action Alternative are applicable to the limited entry non-whiting trawl fishery.

Under this alternative, Scottish seine gear would be 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 would be required to adhere to declaration requirements to provide for enforcement of this exemption. The gear will remain within the WCGOP pool, enabling monitoring of bycatch rates into the future.

Whiting Trawl Fishery

The final Council-preferred Action Alternative includes placeholder fleet-wide annual overfished species bycatch limits for the non-tribal whiting fisheries in 2007 and 2008 as follows:

- Canary rockfish- 4.7 mt
- Darkblotched rockfish- 25 mt
- Widow rockfish- 200 mt

These bycatch limits will be reviewed inseason in March 2007 for their compatibility with the 2007 whiting OY. The addition of a bycatch limit for darkblotched rockfish is a change from the No Action Alternative; the bycatch limits for canary and widow rockfish are the same as those under the No Action Alternative.

The Council also desires to have the flexibility to manage the 2007-08 whiting fisheries using individual-sector bycatch limits. While this is not recommended by the Council for immediate implementation for the 2007 primary whiting fishery, the Council would like to consider this management measure as a routine inseason adjustment during the 2007-08 management cycle. Further discussion of this issue is found in Chapter 4 and analysis of this concept is also anticipated in an Environmental Assessment (EA) of the Shoreside Whiting Monitoring Program which will be considered by the Council at their September and November 2006 meetings. This EA is part of the Federal rulemaking process for Groundfish FMP Amendment 10, which concerns the full retention and non-sorting requirements, among other matters, for the shoreside whiting fishery.

Subsequent to the Council's decision on its preferred alternative in June 2006, NMFS asked the Council to consider adopting the Ocean Salmon Conservation Zone as part of the Council-preferred alternative to give NMFS the authority to implement a nearshore closure (seaward of the 100-fm management line) for all sectors of the whiting fishery if Chinook take exceeds acceptable levels (see section 5.1.1 for more details regarding this management measure). The Council considered this request at their September 2006 meeting and adopted this management measure as recommended by NMFS. The Council and NMFS will still have the authority to make routine inseason changes for 2007 and 2008 whiting fisheries in the next two years. The incidental take level for Chinook salmon can also change through the Endangered Species Act consultation process if needed.

2.2.3.5.2 Limited Entry Fixed Gear Fisheries

Management measures, including RCA boundaries and trip limits, for limited entry fixed gear fisheries under the final Council-preferred Action Alternative are the same as those under the No Action Alternative (2.2.3.1.2), with the following exceptions:

- The lingcod minimum size limit is reduced from 24 inches to 22 inches north of the Oregon/California border at 42° N latitude.
- Increase the lingcod cumulative trip limit to 400 lbs/ month during November.
- Use the 34º27' N latitude management line for stratifying management measures for longspine thornyhead and shortspine thornyhead.
- Increase the California scorpionfish cumulative trip limit to 600 lbs/2 months during periods 1, 3, and 6; increase to 800 lbs/2 months during periods 4 and 5.

- Increase the shallow nearshore rockfish cumulative trip limit to 600 lbs/2 months during periods 1 and 6; increase to 800 lbs/2 months during periods 3 and 5; and increase to 900 lbs/2 months during period 4.
- Increase the deeper nearshore rockfish cumulative trip limit north of 34º27' N latitude to 600 lbs/2 months during period 5.
- Increase the deeper nearshore rockfish cumulative trip limit south of 34º27' N latitude to 600 lbs/2 months during period 6.

Under this alternative the seaward boundary of the western CCA would be modified to allow limited entry fixed gear vessels equipped with Vessel Monitoring Systems to access fish in depths deeper than a line specified with latitude/longitude waypoints approximating the 175 fm contour (Figure 2-12). Based on the recommendation of the Enforcement Committee, the VMS ping rate for these vessels would be required to increase in frequency from 60-minute intervals to 15-minute intervals for vessels in the area currently identified as the western CCA. The incremental cost of the increased ping rate would be incurred by vessels fishing within the new open areas that are part of the status quo western CCA. Vessels carrying groundfish fixed gear, hook-and-line, pot, or trawl gear would be prohibited from transiting the closed fishing areas within the revised boundaries of the CCA.

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. 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.

- **Mandatory compliance**: Add an additional YRCA in the Washington North Coast area, labeled North Coast Area B (Figure 2-8), as described under Action Alternative 1 (2.2.3.2.1).
- **Voluntary compliance**: Maintain the "C-shaped" YRCA in the Washington North Coast area (Figure 2-4), as described in under the No Action Alternative (2.2.3.1.6). This area is defined as a voluntary "area to be avoided" for commercial fixed gear and salmon troll fisheries.
- **Voluntary compliance:** Add an additional YRCA in the Washington South Coast area, labeled South Coast Area B (Figure 2-9), as described under Action Alternative 1 (2.2.3.2.1). This area would be a voluntary "area to be avoided" for commercial groundfish fisheries.

The limited entry fixed gear primary sablefish fishery's tier limits for both 2007 and 2008 under the Council-preferred sablefish OY alternative are: Tier 1, 48,500 lb; Tier 2, 22,000 lb; and Tier 3, 12,500 lb.

2.2.3.5.3 Open Access Fisheries

Management measures, including RCA boundaries and trip limits, for open access fisheries under the final Council-preferred Action Alternative are the same as those under the No Action Alternative (2.2.3.1.3), with the following exceptions:

- The lingcod minimum size limit is reduced from 24 inches to 22 inches north of the Oregon/California border at 42° N latitude.
- Increase the lingcod cumulative trip limit to 400 lbs/ month during November.
- Use the 34º27' N latitude management line for stratifying management measures for longspine thornyhead and shortspine thornyhead.
- Increase the California scorpionfish cumulative trip limit to 600 lbs/2 months during periods 1, 3, and 6; increase to 800 lbs/2 months during periods 4 and 5.

- Increase the shallow nearshore rockfish cumulative trip limit to 600 lbs/2 months during periods 1 and 6; increase to 800 lbs/2 months during periods 3 and 5; and increase to 900 lbs/2 months during period 4.
- Increase the deeper nearshore rockfish cumulative trip limit north of 34º27' N latitude to 600 lbs/2 months during period 5; increase the deeper nearshore rockfish cumulative trip limit south of 34º27' N latitude to 600 lbs/2 months during period 6.

Under this alternative, a new Yelloweye Rockfish Conservation Area, labeled North Coast Area B (Figure 2-8), would be closed to open access groundfish fishing, as described under Action Alternative 1 (2.2.3.2.1). Most of this area is also closed to salmon troll as a salmon conservation measure. The "C-shaped" YRCA in the Washington North Coast area (Figure 2-4) would be maintained and is considered a voluntary "area to be avoided" for commercial fixed gear and salmon troll fisheries. A YRCA would be established in the Washington South Coast area, labeled South Coast Area B (Figure 2-9), which would be a voluntary "area to be avoided" for commercial groundfish fisheries.

Directed Groundfish Fisheries

Under this alternative the seaward boundary of the western CCA would be modified to allow open access vessels equipped with Vessel Monitoring Systems to access fish in depths deeper than a line specified with latitude/longitude waypoints approximating the 175 fm contour (Figure 2-12). Based on the recommendation of the Enforcement Committee, the VMS ping rate for these vessels would be required to increase in frequency from 60-minute intervals to 15-minute intervals for vessels in the area currently identified as the western CCA. The incremental cost of the increased ping rate would be incurred by vessels fishing within the new open areas that are part of the status quo western CCA. Vessels carrying groundfish fixed gear, hook-and-line, pot, or trawl gear would be prohibited from transiting the closed fishing areas within the revised boundaries of the CCA.

Incidental Groundfish Fisheries

The management measures for 2007-08 Open Access incidental groundfish fisheries under the final Council-preferred Action Alternative are the same as those described under the No Action Alternative (2.2.3.1.3), with the following exceptions:

- RCA boundaries for open access exempt trawl fisheries are to be the same as limited entry trawl RCA lines, except that ridgeback prawn trawl is exempted to 100 fm when the inner boundary of the RCA is moved shallower than 100 fm and pink shrimp trawl fisheries are exempt from all RCA restrictions.
- Prohibit commercial salmon trolling in the proposed yelloweye RCA in waters off northern Washington described under Action Alternative 1 (Figure 2-11).

2.2.3.5.4 Nearshore Commercial Fisheries

Nearshore Commercial Fisheries North of 40°10' N latitude

The management measures for 2007-08 northern nearshore commercial fisheries under the final Council-preferred Action Alternative are the same as those described under Action Alternative 3b (2.2.3.4.4), which represents a near status quo fishery (Table 2-12) with the shoreward RCA boundary established at 30 fm. However, the final Council-Preferred Action Alternative also includes the following exceptions:

- Increase the lingcod cumulative trip limit to 400 lbs/ month during November.

- Reduce the lingcod minimum size limit from 24 inches to 22 inches north of the Oregon/California border.

Nearshore Commercial Fisheries South of 40°10' N latitude

The management measures for 2007-08 southern nearshore commercial fisheries under the Final Council-Preferred Action Alternative are the same as those described under Action Alternative 3b (2.2.3.4.4), in which the shoreward non-trawl RCA boundary is adjusted from 30 fm during periods 1, 2, 5, and 6 and 20 fm during periods 3 and 4 (status quo) to 30 fm during all periods (Table 2-12b). However the Final Council-Preferred Action Alternative also includes the following exceptions:

- Use the 34º27’ N latitude management line for stratifying management measures for longspine thornyhead and shortspine thornyhead.
- Increase the California scorpionfish cumulative trip limit to 600 lbs/2 months during periods 1, 3, and 6; increase to 800 lbs/2 months during periods 4 and 5.
- Increase the shallow nearshore rockfish cumulative trip limit to 600 lbs/2 months during periods 1 and 6; increase to 800 lbs/2 months during periods 3 and 5; and increase to 900 lbs/2 months during period 4.
- Increase the deeper nearshore rockfish cumulative trip limit north of 34º27’ N latitude to 600 lbs/2 months during period 5; increase the deeper nearshore rockfish cumulative trip limit south of 34º27’ N latitude to 600 lbs/2 months during period 6.
- Increase the lingcod cumulative trip limit to 400 lbs/ month during November.

2.2.3.5.5 Tribal Fisheries

The management measures for 2007-08 tribal fisheries under the final Council-preferred Action Alternative are the same as those described under Action Alternative 1 (2.2.3.2.5).

2.2.3.5.6 Washington Recreational Fisheries

The final Council-preferred Action Alternative includes the following management measures with respect to Washington recreational fisheries.

Statewide measures for recreational groundfish bag limits and lingcod seasons are the same as those described under the No Action Alternative (2.2.3.1.6). Under this alternative, the minimum size for lingcod is reduced from 24 inches to 22 inches.

A shared harvest guideline for the Washington and Oregon recreational fisheries in 2007-2008 for managing recreational impacts to canary and yelloweye rockfish is proposed under the final Council-preferred alternative as shown in Table 2-26. If either of these harvest guidelines are attained inseason, the WDFW and ODFW would consult and decide if inseason state actions will be needed to maintain impacts within these harvest guidelines. Such state management actions include closing recreational fisheries, restricting recreational fishery seasons, and/or restricting the depths where the fishery is allowed to continue. No retention of either of these species would be allowed to eliminate targeting. In 2007, a 1.5 mt residual yield of yelloweye rockfish is reserved for managing all the recreational fisheries as the first priority under this alternative (Table 2-26). That is, the Council could use this residual yield to keep any of the coastwide recreational fisheries open. If this yield is not needed for maintaining 2007-2008 recreational fisheries, the Council could choose to use this residual yield to maintain commercial fisheries.

Table 2-26. Recreational harvest guidelines (mt) for state-managed recreational fisheries in 2007-2008 under the final Council-preferred alternative.

Species	2007 Recreational HGs	2008 Recreational HGs
Canary rockfish	8.2 mt – Washington/Oregon 9.0 mt – California	8.2 mt – Washington/Oregon 9.0 mt – California
Yelloweye rockfish	6.8 mt – Washington/Oregon 2.1 mt – California 1.5 mt – Sport residual	6.8 mt – Washington/Oregon 2.1 mt – California

This alternative includes measures to maintain an existing and add a new Yelloweye Rockfish Conservation Area off of the Washington coast. The additional YRCA would require a change to the Pacific Halibut Catch Sharing Plan. These 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.

- Maintain the "C-shaped" YRCA in the Washington North Coast area (Figure 2-4), as described in under the No Action Alternative (2.2.3.1.6). Recreational fishing for, or retention, and possession of groundfish and Pacific halibut is prohibited within this area.
- Add an additional YRCA to in the Washington South Coast area, labeled South Coast Area B (Figure 2-9), as described under Action Alternative 1 (2.2.3.2.1). This area would be closed to recreational fishing for groundfish and Pacific halibut and would be a voluntary "area to be avoided" for commercial groundfish fisheries.

Management Measures for Marine Areas 3 and 4 (Queets River to the U.S./Canada border)

The management measures are the same as those described under Action Alternative 3 (2.2.3.3.6), with two revisions: Prohibit fishing for, retention, and possession of **groundfish** seaward of a line approximating 20 fm from May 1 through **September 30**, except on days that halibut fishing is open.

Revisions:

1. Change "rockfish and lingcod" to more broadly cover "all groundfish" for ease of regulatory understanding and enforcement of the regulations.
2. Move the depth restriction in July from 10 fm seaward to 20 fm.

Management Measures for Marine Area 2 (Leadbetter Pt. to the Queets River)

The management measures are the same as those described under Action Alternative 3 (2.2.3.3.6), with one revision: Prohibit fishing for, retention, and possession of **groundfish** seaward of a line approximating 30 fm from the lingcod opening day in March through April 30, and from June 16 through July 31. From May 1 through June 15 (i.e., during the average period of the South Coast halibut fishery), allow the retention of sablefish and Pacific cod seaward of the 30-fm depth restriction.

Revision:

1. Change "rockfish and lingcod" to more broadly cover "all groundfish" for ease of regulatory understanding and enforcement of the regulations, while still allowing the retention of sablefish and Pacific cod, which may be caught incidentally while targeting halibut offshore.

Management Measures for Marine Area 1 (Oregon/Washington border to Leadbetter Pt.)

The management measures are the same as those described under the No Action Alternative (2.2.3.1.6). These measures would prohibit fishing for, retention, and possession of groundfish, except sablefish and Pacific cod, when Pacific halibut are onboard the vessel.

2.2.3.5.7 Oregon Recreational Fisheries

The final Council-preferred Action Alternative includes the following management measures with respect to Oregon recreational fisheries.

The management measures are the same as those described under Action Alternative 3b (2.2.3.4.7) with the following revisions (Table 2-27):

- Allow fishing in all-depth waters during the following time periods: January through March, and October through December.
- A marine fish daily-bag-limit of 8 fish in aggregate.
- Stonewall Bank YRCA boundaries are equal to those under the No Action Alternative (section 2.2.3.1.7, Option A in Figure 2-5).

Table 2-27. Council-preferred 2007-08 Oregon recreational groundfish fishery management measures.

Season Structure												Bag/Length Limits					
Month												Marine Fish Daily Bag[a/]	Flatfish Daily Bag[b/]	Lingcod Daily Bag	Lingcod Length Limit	Cabezon Length Limit	Kelp Greenling Length Limit
J	F	M	A	M	J	J	A	S	O	N	D						
All depth			<40 fm						All depth			8	25	2	22	16	10

[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.

[b/] Flatfish bag consists of all soles and flounders except Pacific halibut.

A shared harvest guideline for the Washington and Oregon recreational fisheries in 2007-2008 for managing recreational impacts to canary and yelloweye rockfish is proposed under the final Council-preferred alternative as shown in Table 2-26. If either of these harvest guidelines are attained inseason, the ODFW and WDFW would consult and decide if inseason state actions will be needed to maintain impacts within these harvest guidelines. Such state management actions include closing recreational fisheries, restricting recreational fishery seasons, and/or restricting the depths where the fishery is allowed to continue. No retention of either of these species would be allowed to eliminate targeting. In 2007, a 1.5 mt residual yield of yelloweye rockfish is reserved for managing all the recreational fisheries as the first priority under this alternative (Table 2-26). That is, the Council could use this residual yield to keep any of the coastwide recreational fisheries open. If this yield is not needed for maintaining 2007-2008 recreational fisheries, the Council could choose to use this residual yield to maintain commercial fisheries.

2.2.3.5.8 California Recreational Fisheries

The final Council-preferred Action Alternative includes the following management measures with respect to California recreational fisheries.

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).
- The sport fishery for sanddabs, using gear specified in Federal and state regulations (size #2 hooks or smaller), is exempt from the season closures and depth restrictions placed on other Federally-managed groundfish.
- Retention of species in the Other Flatfish complex is allowed when fishing with size #2 hooks or smaller (≤ 11 mm from point to shank) for Pacific sanddabs.
- A two-fish bag limit for bocaccio in the northern RLMA (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.
- 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.
- 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, 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 groundfish other than California scorpionfish, but including select non-groundfish species (California sheephead and ocean whitefish).

The management measures that differ from status quo include the following:

- Combined rockfish + cabezon + greenling (RCG) complex daily-bag-limit of 10 fish, of which one can be a cabezon and two can be a greenling of the genus *Hexagrammos*.
- In the South Region, CA scorpionfish is open 12 months: 0-40 fm January-February, 0-60 fm in March-December.
- Season and depth restrictions for rockfish, cabezon, and greenlings differ from status quo (Table 2-13) in all regions but the North region. These are summarized in the Table 2-28.

Table 2-28. Summary of California recreational groundfish seasons and depth restrictions by region under the final Council-preferred Action Alternative.

RCG SEASON BY REGION:												
Region	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**July**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
North region	---	---	---	---	> 30fm Closed							
North Central	---	---	---	---		> 30fm Closed						---
South Central - Monterey	---	---	---	---	> 40fm Closed							---
South Central - Morro Bay	---	---	---	---	> 40fm Closed							---
South Region*	---	---	> 60fm Closed									

NOTES AND KEY:
RCG = Rockfish, Cabezon, Greenlings
--- = Closed to boat based fishing for RCG

Additionally, CDFG would manage California recreational fishery impacts to canary and yelloweye rockfish under harvest guidelines shown in Table 2-26. If either of these harvest guidelines are attained inseason, the CDFG would manage this fishery by implementing inseason management actions such as closing recreational fisheries by region, restricting recreational fishery seasons by region, and/or restricting the depths where the fishery is allowed to continue by region. No retention of either of these species would be allowed to eliminate targeting. In 2007, a 1.5 mt residual yield of yelloweye rockfish is reserved for managing all the recreational fisheries as the first priority under this alternative (Table 2-26). That is, the Council could use this residual yield to keep any of the coastwide recreational fisheries open. If this yield is not needed for maintaining 2007-2008 recreational fisheries, the Council could choose to use this residual yield to maintain commercial fisheries.

2.3 Comparison of the Environmental Consequences

2.3.1 Summary of Effects of the Alternatives

This DEIS includes extensive analysis of the effects of rebuilding the seven depleted groundfish species subject to revised rebuilding plans under Amendment 16-4. 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 2007-08 groundfish management measures are designed to provide fishing opportunities to harvest healthy, target species within the constraints of alternative depleted species’ OYs. The Council decided preferred 2007-08 OYs for all non-depleted species and two OY alternatives for depleted species (a preferred Low OY Alternative and a preferred High OY Alternative) for detailed analysis at their April 2006 meeting. Action Alternative 1 management measures are designed to stay within the preferred Low OYs, and Action Alternative 3 management measures are designed to stay within the preferred High OYs for depleted species in 2007-08. Action Alternative 2 has intermediate effects, staying within the preferred Low OY for some depleted species and otherwise staying within the preferred High OY.

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 2006. The final Council-preferred alternative includes recommended harvest specifications and rebuilding plans for the seven depleted groundfish species and management measures for 2007 and 2008 West Coast fisheries. The final

Council-preferred management measures are intended to stay within all the final recommended OYs for groundfish species. Table 2-29 depicts the estimated take of depleted species by alternative.

This section summarizes the key effects of the No Action Alternative; the action alternatives, including the final Council-preferred alternative; and the F=0 scenario in terms of impacts to rebuilding periods for depleted species and socioeconomic impacts. These summary effects are depicted in Table 2-29 of this document. Table 2-30 summarizes the combined recreational and commercial income impacts of the No Action and action alternatives by West Coast region. Table 2-31 summarizes the changes to Rockfish Conservation Area by alternative. Figure 2-13 depicts trends in groundfish exvessel revenues since 1981, with projections through 2008 under each of the action alternatives. Table 2-32 lists the most vulnerable counties associated with changes in groundfish management measures. These tables and Figure 2-13 provide a "snapshot" of the bottom line biological and socioeconomic effects of the action alternatives.

The F=0 Alternative

The shortest possible rebuilding times are predicted for depleted species under the F=0 alternative (denoted $T_{F=0}$, the time to rebuild in the absence of fishing-related mortality) since fishing-related mortality is eliminated beginning in 2007. This alternative is a comparison "benchmark" in this preliminary DEIS since the Council has decided to allow some harvest under groundfish rebuilding plans to avoid disastrous short-term socioeconomic impacts.

Under the F=0 alternative, multiple sectors are closed and fishing communities experience substantial losses of commercial fishing-related revenue and recreational fishing effort and expenditures (Table 7-69). 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.

Action Alternative 1

Action Alternative 1 constrains fisheries to the preferred Low OYs for depleted species and therefore results in the shortest rebuilding times relative to the other action alternatives considered by the Council for Amendment 16-4 rebuilding plans. Rebuilding is extended by less than five years relative to $T_{F=0}$ for bocaccio, cowcod, darkblotched rockfish, Pacific ocean perch, and widow rockfish. Canary and yelloweye rockfish rebuilding periods are extended by an estimated 7 and 35 years, respectively, under Action Alternative 1.

Action Alternative 1 reduces rebuilding species OYs compared to status quo catch levels, and as a result, revenues generated by commercial fisheries directed at groundfish are lower than status quo levels, and the number of recreational bottomfish trips is lower than status quo. Under this alternative, many of the target species OYs are not attained, and fishing area is decreased for all sectors as the size of groundfish conservation areas is expanded to encompass more area where rebuilding species are found. Under this alternative, exvessel revenues for the major directed groundfish sectors are estimated to be approximately $42.8 million, and the number of recreational angler trips for bottomfish is estimated to be 350,690. These figures represent approximately 62 percent of exvessel revenues generated in 2005, and 65 percent of the number of angler trips in 2005.

Action Alternative 2

Action Alternative 2 effects are intermediate to the other action alternatives. Alternative 2 management measures explore different ways to constrain fishing-related mortality of depleted species and reveal distributional effects to fishing sectors and regions resulting from these alternative measures. Table 1 shows the estimated impacts to depleted species under Action Alternative 2 management measures are within the preferred Low OY for cowcod, but within the preferred High OY for the other six depleted species. Predicted rebuilding times under Action Alternative 2 are likewise intermediate to those under the other action alternatives and proportional to the amount of allowable harvest if that harvest rate is maintained during the entire rebuilding period.

Action Alternative 2 brings rebuilding species OYs to levels that are near status quo catch amounts for many rebuilding species except for yelloweye rockfish. While OYs for rebuilding species are near status quo, negative economic impacts are greater than alternative 1, but less than Action Alternative 3. In addition, a larger portion of the OY remains unattributed to any particular sector.

While many of the OYs for rebuilding species are near status quo, and there are relatively large amounts of OYs not attributed to any particular sector, the amount of exvessel revenues are different for certain sectors and regions of the fishery when compared to 2005 and 2006 revenues. While some sectors have higher exvessel revenues than 2005 or 2006, others have lower exvessel revenues. The difference in the distribution of revenues is directly attributed to changes in target species abundance and OYs. For example, the increase in the 2007 OY for Dover sole results in larger exvessel revenue for the bottom trawl sector as a whole, while the decrease in the 2007 OY for sablefish results in lower coastwide exvessel revenues for the fixed gear sablefish sectors.

On a coastwide basis, combined exvessel revenues for the major directed groundfish sectors are estimated to be approximately $59.7 million, and the number of recreational angler trips for bottomfish is estimated to be 421,271. These figures represent approximately 87 percent of 2005 exvessel revenues, and 78 percent of 2005 bottomfish angler trips.

Action Alternative 3

Action Alternative 3 constrains fisheries to the preferred High OYs for depleted species and therefore results in longer rebuilding times relative to the other action alternatives. Rebuilding is extended by five years or less relative to $T_{F=0}$ for bocaccio, darkblotched rockfish, Pacific ocean perch, and widow rockfish. Cowcod, canary and yelloweye rockfish rebuilding periods are extended by an estimated 8, 10, and 36 years, respectively under Action Alternative 3.

Action Alternative 3 brings rebuilding species OYs to levels that are near status quo catch amounts for many rebuilding species except for yelloweye rockfish. The overall economic impact of Action Alternative 3 is that many sectors are expected to achieve social and economic benefits that are similar to status quo levels. However, like Action Alternative 2, there are differences in the distribution of exvessel revenue and angler trips on a regional basis and on a sector-by-sector basis. This change is driven by changes in the abundance and OYs for target species, as well as changes in the yelloweye OY. The change in the yelloweye OY negatively impacts recreational fisheries in the northern areas, but recreational fisheries in the southern areas are able to attain a higher number of angler trips than under 2005 and 2006 regulations. In the case of commercial fisheries, the bottom trawl sector is able to attain higher levels of exvessel revenues when compared to 2005 and 2006, primarily as a result of the increase in the Dover sole OY. Alternatively, the fixed gear sablefish sectors achieve lower levels of revenue because of a decrease in the sablefish OY.

On a coastwide basis, commercial exvessel revenues for the major directed groundfish sectors are estimated to be approximately $66.9 million, and the number of recreational bottomfish trips is estimated to be 587,873. These figures represent 97 percent of 2005 exvessel revenues, and 109 percent of 2005 recreational angler trips.

Final Council-Preferred Alternative

The final Council-preferred alternative constrains fisheries to the final Council-preferred OYs decided by the Council at their April and June 2006 meetings. Rebuilding is extended by five years or less relative to $T_{F=0}$ for bocaccio, cowcod, darkblotched rockfish, Pacific ocean perch, and widow rockfish. Canary and yelloweye rockfish rebuilding periods are extended by an estimated 10 and 36 years, respectively under the final Council-preferred alternative.

The Council-preferred alternative allows is similar to Action Alternative 3 in that some sectors see more exvessel revenue and recreational angler effort than in 2005 and 2006, while others see less. 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, like Action Alternative 2 and 3, 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 OY negatively impacts recreational fisheries in the northern areas, but recreational fisheries in the southern areas are able to attain a higher number of angler trips than under 2005 and 2006 regulations. In the case of commercial fisheries, the bottom trawl sector is able to attain higher levels of exvessel revenues when compared to 2005 and 2006, primarily as a result of the increase in the Dover sole OY. The Pacific whiting fishery is able to attain revenues that are roughly equal to 2005 and 2006 levels, but the impact to this fishery is also dependant on results of the 2007 and 2008 stock assessments for Pacific whiting. Alternatively, the fixed gear sablefish sectors achieve lower levels of revenue because of a decrease in the sablefish OY. Other groundfish fisheries generate exvessel revenues that are equivalent–or close to–status quo.

On a coastwide basis, commercial exvessel revenues for the major directed groundfish sectors are estimated to be approximately $67.5 million, and the number of recreational bottomfish trips is estimated to be 571,742. These figures represent 98 percent of 2005 exvessel revenues, and 106 percent of 2005 recreational angler trips.

2.3.2 The Economic Implications of Uncertainty and Management Flexibility

The economic impact estimates in the preliminary DEIS are based on management measures that achieve some level of target and non-target species catch or recreational fishing opportunity. Catch projections, revenue estimates, and recreational effort projections are, as with any projection or estimate, subject to varying degrees of accuracy. While these preseason estimates represent the best available information on catch and socioeconomic impacts, these estimates will inherently differ from what actually occurs in the fishery when the 2007 fishing year progresses. These differences can be due to such things as changes in catch per unit effort, unexpected weather patterns, unexpected ocean conditions, changes in the behavior or availability of the fish stocks, or changes in effort on the part of fishermen, amongst other things. Empirical evidence and past experience has shown that catch projections will ultimately differ to some degree from what actually occurs. Some projections will be less than what occurs and some will be higher than what actually occurs. Rebuilding species catch estimates that end up being less than what actually occurs in the fishery have the potential to negatively impact fishing sectors if an inseason management response is necessary to keep the catch of that rebuilding species within the OY. While the catch of rebuilding species that are higher than expected may provide for some amount of revenue or angler satisfaction, rebuilding species provide little social and economic benefit because they represent a small portion of the fishery, but constrain abundant target species. This is because of the mixed stock nature of the fishery. When an inseason action is necessary to stay within a rebuilding species OY because of unexpectedly high catch, that inseason action will typically result in a loss of social and economic benefits as the fishery becomes constrained to minimize further catch of that rebuilding species. While it is impossible to know which species are likely to have higher or lower actual catches than predicted, it can almost always be expected that it will occur to some degree. That is, it is a matter of when catches will differ from predictions and for what species, not a matter of if actual catches will differ from predictions.

The amount of uncertainty related to the catch projections of rebuilding species is directly related to the economic impacts of management measures designed to achieve a given catch level. Predictions of depleted species bycatch are developed based on the average, or mean, estimate derived from analysis of observer data, fish ticket data, and logbook data. A mean estimate implies that there is a 50 percent likelihood that the prediction will be under the actual observation and a 50 percent likelihood that it will be over the actual observation. Given that there are 7 depleted species, this means it is highly likely that the bycatch of at least one depleted species will be higher than predicted. If OYs are constructed in a manner that takes into account the reality that catch predictions have a certain level of uncertainty (that is, if OYs are higher than predicted total catch), then the economic impact that is predicted prior to the start of the season for a given set of management measures becomes more certain. As the difference between the OY of rebuilding species and predicted catch increases, the economic impacts resulting from management measures becomes increasingly more certain. Inversely, as the difference, or "buffer" between the OY of a rebuilding species and predicted catch decreases, the certainty of the economic impacts predicted for that particular management scheme is reduced. For example, if the incidental catch of a depleted species is found to be higher than expected during the course of the season, a restrictive management response will be necessary to insure that the cumulative catch of that depleted species does not exceed the OY. This restrictive management response is likely to be in the form of reduced access to more abundant target species (through area management and decreased catch limits), and the decreased access to target species will outweigh the marginal gains made from increased catch of depleted species, causing an economic loss compared to what would otherwise occur. If the OY is larger than predicted catch, a restrictive management response may not be necessary, or it may not need to be as severe. This means that as the OY of a depleted species becomes larger than predicted catch, the estimated economic impact associated with that OY is more certain.

If the OY for all rebuilding species is determined from predicted catch, it is highly likely that the actual economic impacts resulting from that suite of OYs will be lower than what is predicted because the actual catch of one or more rebuilding species is likely to be higher than expected and some constraining management response will be necessary at some point during the year. A management system designed in a manner where each stock is equally constraining has no flexibility to respond to likely departures from predictions. In addition, a management system designed in a manner where some, or all, OYs are higher than predicted catch does not necessarily mean longer rebuilding times as the entire OY will not necessarily be caught.

Management of groundfish fisheries throughout much of the 2002-2006 period have relied on some degree of management flexibility to keep rebuilding species' catch levels within their respective OYs while maintaining some amount of social and economic benefits. For example, a typical review of inseason catches will reveal that the catch of one or more rebuilding species is higher than what was anticipated. The response has often been to implement a change in management regulations which shifts major portions of the fishery to areas where rebuilding species that are experiencing higher than anticipated catch levels may not be as abundant, but other rebuilding species may be found in greater abundance. This effectively reduces catches of rebuilding species that may be tracking ahead of projections, but it may increase the catch of other rebuilding species. The social and economic impact of restricting the fishery in some areas is often mitigated by the ability to move the fishery to other areas. Without a buffer between predicted catch of rebuilding species and rebuilding species OYs, this type of management flexibility would not be possible, and the actual social and economic impact associated with particular catch levels is likely to be lower than what was expected. Therefore, if it is an objective to maintain some certainty that a level of social and economic benefit related to fishing activities will occur over the course of a year, then a buffer between predicted catches of rebuilding species and the OY of rebuilding species is necessary.

2.3.3 Effects on West Coast Fishing Communities

A consideration in deciding groundfish rebuilding plans is the effect of management measures on West Coast fishing communities. Chapter 7 and Appendix A of the DEIS explores the socioeconomic impacts of alternative harvest levels and corresponding management measures on West Coast fishing sectors, ports, and communities. This section summarizes these effects at the county level by listing those counties that are considered "vulnerable" and "most vulnerable" to changes in management measures by ranking those counties that are most engaged in fishing or dependent on the groundfish fishery and least resilient to negative socioeconomic impacts (Table 2-32).

In this analysis, a county is "commercially engaged" in fishing if it ranks among the top one-third of all coastal counties in at least one of four indicators (number of vessels, permits, dealers, or revenue). A county is "commercially dependent" on groundfish resources if it ranks among the top one-third of all coastal counties in at least one of three indicators (groundfish permits and two groundfish revenue measurements). A county is "recreationally engaged or dependent" on fishing if it ranks among the top one-third of all coastal counties in at least one of four indicators (four measurements of the number of angler and charter trips). A county is "least resilient" if it ranks among the top one-third of all coastal counties in at least one of four indicators (industry diversification, unemployment rate, percentage of the population living below the poverty level, and population) used as proxies for economic resiliency. A county is listed as "vulnerable" if it is commercially engaged and least resilient, commercially dependent and least resilient, or recreationally engaged or dependent and least resilient. A county is listed as "most vulnerable" if it is listed among the top one-third of "commercially engaged", "commercially dependent", or "recreational engaged or dependent" indicators at least three times and is listed among the top one-third of resiliency indicators at least three times.

Table 2-29. Estimated rebuilding duration for depleted groundfish species and predicted socioeconomic impacts under the No Action Alternative, 2007-08 Action Alternatives, and a "no fishing" scenario.

Action Alternative	Depleted Species	OY (mt)	Estimated Impacts[a/] (mt)	Median Time to Rebuild[b/]	Exvessel Revenue from Groundfish[c/] ($ mil.)	Recreational Effort[d/] (no. of trips)
No Action Alternative (2006 specifications and management measures)	Bocaccio	309	135	2029		
	Canary	47	44	2064		
	Cowcod	4.2	3.4	2039		
	Darkblotched	200	182	2010		
	Pacific Ocean Perch	447	74	2023		
	Widow	289	257	2015		
	Yelloweye	27	20	2120		
	Socioeconomic Impacts				$72.0	537,811
F=0 (No groundfish fishing)	Bocaccio	0	0	2021		
	Canary	0	0	2053		
	Cowcod	0	0	2035		
	Darkblotched	0	0	2010		
	Pacific Ocean Perch	0	0	2015		
	Widow	0	0	2013		
	Yelloweye	0	0	2048		
	Socioeconomic Impacts				$ 0	0
Action 1 (Constrains fisheries to the preferred Low OYs for depleted species)	Bocaccio	40	39	2022		
	Canary	32	25	2060		
	Cowcod	4	0.5	2039		
	Darkblotched	130	81	2010		
	Pacific Ocean Perch	44	44	2015		
	Widow	120	116	2014		
	Yelloweye	12.6	11	2083		
	Socioeconomic Impacts				$46.9	350,690
Action 2 (Intermediate constraints to fisheries)	Bocaccio	218	111	2026		
	Canary	44	33	2063		
	Cowcod	8	3.3	2043		
	Darkblotched	229	197	2010		
	Pacific Ocean Perch	100	99	2016		
	Widow	368	144	2015		
	Yelloweye	Ramp-down[e/]	14.3	2084		
	Socioeconomic Impacts				$62.7	421,271
Action 3 (Constrains fisheries to the preferred High OYs for depleted species)	Bocaccio	218	186	2026		
	Canary	44	41	2063		
	Cowcod	8	3.5	2043		
	Darkblotched	229	203	2010		
	Pacific Ocean Perch	100	100	2016		
	Widow	368	191	2015		
	Yelloweye	Ramp-down[e/]	18.3	2084		
	Socioeconomic Impacts				$69.9	587,873

Table 2-29 (Continued. Estimated rebuilding duration for depleted groundfish species and predicted socioeconomic impacts under the No Action Alternative, 2007-08 Action Alternatives, and a "no fishing" scenario.

Action Alternative	Depleted Species	OY (mt)	Estimated Impacts[a/] (mt)	Median Time to Rebuild[b/]	Exvessel Revenue from Groundfish[c/] ($ mil.)	Recreational Effort[d/] (no. of trips)
Final Council-preferred (Constrains fisheries to final Council-preferred OYs)	Bocaccio	218	149.5	2026		
	Canary	44	43.4	2063		
	Cowcod	4	3.5	2039		
	Darkblotched	290 (2007) 330 (2008)	263.7	2011		
	Pacific Ocean Perch	150	115.1	2017		
	Widow	368	263.8	2015		
	Yelloweye	Ramp-down[e/]	19.8 (2007) 19.7 (2008)	2084		
	Socioeconomic Impacts				$58/$64/$70[f/]	571,742

a/ Estimated impacts are from the GMT's bycatch scorecards for each alternative. The No Action Alternative represents impacts with inseason adjustments implemented in May 2006.

b/ Median rebuilding time is the estimated time to rebuild the stock if the entire OY is taken and the harvest rate is maintained after 2008 and through the entire course of rebuilding (i.e., harvest is taken at the rate used to determine the OY).

c/ Includes tribal groundfish.

d/ Recreational effort includes only bottomfish trips (groundfish and Pacific halibut).

e/ 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.

f/ Council Preferred alternative with "low whiting OY"/"medium whiting OY"/"high whiting OY", respectively.

Table 2-30. Summary of estimated income impacts resulting from combined recreational angler expenditures and commercial fisheries landings by region under the management alternatives (million $).

					Council Preferred Alternative		
Region	**No Action**	**Alt 1**	**Alt 2**	**Alt 3**	**Low whiting OY**	**Medium whiting OY**	**High whiting OY**
Puget Sound	15.4	13.4	14.9	15.0	14.9	14.9	14.9
North Washington Coast	16.6	15.0	15.5	15.8	15.8	15.8	15.8
South & Central WA Coast	121.1	110.1	114.6	120.0	110.4	114.6	120.1
Astoria-Tillamook	97.2	89.1	96.2	97.9	95.1	96.5	98.0
Newport	49.7	39.4	45.4	48.9	42.5	45.6	49.0
Coos Bay	32.4	29.3	32.1	32.4	32.1	32.3	32.6
Brookings	17.7	16.2	17.5	17.6	17.7	17.7	17.7
Crescent City-Eureka	19.4	16.3	19.3	19.7	19.3	19.6	19.9
Fort Bragg	11.0	8.9	10.9	11.7	11.8	11.8	11.8
Bodega Bay - San Francisco	41.1	39.5	40.4	44.3	41.9	41.9	41.9
Monterey - Morro Bay	38.0	32.4	33.7	39.6	40.0	40.0	40.1
Santa Barbara	62.9	61.3	61.9	62.9	62.9	62.9	62.9
Los Angeles - San Diego	145.1	140.5	142.2	145.0	145.0	145.0	145.0
At Sea (including Tribal)	43.4	24.5	32.3	42.0	24.5	32.3	42.0
TOTAL	711.1	635.9	676.9	712.8	673.8	690.9	711.6

Table 2-31. The change in the size of alternative Rockfish Conservation Areas.

RCA by Area	Period	No Action		Alt 1		Alt 2		Alt 3a		Alt 3b		Council Preferred Alt		Size of RCA compared with No Action a/				
		in line	out line	in line	out line	in line	out line	in line	out line	in line	out line	in line	out line	Alt 1	Alt 2	Alt 3a	Alt 3b	Council Preferred Alt
Non-Trawl RCA																		
North of 46°16' (WA)	All	0	100	0	150	0	125	0	100	0	100	0	100	+	+	0	0	0
46°16' to 40°10'	All	30	100	20	150	20	125	20	100	30	100	30	100	+	+	+	0	0
40°10' - 34°27'	1	30	150	20	150	20	150	30	150	30	150	30	150	+	+	0	0	0
	2	30	150	20	150	20	150	30	150	30	150	30	150	+	+	0	0	0
	3	20	150	20	150	20	150	30	150	30	150	30	150	0	0	-	-	-
	4	20	150	20	150	20	150	30	150	30	150	30	150	0	0	-	-	-
	5	30	150	20	150	20	150	30	150	30	150	30	150	+	+	0	0	0
	6	30	150	20	150	20	150	30	150	30	150	30	150	+	+	0	0	0
South of 34°27'	1	60	150	40	180	40	180	60	150	60	150	60	150	+	+	0	0	0
	2	60	150	40	180	40	180	60	150	60	150	60	150	+	+	0	0	0
	3	60	150	40	180	40	180	60	150	60	150	60	150	+	+	0	0	0
	4	60	150	40	180	40	180	60	150	60	150	60	150	+	+	0	0	0
	5	60	150	40	180	40	180	60	150	60	150	60	150	+	+	0	0	0
	6	60	150	40	180	40	180	60	150	60	150	60	150	+	+	0	0	0
Trawl RCA																		
North of 40°10’	1	75	200	75	250	75	200	75	200	75	200	75	250	+	0	0	0	+
	2	75	200	75	250	75	200	75	200	75	200	75	250	+	0	0	0	+
	3	75	200	75	250	75	250	100	250	100	250	75	200	+	+	+	+	0
	4	100	200	75	250	75	250	100	250	100	250	100	200	+	+	+	+	0
	5	75	200	75	250	75	200	75	200	75	200	75	200	+	0	0	0	0
	6	75	200	75	250	75	200	75	200	75	200	75	250	+	0	0	0	+
North of 40°10’ Selective Footrope Limits	1	75	200	75	250	75	200	75	200	75	200	75	250	+	0	0	0	+
	2	75	200	75	250	75	200	100	200	100	200	75	250	+	0	-	-	+
	3	75	200	75	250	75	250	100	250	100	250	75	200	+	+	+	+	0
	4	100	200	75	250	75	250	100	250	100	250	100	200	+	+	+	+	0
	5	75	200	75	250	75	200	100	200	100	200	75	200	+	0	-	-	0
	6	75	200	75	250	75	200	100	200	100	200	75	250	+	0	-	-	+

Table 2-31. The change in the size of alternative Rockfish Conservation Areas (continued).

RCA by Area	Period	No Action		Alt 1		Alt 2		Alt 3a		Alt 3b		Council Preferred Alt		Size of RCA compared with No Action a/				
		in line	out line	in line	out line	in line	out line	in line	out line	in line	out line	in line	out line	Alt 1	Alt 2	Alt 3a	Alt 3b	Council Preferred Alt
Trawl RCA																		
40°10’ to 38°	1	75	150	60	200	100	150	100	150	100	150	100	200	+	-	-	-	+
	2	75	150	60	200	100	150	100	150	100	150	100	150	+	-	-	-	-
	3	100	150	75	200	100	150	100	150	100	150	100	150	+	0	0	0	0
	4	100	150	60	200	100	150	100	150	100	150	100	150	+	0	0	0	0
	5	75	150	60	200	100	150	100	150	100	150	100	150	+	-	-	-	-
	6	75	150	60	200	100	150	100	150	100	150	100	200	+	-	-	-	+
38° to 34°27'	1	75	150	60	150	100	150	100	150	100	150	100	150	+	-	-	-	-
	2	75	150	60	150	100	150	100	150	100	150	100	150	+	-	-	-	-
	3	100	150	75	150	100	150	100	150	100	150	100	150	+	0	0	0	0
	4	100	150	60	150	100	150	100	150	100	150	100	150	+	0	0	0	0
	5	75	150	60	150	100	150	100	150	100	150	100	150	+	-	-	-	-
	6	75	150	60	150	100	150	100	150	100	150	100	150	+	-	-	-	-
South of 34°27'	1	75	150	60	150	100	150	100	150	100	150	100	150	+	-	-	-	-
	2	75	150	60	150	100	150	100	150	100	150	100	150	+	-	-	-	-
	3	100	150	75	150	100	150	100	150	100	150	100	150	+	0	0	0	0
	4	100	150	60	150	100	150	100	150	100	150	100	150	+	0	0	0	0
	5	75	150	60	150	100	150	100	150	100	150	100	150	+	-	-	-	-
	6	75	150	60	150	100	150	100	150	100	150	100	150	+	-	-	-	-

a/ "+" denotes larger RCA, "-" denotes smaller RCA, "0" denotes no change.

Table 2-32. 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	
	Monterey	Santa Cruz	
		Monterey	*
	Morro Bay	San Luis Obispo	*
	Santa Barbara	Santa Barbara	*
		Ventura	
	Los Angeles	Los Angeles	*
		Orange	
	San Diego	San Diego	

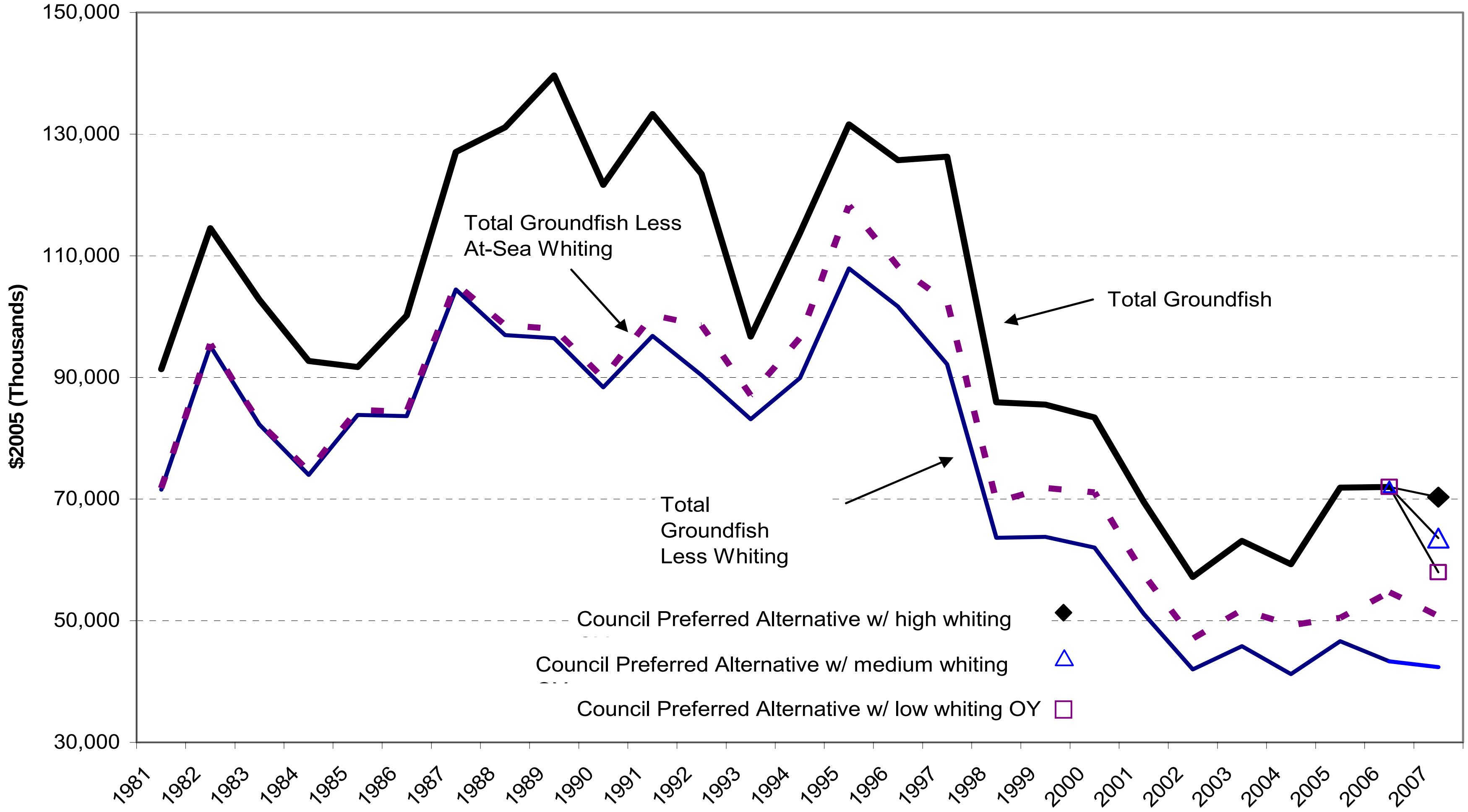


Figure 2-13. Trends in exvessel revenues from the West Coast groundfish fishery and projected revenues under the final Council-preferred alternative.

3.0 WEST COAST MARINE ECOSYSTEMS AND ESSENTIAL FISH HABITAT

3.1 Affected Environment

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 (Mann and Lazier 1996; Parrish, et al. 1981). 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, 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).

The California Current itself is a year-round feature consisting of a massive southward flow of the cool waters of the west wind drift. The current is best characterized as a shallow, wide, and slow-moving body of water, ranging from the shelf break to 1,000 km offshore, with the strongest flows at the sea surface, and in the summertime (Dodimead, et al. 1963; Hickey 1979; Lynn and Simpson 1987). This surface current is matched in the summer by the California Undercurrent, which moves water northward from the south in a deep yet narrow band of subtropical water typically found just off of the shelf break at depths of 100 to 300 m. The undercurrent flows from Baja California to Vancouver Island, transporting warmer, saltier southern water north along the coast (Hickey 1979). On average, the California Current flow volume reaches a maximum in spring and summer, when the flow moves inshore, closer to the shelf break. The California Undercurrent develops in late spring through early summer and persists into the fall. During late summer and fall, there is considerably more mesoscale variability in flow patterns, with fields of cyclonic and anticyclonic eddies and considerable mixing of water masses between shelf and offshore waters (Brink and Cowles 1991). Beginning in the fall, and through the winter, the northward flowing Davidson Current is the dominant feature over the shelf and beyond the shelf break (Hickey 1998).

Current dynamics over the continental shelf are generally forced by regional wind fields, which tend to be southerly in the spring and summer, and northerly in the winter. Spring and summer winds drive offshore Ekman transport of surface waters, which is balanced by the upwelling of deeper waters that tend to be cooler and nutrient rich. Between the Strait of Juan de Fuca and Cape Blanco, summer upwelling leads to the development of a southward flowing upwelling jet over the continental shelf (Barth, et al. 2000; Hickey 1998). The shelf narrows as it approaches Cape Blanco, intensifying the energy of the jet (Barth, et al. 2000; Batteen 1997). As this jet reaches Cape Blanco it turns sharply offshore, mixing the cool, nutrient rich waters of the jet with the warmer, less productive waters of the slow-moving California Current. These interactions lead to the development of eddy fields and mesoscale variability in primary and secondary productivity that distinguish the region south of Cape Blanco from that to the north (Strub, et al. 1991). All these currents, countercurrents, undercurrents, jets, and meanders transport water masses of different origins and characteristics, as well as the nutrients and organisms entrained within them, to the California Current System.

Wickett (1967) demonstrated that secondary productivity off southern California was influenced by the advection of northern water from the west wind drift, such that interannual differences in southern Ekman transport explained 50 to 60 percent of the variance in zooplankton biomass. Chelton, et al. (1982) followed up these observations by observing that when the bulk of the divergent flow is to the south, the California Current experiences greater southward transport, more productive source waters and higher secondary production in the region off of southern California. Fulton and LeBrasseur (1985) further demonstrated that the zooplankton biomass, and even the mean size of copepods, was greater in the northern portion of the California Current when transport was high. Ongoing research has continued to demonstrate that climate-driven changes in transport and ocean conditions dramatically affect both the species composition and productivity of zooplankton in the northern California Current (Mackas, et al. 2005; Peterson, et al. 2002; Peterson and Schwing 2003b). Thus, while local wind fields and coastal upwelling ultimately drive much of the primary production at the base of the food web, growing evidence suggests that large-scale physical processes and associated changes in the community composition of zooplankton is a significant factor in determining the overall productivity of the ecosystem (Feinberg and Peterson 2003; Peterson and Keister 2003; Swartman and Hickey 2003).

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. Hubbs (1948) believed so strongly in the correlation between water temperature and fish distributions that he felt "justified in drawing inferences, from the known data on fish distribution, regarding ocean temperatures of the past." It is worth noting that Hubbs had already drawn distinctions between eras that seemed to be associated with the establishment of warm-water populations over long time periods, and the occasional warm years (generally associated with stronger El Niño events) that brought irregular tropical or subtropical fish much further north along the coast.

Currently, the El Niño/Southern Oscillation (ENSO) is widely recognized to be the dominant mode of interannual variability in the equatorial Pacific, with impacts throughout the rest of the Pacific basin and the globe (Mann and Lazier 1996). During the negative (El Niño) phase of the ENSO cycle, jet stream winds are typically diverted northward, often resulting in increased exposure of the West Coast of the U.S. to subtropical weather systems. Concurrently, coastally trapped waves propagate the equatorial ENSO signal northward along the West Coast of Central and North America as far as the subarctic, resulting in increased northern advection, warmer sea surface (and subsurface) temperatures, elevated coastal sea levels, and deepened thermoclines (Bakun 1996). The impacts of these events to the coastal ocean generally include reduced upwelling winds, deepening of the thermocline, intrusion of offshore (subtropical) waters, dramatic declines in primary and secondary production, poor recruitment, reduced growth and survival of many resident species (such as salmon and groundfish), and northward extensions in the range of many tropical species (McGowan, et al. 1998; Pearcy 2002; Pearcy and Schoener 1987). There is reduced availability of many forage species, particularly market squid, and juvenile survival of most rockfish is extremely low. Concurrently, top predators such as seabirds and pinnipeds often exhibit reproductive failure.

In addition to interannual variability in ocean conditions, the North Pacific seems to exhibit substantial interdecadal variability. Mantua et al. (1997) first defined what is now commonly referred to as the Pacific (inter) Decadal Oscillation (PDO), which is defined as the leading principal component of North Pacific (above 20° N latitude) sea surface temperatures between 1900 and 1993, and superficially resembles ENSO over a decadal time scale. During positive regimes, coastal sea surface temperatures in both the Gulf of Alaska and the California Current tend to be higher, while those in the North Pacific Gyre tend to be lower; the converse is true in negative regimes. Evidence suggests that there have been two full PDO cycles in the 20th century. Cool (negative PDO) regimes occurred between 1890 and 1924, and from 1947 to 1976, while warm (positive PDO) regimes from 1925 to 1946 and again from 1977 to 1999. Variation in the productivity of salmon stocks throughout the Northeast Pacific seems to track these changes in ocean temperature, such that positive PDO regimes are associated with increased productivity of salmon stocks from western Alaska to northern British Columbia, and negative regimes favor stocks from California to southern British Columbia (Hare, et al. 1999; Mantua, et al. 1997).

Although the precise mechanism for the PDO remains elusive, the pattern is clearly linked to variability in atmospheric conditions. The average wintertime Aleutian low both deepened and moved eastward in the post-1977 regime (Mantua, et al. 1997), resulting in considerably stronger eastward wind stress (Parrish, et al. 2001). This increase in wind stress has been tied to the observed cooling (and increased productivity) of the waters in the central North Pacific and Alaska Gyre (Brodeur and Ware 1992; Polovina, et al. 1995), and the consequent warming of coastal waters in the Gulf of Alaska and California Current (Mantua, et al. 1997). In a more recent effort to quantify the broad scale impacts of the PDO on Northeast Pacific ecosystems, Hare and Mantua (2000) compiled 100 physical and biological time series throughout the Northeast Pacific, including time series of recruitment and abundance for commercially important coastal pelagics, groundfish and invertebrates. They found that the dominant principal component of these 100 time series has the same trajectory as the PDO, consistent with anecdotal accounts of covariance between the PDO and many other physical and biological indices.

Growing evidence also suggests that the PDO may have shifted from a positive to negative regime since 1999, as the period between 1999 and 2002 was associated with a negative PDO signal, cool coastal ocean temperatures, high southward transport, and tremendous salmon productivity (Peterson and Schwing 2003b). However, since that period there has been considerable confusion with respect to whether a shift in the PDO did actually occur, or even whether the PDO remains a dominant mode of variability in North Pacific Climate (Bond, et al. 2003; Goericke, et al. 2005b; Goericke, et al. 2005a). The degree to which long-term warming is affecting the world's oceans and its ecosystems relative to other forms of variability is currently a major concern, and the consequent interactions between monotonic (global change), interdecadal (PDO) and interannual (ENSO) climate variability are difficult to disentangle. Although a great many processes drive changes in sea surface temperature trends over multiple time scales, there is growing consensus that the integrated heat content of the global oceans has been increasing, and can only be adequately accounted for by atmospheric forcing attributed to the accumulation of greenhouse gasses in the atmosphere (Barnett, et al. 2001; Barnett, et al. 2005; Levitus, et al. 2000).

Within the California Current itself, (Mendelssohn, et al. 2003) described long-term warming trends in the upper 50 to 75 m of the water column using subsurface temperature records in the California Current over the past 50 years. McGowan, et al. (1998) attributed significant long term declines in zooplankton populations in the California Current over the same period to increased water temperatures that resulted in an intensification of stratification and a reduction of nutrient regeneration into surface waters. Recent paleoecological studies from marine sediments also indicate that 20th century warming trend in the California Current have exceeded natural variability in ocean temperatures over the last 1,400 years (Field, et al. 2006a). All of this evidence suggests that although the development of statistical indices of climate variability across multiple time scales have improved our understanding of how climate has affected North Pacific ecosystems and productivity in the past, the future remains subject to extremely poor predictability.

3.1.3 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 the remainder of this section.

At the scale of the ecosystem, the most widely recognized patterns are distinct zoogeographic provinces extending North and South of Point Conception, California, known as the Oregonian and San Diego Provinces. The Oregonian Province extends from the Straight of Juan de Fuca in the North to Point Conception in the South. The San Diego Province begins at Point Conception and runs south past the terminus of the EEZ (NMFS 2004a).

Patterns of adult groundfish distribution based on depth have been observed to occur between nearshore, continental shelf, and the continental slope and have been used to form discrete management units. This information is detailed in 4.1. Botsford and Lawrence (2002) showed considerable spatial and temporal synchrony in coho salmon and Dungeness crab catches among ports and regions in the California Current between 1950 and 1990; interestingly, they also found that Chinook landings did not have spatial coherence. Similarly, Field and Ralston (Field and Ralston 2005) showed that 51-72 percent of the year-to-year variability in recruitment for three winter spawning rockfish (yellowtail, widow and chilipepper) seems to be shared coastwide, over a spatial scale of 500-1,000 km. The major differences in recruitment strength seemed to be associated with Cape Blanco and/or Cape Mendocino, and some evidence suggests differences in relative year class strength north and south of Point Conception as well. With respect to genetic evidence for biogeographic boundaries, Hedgecock (1994) found that fish and invertebrates with planktonic larvae generally maintain low spatial genetic variance over large (500-2000 km) regions in the California Current. Analysis of a range of *Sebastes* species also suggests little genetic differentiation within the California Current region (McGauley and Mulligan 1995; Rocha-Olivares and Vetter 1999; Wishard, *et al.* 1980), although some nearshore species may exhibit greater spatial patterns of population substructure, particularly north and south of Cape Mendocino (Cope 2004).

Williams and Ralston (2002) found that Cape Mendocino (and the Mendocino Escarpment) was one of the most noteworthy barriers to the latitudinal distribution of rockfish species diversity. Most stock assessments for groundfish tend to be either coastwide assessments, or are relative to the stocks north or south of Cape Mendocino (occasionally Cape Blanco). Both Cape Mendocino and Point Conception are key management boundaries for the Council. In general, evidence suggests wide to very wide dispersal of larvae and juveniles for most groundfish, with modest to limited movement of adults (general on the scale of thousands of kilometers for most species, with limited examples of small numbers of some populations moving in the hundreds of kilometers). There are strong seasonal inshore and offshore migrations for many species, particularly flatfish, and some evidence for ontogenetic movement in some species by both/either depth and latitude. Pacific hake are the only confirmed highly migratory groundfish species in the FMP, with a clear seasonal migration from southern spawning grounds off of northern Mexico and Southern California to northern foraging habitat off of Oregon, Washington, and British Columbia (Bailey, *et al.* 1982). There is an ontogenetic component to this migration, as juveniles tend to be found off of central and northern California, with larger, older fish tending to travel further north. Similarly, the distribution of hake tends to be more northerly in warm years (Dorn 1995; Swartman and Hickey 2003), reflecting interannual shifts in marine habitat conditions.

While the physical and bathymetric features associated with these general biogeographic boundaries are fixed in space, the physical characteristics of water masses and associated plankton communities are clearly highly dynamic in space and time (as discussed in Section 3.1.2). Fulton and LeBrasseur (1985) described a transport-driven shifting subarctic domain in the northern reaches of the California Current System, the margin of which was characterized by abrupt declines in zooplankton biomass south of the subarctic boundary. Although the physical dynamics are now thought to be more complex than their model, it is clear that climate driven changes in transport and ocean conditions dramatically alter both the species composition and productivity of zooplankton throughout the California Current to a considerably greater extent than static boundaries based on geography (Mackas, *et al.* 2005; McGowan, *et al.* 1998; Peterson, *et al.* 2002; Peterson and Schwing 2003b).

For example, in the late 1960s and early 1970s, the dominant copepod species in the Northern California Current during the summer tended to be subarctic (or boreal) types such as *Pseudocalanus mimus*, *Calanus marshallae* and *Arcatioa longiremis*; species that are commonly found over shelf waters throughout the Gulf of Alaska (Peterson and Miller 1977). Data suggest that northern species became relatively less abundant, while southern (subtropical) species such as *Paracalanus parvus* and *Calanus pacificus* were more abundant through the 1980s and early 1990s. These southern species were almost completely dominant during the 1997–98 El Niño, at which time standing biomass was near all time lows (Peterson, *et al.* 2002). Since 1999, northern species have again dominated numerically during spring and summer, and the standing biomass of zooplankton has been roughly double that observed prior to 1999 (Peterson and Schwing 2003b).

3.1.4 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 of fishing on EFH. NMFS works through a consultation process to minimize adverse effects of non-fishing activities (50 CFR 600 subpart J).

3.1.4.1 Coastal Pelagic Species

The CPS fishery includes four finfish (Pacific sardine, Pacific (chub) mackerel, northern anchovy, and jack mackerel) and market squid. CPS finfish generally live nearer to the surface than the sea floor. The definition of EFH for CPS is based on the temperature range where they are found, and on the geographic area where they occur at any life stage. This range varies widely according to ocean temperatures. The EFH for CPS also takes into account where these species have been found in the past, and where they may be found in the future.

The east-west boundary of EFH for CPS includes all marine and estuary waters from the coasts of California, Oregon, and Washington to the limits of the EEZ (the 200-mile limit) and above the thermocline where sea surface temperatures range between 10 and 26 °C. (A thermocline is an area where water temperatures change rapidly, usually from colder at the bottom to warmer on top). The southern boundary is the U.S.-Mexico maritime boundary. The northern boundary is more changeable, and is defined as the position of the 10° C isotherm, which varies seasonally and annually. (The 10° C isotherm is a rough estimate of the lowest temperature where finfish are found, and thus represents their northern boundary.) In years with cold winter sea surface temperatures, the 10°C isotherm during February is around 43° N latitude offshore, and slightly further south along the coast. In August, this northern boundary moves up to Canada or Alaska. A more complete description of CPS and associated EFH is contained in the CPS FMP, which is incorporated herein by reference.

3.1.4.2 Salmon

Salmon range from more than 1,000 miles inland to thousands of miles out at sea. Although the waters off Canada are salmon habitat, they are also not included in the description of salmon EFH because they are outside of U.S. jurisdiction. However, waters off Alaska are included in the description.

In estuaries and marine areas, salmon habitat extends from the shoreline to the 200-mile limit of the EEZ and beyond. In freshwater, salmon EFH includes all the lakes, streams, ponds, rivers, wetlands, and other bodies of water that have been historically accessible to salmon. The description of EFH also includes areas above artificial barriers, except for certain barriers and dams that fish cannot pass. However, activities that occur above these barriers and that are likely to affect salmon below the barriers may be affected by court rulings from ongoing EFH-related litigation.

The Council is required to minimize the negative impacts of fishing activities on essential salmon habitat. The ocean activities that the Council is concerned with include the effects of fishing gear, removal of salmon prey by other fisheries, and the effect of salmon fishing on reducing nutrients in streams due to fewer salmon carcasses in the spawning grounds. The Council may use gear restrictions, time and area closures, and harvest limits to reduce negative impacts on salmon EFH.

The Council is also required to comment and make recommendations regarding other agencies' actions that may affect salmon EFH. This usually takes the form of endorsing an enhancement program or other type of program, requesting information and justification for actions that might affect salmon habitat, and promoting the needs of the salmon fisheries. The Council works with many other agencies to identify cumulative impacts on salmon habitat, to encourage conservation, and to take other actions to protect salmon habitat. A more complete description of salmon and associated EFH is contained in the salmon FMP, which is incorporated herein by reference.

3.1.4.3 Highly Migratory Species

These species (tuna, swordfish and sharks) range widely in the ocean, both in terms of area and depth. Highly migratory species (HMS) are usually not associated with the features that are typically considered fish habitat (such as seagrass beds, rocky bottoms, or estuaries). Their habitat may be defined by temperature ranges, salinity, oxygen levels, currents, shelf edges, and sea mounts. Little is known about why highly migratory species frequent particular areas. Nevertheless, these species may be affected by actions close to shore or on land, such as fishing, dredging, wastewater discharge, oil and gas exploration and production, aquaculture, water withdrawals, release of hazardous materials, and coastal development. A more complete description of HMS and associated EFH is contained in the HMS FMP which is incorporated herein by reference.

3.1.4.4 Groundfish

The Council first identified groundfish EFH in 1998 via Amendment 11 to the FMP. Because information about each groundfish species' habitat was limited, EFH was defined as the whole West Coast EEZ. However, in 2000, based on the *American Oceans Campaign* v. *Daley* court case, the Council was directed to revisit the question of groundfish EFH. In 2001, NMFS Northwest Region staff began work on an EIS for groundfish EFH off Washington, Oregon, and California, which after several years of work was finalized in 2005. The Council's preferred alternative in the final EIS became Amendment 19 to the Groundfish Fishery Management Plan in 2006.

EFH for groundfish is described as all waters from the high tide line (and parts of estuaries) to 3,500 meters (1,914 fathoms) in depth. HAPCs are a subset of EFH used to focus management and restoration efforts. The current HAPC types are: estuaries, canopy kelp, seagrass, rocky reefs, and "areas of interest" (a variety of submarine features, such as banks, seamounts, and canyons, along with Washington State waters).

In addition to identifying EFH and describing HAPCs, the Council also adopted mitigation measures directed at the adverse impacts of fishing on groundfish EFH. Principal among these are closed areas to protect sensitive habitats. There are three types of closed areas: bottom trawl closed areas, bottom contact closed areas, and a bottom trawl footprint closure. The bottom trawl closed areas are closed to all types of bottom trawl fishing gear. The bottom trawl footprint closure closes areas in the EEZ between 1,280 m (700 fm) and 3,500 m (1,094 fm), which is the outer extent of groundfish EFH. The bottom contact closed areas are closed to all types of bottom contact gear intended to make contact with the bottom during fishing operations, which includes fixed gear such as longline and pots. A more complete description of groundfish and associated EFH is contained in the groundfish FMP, which is incorporated herein by reference.

3.1.5 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:

- RCA: 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. Not all of the historical RCA areas have been developed into GIS data, but most of the areas from 2003 are mapped as an example. A chronology of changing trawl and non-trawl RCAs for the year 2003 is included below.
- CCA: Sections of the CCA cover a total area of 1,372,447 ha.
- Darkblotched Conservation Area (DBCA): The Dark Blotched 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.

State Marine Protected Areas

California: Marine protected area (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 Oregon Department of Fish and Wildlife. 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.

3.1.6 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.[13] 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 rebuilding rockfish stocks, and indeed all rockfish more generally, occupy a broad range of ecological niches and trophic roles, and some analysis of their principal predators, prey, and competitors is an important consideration with respect to the impacts that rebuilding decisions may have on the larger ecosystem. Larval rockfish (and larval fish more generally), have been shown to play a minor role in the macrozooplankton community, which is dominated by a wide range of predators and competitors (McGowan and Miller 1980). However, both juvenile and adult rockfish are important prey items to a wide range of other rockfish, other piscivorous fishes, seabirds, and marine mammals. Most food habits studies do not reliably or consistently report rockfish to the species level. Therefore, a summary of key predators here is focused more generally the role of rockfish as prey, rather than the role of individual rebuilding species as prey. Although it is not possible to assess potential impacts to predators that may or may not result from the depletion of rockfish populations, particularly with respect to the level of depletion beyond target levels or the natural population variability exhibited by unfished species (Miller and Sydeman 2004; Moser, *et al.* 2000), it is clear that rockfish in general (particularly juveniles) represent a significant trophic linkage throughout the ecosystem.

For example, Merkel (1957) reported that juvenile rockfish were particularly important prey of Chinook salmon along the central California coast, representing on the order of 22 percent of prey by volume throughout the year, with most predation occurring between May and July, when pelagic juveniles move inshore to settle. Brodeur and Pearcy (1990) also found heavy predation on larval and juvenile rockfish by coho and Chinook salmon along the Oregon and southwest Washington coasts. The importance of rockfish as prey to piscivorous rockfish such as bocaccio, cowcod, and yelloweye is summarized below; many nearshore rockfish species also predate heavily on other rockfish, particularly juveniles (Hobson, *et al.* 2001; Lee 1997; Love, *et al.* 2002). Lingcod are among the most voracious predators of both juvenile and adult rockfish; Phillips (1959) reported that a 54 lb lingcod in Monterey, California had been found with a 12-inch starry rockfish and an 18½-inch canary rockfish in its stomach. Additional studies have confirmed that rockfish are important prey items for both California (Shaw and Hassler 1989) and Oregon lingcod (Steiner 1978). Sablefish are also significant predators of both juvenile and

[13] 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.

adult rockfish, with rockfish representing between 20 and 60 percent of sablefish prey by volume (Buckley, *et al.* 1999; Cailliet, *et al.* 1988; Laidig, *et al.* 1997). However, for most depth ranges sablefish prey primarily on longspine thornyheads. Although Pacific hake are known predators of juvenile rockfish, juvenile rockfish represent significantly less than 1 percent of their diet by both volume and frequency of occurrence. Pacific halibut, soupfin sharks, dogfish sharks, and albacore tuna are other known rockfish predators (Bonham 1949; Rankin 1915; Ripley 1946), and many other fish are likely to feed on rockfish (particularly juveniles) as well.

A wide range of seabirds also prey heavily on juvenile rockfish (Chu 1984; Wiens and Scott 1975). For many species, as much as 90 percent of their diet comprises juvenile rockfish during the late spring and early summer, which coincides with the breeding season for many resident species (Ainley, *et al.* 1993; Miller and Sydeman 2004). However, there is considerable interannual, and interdecadal variability in the frequency of rockfish in seabird diets, related primarily to the availability of juveniles to seabirds. While many studies have not attempted to identify juvenile *Sebastes* to species, for those that have (largely off of the central and southern California coasts) unexploited species such as shortbelly rockfish generally account for more than two-thirds of the juvenile rockfish identified (Ainley, *et al.* 1996; Merkel 1957; Miller and Sydeman 2004). Throughout the 1990s, declines in juvenile rockfish predation by central California seabirds occurred in both exploited and unexploited rockfish species (Miller and Sydeman 2004; Mills, *et al.* 2006; Sydeman, *et al.* 2001). It is reasonable to expect that fisheries removals have contributed to overall declines in juvenile production, with proportionately greater declines in production for stocks that have been historically overfished and are now rebuilding.

As seabirds have a success-failure breeding response, rather than a response that is proportional to food supply, there is a potential for seabird populations to be highly sensitive to changes in food abundance (Furness and M.L.Tasker 2000; MacCall 1984; Sydeman, *et al.* 2001). This may be particularly true for seabirds in which juvenile rockfish have been shown to be a preferred prey item. Research has shown that common murres prefer to forage locally for juvenile rockfish during their breeding season (May-June, when juvenile rockfish are most abundant), since the close proximity to the breeding grounds reduces foraging trip duration. In years when juvenile rockfish are less abundant, murres forage in coastal waters for northern anchovy and other forage fishes (1990; Miller and Sydeman 2004). Consequently, it is difficult to determine whether declines in overfished species could have had a notable impact on seabird reproductive success or other predators above and beyond that which has occurred as a result of fishing stocks to target levels and natural variability. These declines are coincident with the poor recruitment observed in many exploited species (described in Section 4.1), as well as poor reproductive performance for many seabird species that depend heavily on juvenile rockfish in the breeding season (Sydeman, *et al.* 2001). However, the observation that declines were observed in the consumption by seabirds of juveniles of both unexploited and exploited species suggests that ocean conditions were a major factor in the low abundance of juvenile rockfish.

Both juvenile and adult rockfish are typically a modest, but significant, component in the diets of most California Current pinnipeds and many cetaceans; however, rockfish prey are rarely identified to the species level (Morejohn, *et al.* 1978; Perez and Bigg 1986; Stroud, *et al.* 1981). Morejohn et al. (1978) did identify bocaccio rockfish to species in diets of harbor seals and elephant seals, but other rockfish were listed solely as *Sebastes sp*. Lowry and Carretta (Lowry and Carretta 1999) reported that shortbelly rockfish were among the most frequently encountered prey items for California sea lions at San Nicolas, San Clemente, and Santa Barbara Islands. Lowry et al. (1991) also suggested that California sea lion food habits tend to be temporally dynamic and related to the relative availability of prey. Off of central California, some rockfish taken in food habits studies have been identified using otoliths, with those identified to species including shortbelly, bocaccio, splitnose, vermillion, and canary rockfish.[14]

Given that most marine mammal populations in the California Current exhibit either stable or increasing abundance trends over the last several decades, it seems unlikely that the depletion of overfished rockfish or any alteration to their expected recovery trajectories that might result from management decisions would have a negative impact on marine mammals. However, the converse situation, in which increasing marine mammal populations might slow or prevent the recovery of rebuilding species (a depensatory impact), may be plausible. For example, Bundy (2001) used a multispecies model of the Newfoundland-Labrador ecosystem to evaluate such potential interactions between harp seals and cod. Her results suggest that although the decline of cod was the result of overfishing, the recovery may be hindered by the increasing natural mortality rate associated with a nearly constant per capita consumption of cod by harp seals and concurrent increases in seal abundance. Such factors, which are know as depensatory processes that could complicate recovery efforts for some species, are difficult to quantify, and consequently are not explicitly considered in the analysis of rebuilding trajectories. However, since most rockfish are characterized by low growth, low metabolic rates, and low natural mortality rates, they are likely to be less tightly coupled with the dynamics of either their predators or their prey over most temporal and spatial scales.

With respect to the food habits of the depleted species themselves, accurate quantification of food habits is poor. Most rockfish are notoriously difficult to sample for food habits studies due to the eversion of their air bladder upon capture in sampling gear, usually resulting in regurgitation of any stomach contents. Thus, while several quantitative studies exist for widow, canary, yelloweye, and darkblotched rockfish, anecdotal accounts of food habits are the primary source of information for cowcod and bocaccio rockfish. For all of these species, general patterns of prey preferences are evident from the literature; however, prey preferences may also vary substantially over time (seasons, years), space (depth, latitude, habitat) and life history stage (most species tend to exhibit some ontogenetic shift in prey preferences with size).

Available food habits studies tend to confirm that POP, darkblotched, canary, and widow rockfish are primarily planktivorous, with the vast majority of the diets of the first three of these being euphausiids. For example, Brodeur and Pearcy (1984) found that euphausiids comprised 85 percent of prey by volume for POP, 92 percent by volume for Canary rockfish, and roughly 75 percent by volume (of identifiable remains) for a small number of darkblotched rockfish (for which most prey remains were unidentifiable). All three of these species also fed to some extent on smaller amounts of pelagic shrimp, cephalopods, mesopelagic fishes, and other prey. Lee (2002) also found that canary rockfish relied heavily on euphausiids, which accounted for over 98 percent of prey by volume. By contrast, widow rockfish have a more varied range of prey items, including a heavy reliance on gelatinous zooplankton. Phillips (1964) reported that widow rockfish, which tend to occupy semi-pelagic habitat, feed on macrozooplankton, particularly amphipods. Adams (1987b) found that widow rockfish diets in northern California were dominated by four key groups of prey items; salps and other gelatinous zooplankton, euphausiids, pelagic shrimp, and small fish (primarily mesopelagic fish, juvenile hake, and forage fish such as anchovy and smelt). Lee (2002) found that nearly 75 percent of the diet by volume of widow rockfish off of Oregon and Washington was composed of salps and other gelatinous predators, with smaller fractions of euphausiids, pelagic shrimps, and small fish.

Although quantitative food habits studies do not exist for either cowcod or bocaccio rockfish, both Phillips (1964) and Love, et al. (2002) described bocaccio rockfish as almost exclusively piscivorous.

[14] M. Weise, University of California Santa Cruz, unpublished data, but see Weise and Harvey (Weise and Harvey 2005) for an overview of the study and methods.

Love, et al. (2002) include other rockfish, hake, sablefish, anchovy, mesopelagic fishes, and squid as the key prey for large juvenile and adult bocaccio, while cowcod are described by Love et al. (2002) as feeding on "anything that is not bolted down," but primarily fish and cephalopods. Limited data is reported in the literature for yelloweye rockfish. Steiner (1978) reported on the stomach contents of 28 yelloweye caught on rocky reefs off of the central Oregon coast, which preyed primarily on benthic epifauna, flatfish, other rockfish, and shrimp. Rosenthal, et al. (Rosenthal, *et al.* 1988) found that yelloweye rockfish in southeast Alaska were primarily piscivorous, preying primarily on herring, other rockfish, and sand lance. Thus, the general patterns that emerge for these seven species are that three are higher trophic level piscivores that tend to be found on rocky or highly structured habitat (cowcod, bocaccio, and yelloweye rockfish), three are primarily planktivores associated with shelf and slope benthic habitat (POP, canary, and darkblotched rockfish) and one is an omnivorous species that occurs and feeds primarily in midwater, and primarily on gelatinous zooplankton (widow rockfish).

As higher trophic level predators, cowcod, bocaccio, and yelloweye rockfish have a greater potential to play a structuring role in the ecosystem, particularly over smaller spatial scales. Despite their overall rarity throughout the marine environment relative to more abundant omnivorous or planktivorous rockfish,[15] submersible surveys have found that these piscivorous species can be found at relatively high levels of abundance in many rocky reef habitats isolated and presumably lightly fished reefs (Jagielo, *et al.* 2003; Yoklavich, *et al.* 2002; Yoklavich, *et al.* 2000). In surveys of reefs that had high piscivores density, the concentration of smaller, fast-growing and early maturing *Sebastes* species was considerably lower (such as greenstripe, rosethorn, splitnose, and pygmy rockfish). By contrast, in rocky reef habitats known or suspected to be subject to heavier fishing pressure, the abundance of such small, fast-growing, and early-maturing species was considerably greater. For example, Stein et al. (1992) found that reefs with small numbers of piscivorous rockfish (such as yelloweye) had very high numbers (as much as three orders of magnitude greater) of smaller species. Yet the scarcity of data on spatial patterns of abundance and fishing pressure, and a lack of all but qualitative food habits data for most these species, makes demonstrating and quantifying such interactions extremely challenging.

Additional empirical support for either intraguild competition or top-down impacts of fishing that may have resulted in either localized or large-scale community changes is presented in Levin, et al. (Levin, *et al.* 2006), who found some evidence for broad-scale changes in the taxonomic composition of benthic marine fishes in the California Current. Their analysis focused on 16 species of rockfish, eight species of flatfish, and seven species of cartilaginous fish that were sampled by bottom trawl surveys on the continental shelf between 1977 and 2001 (including all of the rebuilding species except for cowcod). For the species they included in their analysis, rockfish declined from over 60 percent of the catch in 1977 to less than 17 percent of the catch in 2001, with flatfish catches increasing by a similar magnitude. Additionally, populations of larger rockfish (including primarily the rebuilding species) had fallen at high rates (as reflected by stock assessments), while those of smaller species, particularly those associated with soft substrate, had generally increased in abundance. These authors also note that the potential for smaller species of rockfish to consume or outcompete recruiting juveniles of larger species highlights the potential that fishing could shift the community composition of the rockfish assemblage, or the benthic groundfish assemblage more generally, into an alternate state.

[15] Estimates of unfished biomass (B_0) for cowcod and yelloweye are on the order of 3,000 and 7,500 mt respectively. By contrast, estimates of unfished biomass for bocaccio and widow and canary rockfish are on the order of 70,000, 90,000, and 230,000 mt respectively. Similarly, cowcod have always been among the rarest of *Sebastes* spp. larvae identifiable to species in the standard CalCOFI survey area (nearshore to offshore waters south of Point Piedras Blancas off California) between 1951 and 1998, with estimates of abundance as much as two orders of magnitude less than more abundant species (Moser, *et al.* 2000).

The potential for intraguild competition or top-down forcing, in both small-scale rocky reef systems and throughout the larger ecosystem, is also supported by theoretical considerations and simulation models. Walters and Kitchell (2001) as well as MacCall (2002a) have demonstrated the potential for strong interactions among the adults of higher trophic level piscivores and their prey, such that adults crop down forage species that may be potential predators or competitors of their own juveniles, with consequent negative impacts on higher trophic level predators when their populations are reduced by fishing (see also Swain and Sinclair 2000). Baskett, et al. (2006) have explored the potential for such interactions as well, with a community interactions model based on rocky reef habitat and juvenile and adult life history stages of rockfish parameterized to represent yelloweye and pygmy rockfish. Their model sought to evaluate interspecific dynamics among rocky reef rockfish within a marine reserve, and considered the interactions among fishing, population recovery following cessation of fishing mortality, juvenile predation and competition.

Without interspecific interactions, the model developed by Baskett, et al. (2006) predicted that larger piscivores would recover given minimal levels of dispersal and reserve size. However, when community interactions were taken into account, initial conditions such as the relative abundance of the piscivores and the size of the reserve became more important with respect to the ultimate stable state, and the models predicted that under some circumstances recovery could be unlikely. Due to lack of adequate information on abundance and plausible parameter values for many of the interactions, the model was simplistic in the sense of modeling a single predator (with two life history stages) and a single prey/competitor, with little evaluation of the complicating impacts of climate variation, variability in recruitment, multiple alternative prey items, and other factors. Despite this, their results were consistent with similar simulations of the potential consequences of community interactions in marine systems (MacCall 2002a; Mangel and Levin 2005; Walters and Kitchell 2001), and speak to the importance of considering such interactions in the design, implementation and monitoring of recovery efforts for rebuilding species.

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 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. Based on the analyses in the EFH EIS (NMFS 2005) and the mitigation measures implemented as part of that action, NMFS concludes that the effects of 2007–08 harvest specifications will not be significant and are therefore not analyzed further.

The 2004–05 groundfish harvest specifications EIS pointed out there is currently insufficient information to predict the effects of fishing on the marine ecosystem in any precise way nor distinguish among the alternatives in terms of these types of effects. As noted in that EIS, NEPA regulations address this issue. When an agency is evaluating reasonably foreseeable significant adverse effects, there is incomplete or unavailable information, and the costs of obtaining it are exorbitant or the means unknown, the agency must, (1) so state, (2) describe the importance of the unavailable information to the assessment, (3) summarize any existing scientific information, and (4) evaluate impacts based on generally accepted scientific principals (40 CFR Part 1502.22), which may accord with the best professional judgment of agency staff. NMFS acknowledges that the information necessary to fully evaluate impacts to EFH and marine ecosystems, as described in the preceding paragraph, cannot be reasonably obtained at this time, and impacts are generally unknown.

Furthermore, it is not possible to separate out the direct/indirect effects of the action on the ecosystem (fishery removals), which may be modest, and the cumulative effects of past and future groundfish fishing mortality (occurring as past or reasonably foreseeable future actions under the management framework). Therefore, the following sections summarize existing scientific information on two potential long-term effects of the depletion of stocks from unfished biomass: (1) potential effects to constituents of the food web as a result of depletion of groundfish species at different trophic levels and (2) broad-scale genetic and demographic changes in fish populations resulting from fishing. Section 3.3 assesses the effects of the proposed action in light of this discussion.

3.2.1 Effects of Fishing on the Food Web

The sections above provide a conceptual framework, based on trophic considerations and the basic structure and function of marine food webs, for considering the plausible impacts of the removal of both overfished (rebuilding) stocks as well as healthy stocks from the marine ecosystem. The impact associated with both the status quo and the action alternatives are the removals of these species from the ecosystem, at various levels depending upon the OY alternatives. Biogeography and EFH are presented for consideration of other elements of the ecosystem along with current measures to protect EFH.

Although far from conclusive, the empirical evidence and theoretical considerations discussed in Section 3.1.3 suggest some potential for top-down impacts or intraguild competition, as a result of declines in higher trophic level species such as cowcod, bocaccio, and yelloweye rockfish over small spatial scales. It is reasonable to expect that similar impacts could potentially be associated with fishery-induced declines in stocks of healthy species (those reduced from their equilibrium abundance, but not to levels below overfishing limits), such as sablefish, Pacific halibut, petrale sole, shortspine thornyhead, Pacific hake, and other piscivorous or higher trophic level species. Such impacts are often referred to as trophic cascades, in which declines of high trophic level species (keystone predators) have cascading impacts through food webs to the abundance, productivity, and species diversity of lower trophic levels. Empirical examples of trophic cascades tend to be more common for semi-enclosed ecosystems such as lakes, or highly structured (two dimensional) environments, such as intertidal or sub-tidal ecosystems (Paine 1966; Simenstad, *et al.* 1978; Tegner and Dayton 2000). As one ventures further from these environments, the evidence for top-down control, or trophic cascades, becomes considerably spottier, although (Van der Elst 1979) reported a classic example of top-down control of a coastal ecosystem off of the Natal coast in South Africa.[16]

However, in coastal upwelling ecosystems such as the California Current, most evidence suggest that the primary forcing factor for ecosystem productivity and structure over the scale of the entire system tends to be either “bottom-up” (based on the amount and variability of primary or secondary production) or “middle-out.” For example, (Ware and R.E.Thomson 2005) proposed that the carrying capacity of north Pacific coastal ecosystems was primarily determined by bottom-up control, based on correlations

[16] In this case, increased mortality of large sharks resulted from the use of shark nets to protect bathers, which subsequently caused an apparent increase in the abundance of smaller dusky and milk sharks on which they preferentially fed. This increase of smaller sharks resulted in a substantial decline in catch per unit effort of several populations of teleost fishes that were both commercially and recreationally important to coastal communities in the region.

between latitudinal variability in primary production and commercial fisheries yields. Alternatively, bottom-up control in these ecosystems could be a function of secondary production, through variability in the productivity and species composition of the zooplankton community. As discussed in Section 3.1.2, the California Current seems to experience higher secondary production during periods of stronger southward transport and cooler sea surface temperatures. Zooplankton, particularly euphausiids, are the principal prey item for most of the mid-trophic level organisms in the California Current, including Pacific hake and most rockfish.

An alternative to bottom-up control is "middle-out" control, also referred to as "wasp-waist" control, in which a small number of key mid-trophic level species represent a bottleneck of energy flow between lower and higher trophic levels. It has long been noted that food webs in coastal upwelling ecosystems tend to be structured around CPS, such as krill, sardine, anchovy, and hake, that exhibit boom-bust cycles of abundance over decadal time scales (Bakun 1996; Parrish, *et al.* 1981; Schwartzlose, *et al.* 1999). Such dynamics have long been thought to be a consequence of the energetic and highly variable oceanographic processes that shape the physical environment and drive production throughout pelagic and benthic food webs in coastal upwelling ecosystems (such as the California Current system) over a range of time scales (Mann and Lazier 1996; Parrish, *et al.* 1981). The idea of wasp-waist control was first suggested by Rice (1995) and developed in greater detail in Cury et al. (2000). The premise is that the low species diversity often observed in the middle of many upwelling ecosystems results in a vast majority of the energy in the food web flowing through CPS such as sardine, anchovy, and mackerel. Many of these seem to feature "weak links" in their life cycles related to sensitivity to climate forcing, such that climate conditions determine the productivity of these stocks, and indirectly drive the dynamics of both higher and lower trophic levels.

Empirical evidence for any of these types of control is typically limited for large marine ecosystems (Hunt and McKinnell 2006). However, where trophic interactions among exploited species are documented or suspected, ecosystem modeling can provide a template to evaluate both the magnitude and consequences of removals of either predators or prey in the system of interest (Christensen and Walters 2004; Hollowed, *et al.* 2000). Although such models are unavoidably constrained by conceptual shortcomings and data limitations, most critical reviews of multispecies modeling approaches agree that ecosystem models can augment contemporary single species models by confronting an array of interactions and dynamics that are more difficult to address with single-species models, such as competition, predation and environmental variability (Fulton, *et al.* 2003; Hollowed, *et al.* 2000; Plagányi and Butterworth 2004). For example, Walters, *et al.* (2005) used the results from a number of existing ecosystem models to demonstrate that widespread application of contemporary (MSY proxy) single-species management approaches could lead to dramatic impacts on ecosystem structure, particularly where such approaches are applied to forage species. Their results add considerable weight to the perceived need to consider forage species as resources whose value is derived from their role as prey to commercially and recreationally important stocks, a consideration consistent with recent the Council determination to place a precautionary ban on krill (euphausiid) harvests throughout the West Coast EEZ.

Dynamic simulations of an ecosystem model of the Northern California Current were developed by Field, et al. (2006b), who modeled the continental shelf and slope ecosystem between Cape Mendocino and Cape Flattery between 1960 and 2004. The model was based on, and tuned to, biomass estimates from stock assessments and surveys, consumption and production rates estimated from empirical studies or the literature, historical estimates of landings and discard rates, and the limited food habits data that were available in this region. The model was run forward first under the assumption of a constant environment, then forced dynamically with several climate indices. They found that most of the variability observed in single species models and dynamics can be replicated with a multi-species modeling approach, despite significant changes in food web structure and the abundance of both predators and prey in this ecosystem over time. In general, these results imply that over the macro-scale, there do not appear to be obvious changes in ecological structure that have resulted in strong interspecific interactions (predation, competition) between most of these species. One large exception to this generalization was Pacific hake, which by virtue of their large biomass and high consumption of forage species in the model were shown to have potential competitive interactions. Agostini (2005) found that most model components (particularly pandalid shrimp, rockfish, salmon, seabirds and marine mammals) benefited from a reduction in hake biomass, primarily as a result of increases in the availability of euphausiids, forage fish and other prey.

These results are consistent with what is known of the life histories for many of the rockfish, roundfish and longer-lived flatfish in the California Current, where low mortality rates are indicative of low predation rates and presumably weakly coupled trophic interactions. In other words, species with a low natural mortality rate are unlikely to be a "key prey species" for higher trophic level predators, and are consequently less likely to effect significant bottom-up control in the energy flow or structure of the ecosystem. Consequently, the effects of severe declines in the overfished species that were explicitly included in this model (canary rockfish, widow rockfish, and POP) to other elements of the ecosystem appear to be minimal. The model found considerably stronger interspecific interactions in species such as shrimp, salmon, and small flatfish where there is high turnover and high predation coupled with substantial changes in many of their key predators (such as hake, sablefish, marine mammals) over the last forty years. There were, of course, other exceptions to this generalization; in fact one of the strongest interactions appeared to be among several of the slowest growing species; sablefish, shortspine thornyhead, and longspine thornyhead. Essentially, the model suggested that natural mortality rates for longspine thornyheads may have fallen by nearly fourfold over recent decades as a result of substantial declines in sablefish and shortspine thornyheads, their key predators. As a result, the expectation would be that longspine thornyhead abundance would increase over time, a prediction consistent with recent trawl survey results.

However, this work focused on integrating a broad array of species and habitats, and due to their relative rarity and the paucity of food habits data, the piscivorous species of rockfish described in the previous section were not modeled as independent populations. As the fauna and environmental conditions along the continental slope differ tremendously from those on the shelf and near the shelf break, evaluating these interactions more carefully is likely to require development of spatially explicit modeling efforts, coupled with more appropriate consideration of age and/or size based bioenergetic requirements and predation interactions. A comparable, but considerably more complex model, with greater population (demographic) structure, spatial complexity and explicit physical forcing (Fulton, *et al.* 2004), is currently under development by researchers at the NMFS Northwest Fisheries Science Center. As baseline knowledge and modeling abilities increase, such models will hold greater promise for successfully identifying the processes and mechanism of ecosystem change, and guiding decisions that might hasten the recovery of both individual species and sustain the community and ecosystem in which they reside.

Other theoretical considerations point to the potential for an important role for rebuilding species in the California Current over broad spatial and temporal scales, particularly the stocks that were historically more abundant. By virtue of their slow growth and low mortality rate, these stocks may fill a role in stabilizing highly dynamic ecosystems, by dampening what might otherwise be even greater ecological responses by high turnover species to rapid changes or short-term bursts in production (Apollonio 1994). However, the same could be said of any ecosystem for which all stocks were at their "target" levels. The premise of nearly all contemporary fisheries management is that reducing stocks to target levels results is sustainable from a single species perspective, but there is little or no theoretical or empirical basis on which to conclude that this approach is optimal from the perspective of other, codependent elements of the ecosystem (Goodman, *et al.* 2002; Mangel, *et al.* 2000). As Goodman et al. (2002) discuss, fishing to achieve any MSY-related objectives inevitably shifts the equilibrium biomass, age and size structure of a population from that which occurred in the unfished condition, and any such changes have the potential to propagate through the food web and effect consequent changes on other species.

3.2.2 Genetic and Demographic Effects of Fishing

While contemporary approaches to fisheries science focus on estimating surplus production, stock-recruit relationships and MSYs, it is worth noting that from a purely "holistic" perspective, the fishing down of any species removes or alters energy pathways and ecological structure from either other species (such as seabirds and marine mammals) or other ecosystem processes (Aydin 2004), although this observation does not invalidate the logic of surplus production from a single-species perspective. It has long been assumed that fish stocks and populations, and subsequently the ecosystems in which they exist, are healthy if they are maintained close to the levels that provide MSY. However, there is a growing body of ecological, genetic and theoretical evidence that suggests that this may not necessarily be a fair assumption, neither for the exploited species themselves nor the ecosystems in which they exist. A growing body of literature suggests that fisheries have the potential to effect substantial changes in both genetic and demographic characteristics of fish populations; as Stokes and Law (2000) suggest "to an evolutionary biologist, fishing is a massive uncontrolled experiment in evolutionary selection." Selection by fisheries has clearly been demonstrated to result in changes in size at age,[17] changes in size and age at maturity, changes in natural mortality and increased total fecundity (Conover and Munch 2002; Mangel, *et al.* 1993; Mangel and Stamps 2001; Stergiou 2002; Stokes and Law 2000); and some examples even suggest changes in body shape, alterations in heritable patterns of distribution and migration, and even changes in avoidance behavior (Heino and Godø 2006; Ricker 1981).

Their results speak not only to the necessity to consider evolutionary consequences, but also to the observation that the consequences could be detrimental to humans as well as fish. Quite simply, these evolutionary consequences can reduce the sustainable yield of a population by decreasing the age at maturity and consequently reducing the relative amount of somatic growth in a population relative to reproductive effort. As Conover (2000) suggests, "Yield… is not a currency that is crucial to fitness. From the fishes' point of view, the goal is maximizing the relative contribution of genes (not biomass) to succeeding generations." The current National Standard Guidelines recognize the significance of such factors on both populations and ecosystems, as they state that the benefits of protecting marine ecosystems include "maintaining viable populations (including those of unexploited species), maintaining evolutionary and ecological processes (e.g., disturbance regimes, hydrological processes, nutrient cycles), maintaining the evolutionary potential of species and ecosystems, and accommodating human use" (50 C.F.R. 600.310). Such observations demonstrate that maintaining the role of species in an ecosystem, and minimizing the selective role of fishing on marine fish diversity on multiple levels, are both key challenges and crucial element to any future ecosystem-based approach to the management of marine resources.

[17] As early as 1912 it was noticed that fish caught in the early or developing years of a fishery tended to be larger at age than those caught in more recent years, and it is now known that when mortality increases as a result of size-selected fishing; faster-growing individuals are removed at higher rates than slower-growing individuals. The result is that slower-growing animals make up a greater percentage of their age group; and the population in question is selected to be smaller at a given age over time. The same logic applies to the selection of earlier ages at maturity and to other selective factors.

3.3 Possible Impacts of the Proposed Action

While considerable research has been undertaken to better understand trophic interactions and other ecosystem considerations throughout the U.S. and the world, and to consider the cumulative, large-scale effects of fishing on marine ecosystems from a more holistic perspective, there is no clear consensus on what would actually constitute precautionary harvest policies or rates from a multispecies or ecosystem perspective. As a result, there is no fundamental 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.

From a basic ecological perspective, all species have a role to fill in the system, and the loss or severe reduction of any stock or species could have reverberations throughout the food web. Even the reduction of fished populations to their target levels affects the flow of energy through the marine ecosystem, and has the potential to either modestly or massively alter the structure and integrity of the communities that either prey on, are preyed upon, or otherwise interact with those species. As discussed in Section 3.1.6, some seabirds that depend on juvenile rockfish have undergone declines in breeding success, and declines in the availability of prey have been implicated as potential causes. However, ocean conditions and the effects of fishing are likely to be compounded, and the trends themselves are difficult to discern. Based on the observation that most resident or migratory marine mammal populations in the California Current have been increasing at modest to substantial rate over the past several decades (including California sea lions, harbor seals, elephant seals, gray whales, and humpback whales), it is similarly difficult to expect that the cumulative impacts of fishing have been detrimental for these guilds (independent of the incidental mortality resulting from fishing activity, described in Section 4.3).

Based on what is known or suspected about the large-scale nature of energy flow in upwelling environments, it is reasonable to expect that the cumulative impacts that have resulted from overfishing, and may continue to result from any delay in rebuilding, are modest to negligible when integrated across the entire California Current ecosystem. This is particularly true when considering the potential cumulative impact of depleting these populations below target levels (e.g., 10 percent to 25 percent of historical abundance) relative to depleting such populations to precisely their target levels (e.g., ~40 percent of historical abundance). However, for several rebuilding species, particularly those at higher trophic levels, these impacts may be more significant at smaller spatial scales for some habitat types and regions, since severe depletion may well have resulted in substantial shifts in the community composition of some benthic habitat. Furthermore, clearly identifying and evaluating the potential consequences to the ecosystem of modest changes in population trends and abundance that may result from deviations in rebuilding trajectories, above and beyond those that would have resulted from fishing stocks down precisely to target levels, is an analysis beyond the scope of existing data and capacity. The empirical data, either from visual or trawl surveys, are limited in their resolution, and although theoretical (simulated) studies suggest that thresholds between alternative stable states may exist, identifying such thresholds is beyond the realm of existing capacity.

3.3.1 OY Alternatives

Despite these general observations about the effects of the groundfish management framework on ecosystem processes, 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, action 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 alternative establishes more aggressive rebuilding schedules for depleted species, with the exception of yelloweye rockfish. 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.

3.3.2 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.

The management measure alternatives are intended to correlate projected total catch to the range of OYs represented by the Council's preliminary low-high range identified at the April meeting for analytical purposes. As suggested above, their 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 is implements area closures generally similar to those currently in place (no action) except for the reduction in the size of the CCA. Although projected to result in total catch of cowcod exceeding the Council-adopted OY (which is related to rebuilding targets), there is insufficient information to determine whether this will have significant adverse impacts on the marine ecosystem. 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.

3.3.3 Benefits of an Ecosystem Approach to Fishery Management

Although not a part of the proposed action, an ecosystem-based approach to managing fisheries could more effectively account for and potentially mitigate some of the adverse effects of fishing on the marine ecosystem. A truly integrated ecosystem approach might make management decisions based on accurate indices of ecosystem productivity, the needs of other predators (such as seabirds and marine mammals), and the consequences of fishing on habitat and ecological structure. Unfortunately, the data necessary to develop and adequately parameterize multispecies models are lacking for most ecosystems, including the California Current. Even with adequate data, the ability of multispecies models to make meaningful predictions regarding the consequences of decisions is limited. Although multispecies models are capable of providing insight regarding potential or likely interspecific interactions, and can provide long term (strategic) guidance regarding likely ecosystem impacts of fishing, there are still far too many unanswered basic ecological questions to expect that the ecological consequences of fishing at alternative harvest rates can be described or quantified. For example, May (1999) reminds us that even basic mechanisms responsible for density-dependent or density independent regulatory mechanisms continue to be unresolved for many populations, an issue of particular importance for rockfish, for which stock assessment models estimate a wide spectrum between strong density dependence and strong density independence. It may be that the only certainty that managers can expect is that decisions will have to continue to be made with imperfect information.

4.0 AFFECTED SPECIES

4.1 Species Description and Status

There are over 90 species of groundfish managed under the groundfish FMP. These species include over 60 species of rockfish in the family Scorpaenidae, 7 roundfish species, 12 flatfish species, assorted shark, skate, and a few miscellaneous bottom-dwelling marine fish species. Table 4-1 depicts the latitudinal and depth distributions of groundfish species managed under the groundfish FMP.

The following sections contain information on the life histories of a subset of the groundfish managed under the groundfish FMP. While reading these sections, it is important to keep in mind how certain life history traits of the species have important implications on how the stocks are sustainably managed.

In contrast to the highly variable, and often volatile, population cycles of many coastal pelagic and invertebrate populations in the California Current, many of the resident groundfish in the California Current have evolved entirely different life history approaches to coping with environmental variability. Sablefish, Dover sole, spiny dogfish and a large number of rockfish (*Sebastes* and *Sebastolobus*) species have lifespans that typically span decades, and in some extreme examples may reach ages of 100 or greater (Beamish, *et al.* 2006; Love, *et al.* 2002). Although large initial catches of many rockfish had given the impression that these stocks were also highly productive, a growing body of scientific evidence soon made it clear that many of these species were incapable of sustaining high intensity fishing pressure using modern fishing methods (Francis 1986; Gunderson 1977; Gunderson 1984; Leaman and Beamish 1984).

Among the concerns raised in some of the early research and analyses were that the large standing stocks of older individuals were simply maintaining themselves within the dynamic bounds of their ecosystem, and that the failure to consider the role of such longevity in Northeast Pacific groundfish could lead to management challenges. Factors such as extreme longevity, low natural mortality, increasing fecundity with age, and infrequent reproductive success (recruitment) were explicitly considered when initial harvest rate strategies were developed for the Council (e.g. Clark 1991). However, the paucity of data and magnitude of some of these factors as related to the low productivity of many species were not fully appreciated in many early studies, and are now known to be important considerations in developing harvest rate guidelines and management policies (Clark 2002; Dorn 2002). Consequently, harvest rates for many species have been reduced repeatedly in recent years to account for the improved knowledge regarding the overall productivity of these stocks. As new information continues to emerge regarding the significance of diverse age structures and other factors in sustaining groundfish resources (Berkeley, *et al.* 2004; Berkeley 2004; Bobko and Berkeley 2004), such information continues to be evaluated and incorporated into the stock assessment and assessment review processes that provide the scientific basis upon which management decisions are made.

Management of these groundfish species is based on principles outlined in the MSA, groundfish FMP, and National Standard Guidelines, which provide guidance on the 10 national standards in the MSA. Stock assessments are based on resource surveys, catch trends in West Coast fisheries, and other data sources. Section 6.1.4 describes, in general terms, how stock assessments are conducted and reviewed before they are applied in West Coast groundfish management.

Table 4-1. Latitudinal and depth distributions of groundfish species (adults) managed under the Pacific Coast Groundfish Fishery Management Plan. [a/] **(Page 1 of 4)**

Common name	Scientific name	Latitudinal Distribution		Depth Distribution (fm)	
		Overall	Highest Density	Overall	Highest Density
Flatfish Species					
Arrowtooth flounder	*Atheresthes stomias*	N. 34º N lat.	N. 40º N lat.	10-400	27-270
Butter sole	*Isopsetta isolepis*	N. 34º N lat.	N. 34º N lat.	0-200	0-100
Curlfin sole	*Pleuronichthys decurrens*	Coastwide	Coastwide	4-291	4-50
Dover sole	*Microstomus pacificus*	Coastwide	Coastwide	10-500	110-270
English sole	*Parophrys vetulus*	Coastwide	Coastwide	0-300	40-200
Flathead sole	*Hippoglossoides elassodon*	N. 38º N lat.	N. 40º N lat.	3-300	100-200
Pacific sanddab	*Citharichthys sordidus*	Coastwide	Coastwide	0-300	0-82
Petrale sole	*Eopsetta jordani*	Coastwide	Coastwide	10-250	160-250
Rex sole	*Glyptocephalus zachirus*	Coastwide	Coastwide	10-350	27-250
Rock sole	*Lepidopsetta bilineata*	Coastwide	N. 32º30' N.lat.	0-200	summer 10-44 winter 70-150
Sand sole	*Psettichthys melanostictus*	Coastwide	N. 33º50' N.lat.	0-100	0-44
Starry flounder	*Platichthys stellatus*	Coastwide	N. 34º20' N.lat.	0-150	0-82
Rockfish Species [b/]					
Aurora rockfish	*Sebastes aurora*	Coastwide	Coastwide	100-420	82-270
Bank rockfish	*Sebastes rufus*	S. 39º30' N.lat.	S. 39º30' N.lat.	17-135	115-140
Black rockfish	*Sebastes melanops*	N. 34º N lat.	N. 34º N lat.	0-200	0-30
Black-and-yellow rockfish	*Sebastes chrysomelas*	S. 40º N lat.	S. 40º N lat.	0-20	0-10
Blackgill rockfish	*Sebastes melanostomus*	Coastwide	S. 40º N lat.	48-420	125-300
Blue rockfish	*Sebastes mystinus*	Coastwide	Coastwide	0-300	13-21
Bocaccio [c/]	*Sebastes paucispinis*	Coastwide	S. 40º N. lat., N. 48º N. lat.	15-180	54-82
Bronzespotted rockfish	*Sebastes gilli*	S. 37º N lat.	S. 37º N lat.	41-205	110-160
Brown rockfish	*Sebastes auriculatus*	Coastwide	S. 40º N lat.	0-70	0-50
Calico rockfish	*Sebastes dallii*	S. 38º N lat.	S. 33º N lat.	10-140	33-50
California scorpionfish	*Scorpaena gutatta*	S. 37º N lat.	S. 34º27' N.lat.	0-100	0-100
Canary rockfish	*Sebastes pinniger*	Coastwide	Coastwide	27-460	50-100
Chameleon rockfish	*Sebastes phillipsi*	37º-33º N lat.	37º-33º N lat.	95-150	95-150
Chilipepper rockfish	*Sebastes goodei*	Coastwide	34º-40º N lat.	27-190	27-190
China rockfish	*Sebastes nebulosus*	N. 34º N lat.	N. 35º N lat.	0-70	2-50
Copper rockfish	*Sebastes caurinus*	Coastwide	S. 40º N lat.	0-100	0-100
Cowcod	*Sebastes levis*	S. 40º N lat.	S. 34º27' N.lat	22-270	100-130

Table 4-1. Latitudinal and depth distributions of groundfish species (adults) managed under the Pacific Coast Groundfish Fishery Management Plan (continued). [a/] **(Page 2 of 4)**

Common name	Scientific name	Latitudinal Distribution		Depth Distribution (fm)	
		Overall	Highest Density	Overall	Highest Density
Darkblotched rockfish	*Sebastes crameri*	N. 33º N lat.	N. 38º N lat.	16-300	96-220
Dusky rockfish [d/]	*Sebastes ciliatus*	N. 55º N lat.	N. 55º N lat.	0-150	0-150
Dwarf-Red rockfish	*Sebastes rufinanus*	33º N lat.	33º N lat.	>100	>100
Flag rockfish	*Sebastes rubrivinctus*	S. 38º N lat.	S. 37º N lat.	17-100	shallow
Freckled rockfish	*Sebastes lentignosus*	S. 33º N lat.	S. 33º N lat.	22-92	22-92
Gopher rockfish	*Sebastes carnatus*	S. 40º N lat.	S. 40º N lat.	0-30	0-16
Grass rockfish	*Sebastes rastrelliger*	S. 44º40' N.lat.	S. 40º N lat.	0-25	0-8
Greenblotched rockfish	*Sebastes rosenblatti*	S. 38º N lat.	S. 38º N lat.	33-217	115-130
Greenspotted rockfish	*Sebastes chlorostictus*	S. 47º N lat.	S. 40º N lat.	27-110	50-100
Greenstriped rockfish	*Sebastes elongatus*	Coastwide	Coastwide	33-220	27-136
Halfbanded rockfish	*Sebastes semicinctus*	S. 36º40' N.lat.	S. 36º40' N.lat.	32-220	32-220
Harlequin rockfish [e/]	*Sebastes variegatus*	N. 40 º N lat.	N. 51º N. lat.	38-167	38-167
Honeycomb rockfish	*Sebastes umbrosus*	S. 36º40' N.lat.	S. 34º27' N.lat.	16-65	16-38
Kelp rockfish	*Sebastes atrovirens*	S. 39º N lat.	S. 37º N lat.	0-25	3-4
Longspine thornyhead	*Sebastolobus altivelis*	Coastwide	Coastwide	167->833	320-550
Mexican rockfish	*Sebastes macdonaldi*	S. 36º20' N.lat.	S. 36º20' N.lat.	50-140	50-140
Olive rockfish	*Sebastes serranoides*	S. 41º20' N.lat.	S. 40º N lat.	0-80	0-16
Pacific ocean perch	*Sebastes alutus*	Coastwide	N. 42º N lat.	30-350	110-220
Pink rockfish	*Sebastes eos*	S. 37º N lat.	S. 35º N lat.	40-200	40-200
Pinkrose rockfish	*Sebastes simulator*	S. 34º N lat.	S. 34º N lat.	54-160	108
Puget Sound rockfish	*Sebastes emphaeus*	N. 40º N lat.	N. 40º N lat.	6-200	6-200
Pygmy rockfish	*Sebastes wilsoni*	N. 32º30' N.lat.	N. 32º30' N.lat.	17-150	17-150
Quillback rockfish	*Sebastes maliger*	N. 36º20' N.lat.	N. 40º N lat.	0-150	22-33
Redbanded rockfish	*Sebastes babcocki*	Coastwide	N. 37º N lat.	50-260	82-245
Redstripe rockfish	*Sebastes proriger*	N. 37º N lat.	N. 37º N lat.	7-190	55-190
Rosethorn rockfish	*Sebastes helvomaculatus*	Coastwide	N. 38º N lat.	65-300	55-190
Rosy rockfish	*Sebastes rosaceus*	S. 42º N lat.	S. 40º N lat.	8-70	30-58
Rougheye rockfish	*Sebastes aleutianus*	Coastwide	N. 40º N. lat.	27-400	27-250
Semaphore rockfish	*Sebastes melanosema*	S. 34º27' N.lat.	S. 34º27' N.lat.	75-100	75-100
Sharpchin rockfish	*Sebastes zacentrus*	Coastwide	Coastwide	50-175	50-175

Table 4-1. Latitudinal and depth distributions of groundfish species (adults) managed under the Pacific Coast Groundfish Fishery Management Plan (continued) [a/] (Page 3 of 4)

Common name	Scientific name	Latitudinal Distribution		Depth Distribution (fm)	
		Overall	Highest Density	Overall	Highest Density
Shortbelly rockfish	*Sebastes jordani*	Coastwide	S. 46º N lat.	50-175	50-155
Shortraker rockfish	*Sebastes borealis*	N. 39º30' N.lat.	N. 44º N lat.	110-220	110-220
Shortspine thornyhead	*Sebastolobus alascanus*	Coastwide	Coastwide	14->833	55-550
Silvergray rockfish	*Sebastes brevispinis*	Coastwide	N. 40º N lat.	17-200	55-160
Speckled rockfish	*Sebastes ovalis*	S. 38º N lat.	S. 37º N lat.	17-200	41-83
Splitnose rockfish	*Sebastes diploproa*	Coastwide	Coastwide	50-317	55-250
Squarespot rockfish	*Sebastes hopkinsi*	S. 38º N lat.	S. 36º N lat.	10-100	10-100
Starry rockfish	*Sebastes constellatus*	S. 38º N lat.	S. 37º N lat.	13-150	13-150
Stripetail rockfish	*Sebastes saxicola*	Coastwide	Coastwide	5-230	5-190
Swordspine rockfish	*Sebastes ensifer*	S. 38º N lat.	S. 38º N lat.	38-237	38-237
Tiger rockfish	*Sebastes nigrocinctus*	N. 35º N lat.	N. 35º N lat.	30-170	35-170
Treefish	*Sebastes serriceps*	S. 38º N lat.	S. 34º27' N.lat.	0-25	3-16
Vermilion rockfish	*Sebastes miniatus*	Coastwide	Coastwide	0-150	4-130
Widow rockfish	*Sebastes entomelas*	Coastwide	N. 37º N lat.	13-200	55-160
Yelloweye rockfish	*Sebastes ruberrimus*	Coastwide	N. 36º N lat.	25-300	27-220
Yellowmouth rockfish	*Sebastes reedi*	N. 40º N lat.	N. 40º N lat.	77-200	150-200
Yellowtail rockfish	*Sebastes flavidus*	Coastwide	N. 37º N lat.	27-300	27-160
Roundfish Species					
Cabezon	*Scorpaenichthys marmoratus*	Coastwide	Coastwide	0-42	0-27
Kelp greenling	*Hexagrammos decagrammus*	Coastwide	N. 40º N lat.	0-25	0-10
Lingcod	*Ophiodon elongatus*	Coastwide	Coastwide	0-233	0-40
Pacific cod	*Gadus macrocephalus*	N. 34º N lat.	N. 40º N lat.	7-300	27-160
Pacific whiting	*Merluccius productus*	Coastwide	Coastwide	20-500	27-270
Sablefish	*Anoplopoma fimbria*	Coastwide	Coastwide	27->1,000	110-550
Shark and Skate Species					
Big skate	*Raja binoculata*	Coastwide	S. 46º N lat.	2-110	27-110
California skate	*Raja inornata*	Coastwide	S. 39º N lat.	0-367	0-10
Leopard shark	*Triakis semifasciata*	S. 46º N lat.	S. 46º N lat.	0-50	0-2
Longnose skate	*Raja rhina*	Coastwide	N. 46º N lat.	30-410	30-340
Soupfin shark	*Galeorhinus zyopterus*	Coastwide	Coastwide	0-225	0-225
Spiny dogfish	*Squalus acanthias*	Coastwide	Coastwide	0->640	0-190

Table 4-1. Latitudinal and depth distributions of groundfish species (adults) managed under the Pacific Coast Groundfish Fishery Management Plan (continued). [a/] **(Page 4 of 4)**

Common name	Scientific name	Latitudinal Distribution		Depth Distribution (fm)	
		Overall	Highest Density	Overall	Highest Density
Other Species					
Finescale codling	*Antimora microlepis*	Coastwide	N. 38° N lat.	190-1,588	190-470
Pacific rattail	*Coryphaenoides acrolepis*	Coastwide	N. 38° N lat. Coastwide	85-1,350	500-1,350
Ratfish	Hydrolagus colliei	Coastwide	Coastwide	0-499	55-82

a/ Data from (Casillas, *et al.* 1998), (Eschmeyer, *et al.* 1983), (Hart 1988), (Miller and Lea 1972), (Love, *et al.* 2002), and NMFS survey data. Depth distributions refer to offshore distributions, not vertical distributions in the water column.

b/ The category “rockfish” includes all genera and species of the family Scorpaenidae, even if not listed, that occur in the Washington, Oregon, and California area.

c/ Only the southern stock of bocaccio south of 40⇌10' N. lat. is listed as depleted.

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

e/ Only two occurrences of harlequin rockfish south of 51⇌ N. lat. (off Newport, OR and La Push, WA; (Casillas, *et al.* 1998)).

The passage of the Sustainable Fisheries Act in 1996 incorporated the current conservation and rebuilding mandates into the MSA. These mandates—including abundance-based standard reference points for declaring the status of a stock (depleted; in a “precautionary” status; or at levels that can support MSY (healthy or “rebuilt”))—were subsequently incorporated in the groundfish FMP with adoption of Amendments 11 and 12. These reference points are determined relative to an estimate of “virgin” or unexploited spawning biomass of the stock, denoted as $SB_{0,}$ which is defined as the average equilibrium abundance of a stock’s spawning biomass before it is affected by fishing-related mortality.[18] SB_0 is then used to estimate MSY, as identified in the MSA and National Standard Guidelines. MSY represents a theoretical maximum surplus production from a population of constant size; National Standard Guidelines define it as “the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions.” For a given population and set of ecological conditions, there is a biomass that produces MSY (denoted as B_{MSY}), which is less than the equilibrium size in the absence of fishing (B_0). (Generally, population sizes above B_{MSY} are assumed to be less productive, because of competition for resources or other density dependent factors.) The harvest rate used to achieve or sustain B_{MSY} is referred to as the Maximum Fishing Mortality Threshold (MFMT, denoted as F_{MSY}). Two harvest specification reference points, defined in the groundfish FMP, provide guidance in setting the harvest rate: a total catch OY and an ABC. The Council identifies the OY as the management target for each species or species complex. When the stock biomass is determined to be lower than $B_{MSY,}$ the OY is set to less than the ABC in order to rebuild the stock to a healthy level (see the following discussion). The ABC, which is the maximum allowable

[18] The current abundance of a stock relative to its unfished level is commonly written as a percentage or a proportion; this value represents the stock’s depletion level. In addition to using a comparison between current spawning biomass and unfished spawning biomass to determine this reference point, some stock assessment authors compare current and unfished levels of spawning output or of total stock biomass (B), depending on the information that is available.

harvest, is calculated by applying an estimated or proxy F_{MSY} harvest rate to the estimated abundance of the exploitable stock.

The biomass level that produces MSY (i.e. B_{MSY}) is generally unknown and assumed to be variable over time due to long-term fluctuations in ocean conditions, so that no single value is appropriate. Furthermore, F_{MSY} is tightly linked to an assumed level of density dependence in recruitment, and there is insufficient information to determine that level for many West Coast groundfish stocks. Therefore, the use of approximations or proxies is necessary; absent of a more accurate determination of $F_{MSY,}$ the Council applies default MSY proxies. The Council-specified proxy MSY abundance for most West Coast groundfish species is 40 percent of B_0 (denoted as $B_{40\%}$), meaning that the Council adopts management actions aimed to maintain abundance of each stock at or above approximately 40 percent of its virgin biomass. The Council-specified threshold for declaring a stock depleted or depleted is when the stock's spawning biomass declines to less than 25 percent of B_0 (denoted as $B_{25\%}$). The MSA and National Standard Guidelines refer to this threshold as the Minimum Stock Size Threshold or MSST. A rebuilding plan that specifies how total fishing-related mortality is constrained to achieve an MSY abundance level within the legally allowed time is required by the MSA and groundfish FMP when a stock is declared depleted.

Stocks estimated to be above the depletion threshold, yet below an abundance level that supports MSY, are considered to be in the "precautionary zone." The Council has specified precautionary reductions in harvest rate for such stocks in order to increase abundance to $B_{40\%}$. The methodology for determining this precautionary reduction is described in the groundfish FMP and is referred to as the 40–10 adjustment. As the stock declines below $B_{40\%}$, the total catch OY is reduced from the ABC until, at 10 percent of B_0, the OY is set to zero. However, in practice the 40-10 adjustment only applies to stocks above $B_{25\%}$ (the MSST) because once a stock falls below this level, an adopted rebuilding plan supplants it. Most stocks with an estimated abundance greater than $B_{40\%}$ are managed by setting harvest to the ABC. Figure 4-1 presents this framework graphically.

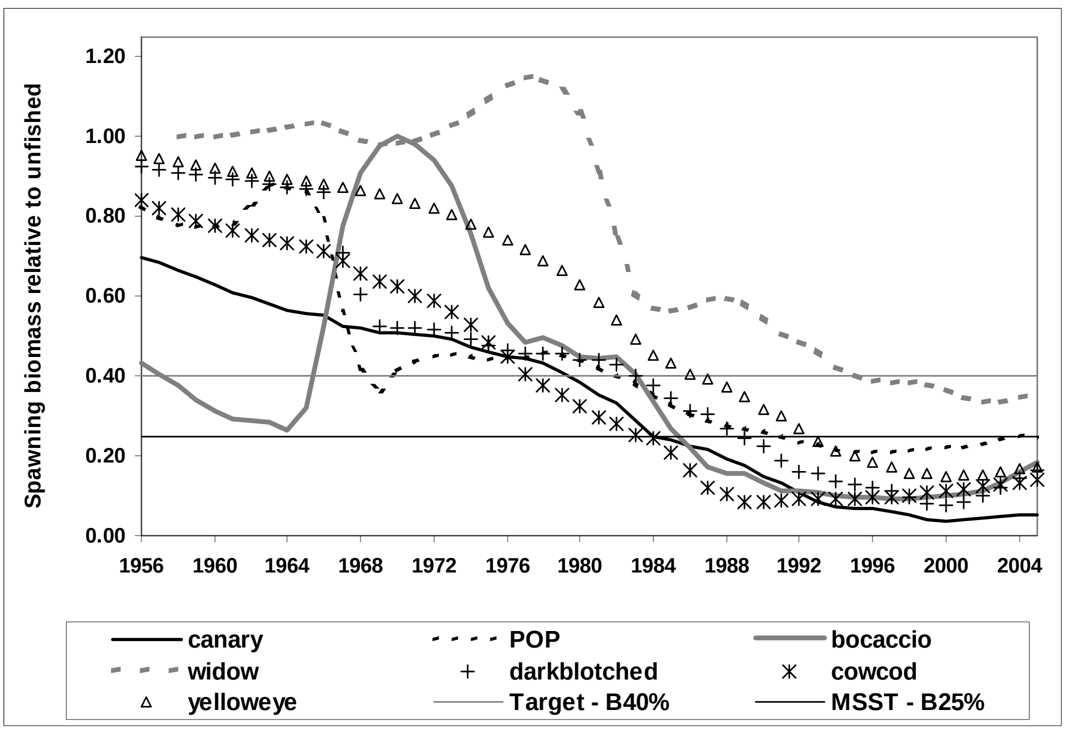


Figure 4-1. Relative depletion trends for rebuilding rockfish species

Sections 4.1.1, 4.1.2 and 4.1.3 describe groundfish stocks according to the categories just described: depleted, precautionary zone, and healthy. However, it is important to realize that of the more than 90 species in the management unit, only a portion is individually managed. Thus, the remaining species are managed and accounted for in groupings or stock complexes (discussed in Section 4.1.4) because individually they comprise a small part of the landed catch and insufficient information exists to develop the stock assessments necessary to set an OY based on yield estimates. (The groundfish FMP identifies the OY for these species as an average of historical catch, based on the assumption that this is below MSY.)

Twenty-three stock assessments were performed in the 2005 stock assessment cycle, and two of these assessments (Pacific whiting, *Merluccius productus* and yelloweye rockfish, *Sebastes ruberrimus*) were redone in early 2006. One assessment, that for vermilion rockfish (*Sebastes miniatus*), was not accepted by the Scientific and Statistical Committee (SSC) as being suitable for the provision of quantitative management advice. Table 4-2 presents a summary of the results of the twenty-two assessments that were accepted as being suitable bases for management, including depletion (the estimated spawning biomass or output relative to the unfished condition), and the associated current and unfished spawning biomass, recent trends in abundance, and the estimated catch level at MSY. Table 4-3 lists life history parameters from the twenty-two stock assessments; steepness of the spawner-recruitment curve (h), the von Bertalanffy Equation growth constant (k), and natural mortality (M) are each important contributors to the understanding of the productivity and resiliency of a species.

Complimentary to this overview, Table 4-4 provides a general overview of the data that were available for each of these assessments, including a qualitative description of the extent to which assessments might be considered data-rich or data-poor, and the estimated or assumed value used in the stock assessment for the steepness of the spawner/recruit curve (generally an indicator of the productivity of the stock). Of these full assessments, only 14 of the 23 conducted in 2005 and 2006 had what might be considered moderate to good information (although these are generally the species that account for the vast majority of groundfish catches in the California Current). In general, stock assessments for nearshore species tend to lack fishery-independent trend information, and rely primarily on catch per unit effort (CPUE) data and demographic data from recreational fisheries. By contrast, assessments for most shelf and slope species are informed by fisheries independent surveys and demographic information from commercial fisheries, and as such tend to be more data rich than those for nearshore species. Although fishery-dependent CPUE data exist for many commercial groundfish species, for most species such series have been truncated to the period prior to 2000, as a result of the difficulties interpreting catch rates given marked changes in management measures for West Coast fisheries in recent years.

Table 4-2. Summary results from twenty-two stock assessments adopted by the Council in 2005 and 2006.

Species (base models)	Depletion	Average annual % change in SSB		2005 Spawning Biomass	2005 Total Biomass	Unfished Spawning Biomass	Unfished Total Biomass	Spawning Biomass at MSY	Harvest Rate at MSY	MSY	MSY Basis
		2000-2005	1995-2000								
Blackgill rockfish	0.52	0.1	0.2	4977	13051	9503	21558	3799	0.029	223	F50%
Bocaccio rockfish	0.11	12.7	1.2	1430	8561	13402	69924	5361	0.0632	1768	F50%
Cabezon (N+S)	0.38	3.7	2.2	516	922	1361	2291	522	0.13	145	F45%
California scorpionfish	0.80	5.3	3.9	816	1866	1024	2007	259	0.161	127	Estimated
Canary rockfish (blended)	0.09	7.2	-11.2	3211	*7438*	34155	*90941*	N/A	N/A	N/A	Estimated
Cowcod	0.17	4.3	4.0	542	593	3191	3045	N/A	0.033	N/A	N/A
Darkblotched rockfish	0.17	16.2	-9.4	4447	10717	26650	28286	10660	0.038	650	F50%
Dover sole	0.63	5.3	3.7	188987	423049	299054	614545	117281	0.0672	16505	F40%
English sole	0.91	12.4	14.4	31379	56134	34312	63642	5696	0.231	4080	Estimated
Gopher rockfish	0.97	-3.3	11.6	1931	2385	1995	2440	798	0.103	101	F50%
Lingcod (N+S)	0.64	24.8	13.1	N/A	34017	N/A	52850	N/A	N/A	N/A	N/A
Longspine thornyhead	0.71	-0.6	-2.3	75049	162642	105157	228275	28305	0.055	3687	F50%
Kelp greenling (OR)	0.49	-8.9	-4.0	157	597	321	1295	123	0.125	82	F45%
Pacific whiting a/	0.31	11.2	-9.8	1178000	2500000	3810000	7832000	1060000	N/A	574000	F40%
Pacific ocean perch	0.23	2.4	0.9	8846	22440	37838	83218	15135	0.0324	1181	F50%
Petrale sole (N+S)	0.31	23.1	8.1	9628	23056	31367	54085	6779	0.13	3164	Estimated
Sablefish	0.34	0.3	-3.0	75070	23255	218860	723474	87544	0.05	2784	F50%
Shortspine thornyhead	0.63	0.0	-0.6	82151	144513	130646	230500	52258	0.0184	1720	F50%
Starry flounder (N+S)	0.50	-8.9	0.7	3566	8901	7158	17956	2864	0.169	1214	F40%
Widow rockfish	0.31	-1.1	-1.8	15444	93685	49678	230505	19871	N/A	N/A	F50%
Yelloweye rockfish	0.17	3.2	-6.6	573	1579	3322	7616	1329	0.024	N/A	F50%
Yellowtail rockfish (3 area)	0.55	-1.0	2.3	16915	74217	31016	120024	15508	0.0863	4680	F50%

a/ Pacific whiting values refer to those from the base (q=1) model in the 2006 assessment, based on carrying forward the life history parameters estimated at the end of the modeling period. An equally plausible model in which q was estimated had results that would generally be scaled upwards.

Table 4-3. Summary of life history parameters identified in the twenty-two stock assessments adopted by the Council in 2005 and 2006.

Species	Steepness of spawner recruit curve (h)		von Bertalanffy Equation growth constant (k)		Natural Mortality (M)	
			Females	Males	Females	Males
Blackgill rockfish	0.65	Fixed	0.068	0.04	0.4	0.4
Bocaccio rockfish	0.21	Estimated	0.19	0.21	0.15	0.15
Cabezon	0.70	Fixed	0.20	0.20	0.25	0.3
California scorpionfish	0.70	Fixed	0.13	0.120	0.25	0.25
Canary rockfish	0.40	Estimated	0.14	0.175	0.06 (young) 0.09 (old)	0.06
Cowcod	0.50	Fixed	0.06	0.06	0.055	0.055
Darkblotched rockfish	0.95	Fixed	0.2	0.25	0.07	0.07
Dover sole	0.80	Fixed	0.1189	0.0732	0.09	0.09
English sole	0.83	Estimated	0.23-0.40 a/	0.28-0.48 a/	0.26	0.26
Gopher rockfish	0.65	Fixed	0.186	0.186	0.2	0.2
Lingcod	0.90	Fixed	LCN: 0.104 LCS: 0.145	LCN: 0.149 LCS: 0.223	0.18	0.32
Longspine thornyhead	0.75	Fixed	0.064	0.064	0.06	0.06
Kelp greenling	0.70	Fixed	0.30 c/	.40 c/	0.26	0.26
Pacific whiting	0.75	Fixed	0.33	0.33	0.23	0.23
Pacific Ocean perch	0.55	Estimated	N/A b/	N/A b/	0.051	0.051
Petrale sole	0.72 - 0.88		0.08	0.08	0.2	0.2
Sablefish	0.34	Prior	0.246	0.298	0.07	0.07
Shortspine thornyhead	0.60	Fixed	0.018	0.018	0.05	0.05
Starry flounder	0.80	Fixed	0.251	0.426	0.3	0.45
Widow rockfish	0.28	Estimated	North: 0.14 South: 0.2	North: 0.18 South: 0.25	0.125	0.125
Yelloweye rockfish	0.44	Fixed	0.0664	0.0664	0.036	0.036
Yellowtail rockfish	N/A		F: 0.07-0.23	0.08-0.25 (est.)	0.11 - 0.28	0.11

a/ The base case model allowed growth for each sex to differ between blocks of time, based on freely estimating the K parameter.

b/ Size at age was determined using an empirical matrix rather than a von Bertalanffy curve, so no value of k was set.

c/ Values are for the Oregon substock analysis of the kelp greenling assessment, as the CA substock analysis was not adopted for management by the Council.

d/ 0.11 for ages 4-6; increases linearly to estimated max M (0.16-0.28) at age 25

Table 4-4. Overview of the primary data sources available for each of the 22 stock assessments adopted by the Council in 2005–2006.

Species	General data quality and consistency a/	Commercial fishery data				Recreational fishery data				Fishery independent surveys			
		cpue index	latest year	age comps	length comps	index used	last year	age comps	length comps	trawl survey	age comps b/	length comps	other surveys c/
Blackgill rockfish	poor	no		no	yes	no		no	no	shelf/slope	no	yes	
Bocaccio rockfish	good	no		no	yes	yes	2003	no	yes	shelf	no	yes	larval
Cabezon	moderate	no		no	yes	yes	2003	no	yes	no	n/a	n/a	larval
California scorpionfish	moderate	no		no	yes	yes	2003	no	yes	LA san.	n/a	n/a	pre-rec
Canary rockfish	good	yes	1996	yes	yes	yes	1998	yes	yes	shelf	yes	yes	
Cowcod	poor	no		no	no	yes	2000	no	no	no	n/a	n/a	submersible
Darkblotched rockfish	moderate	no		yes	yes	no		no	no	shelf/slope	yes	yes	
Dover sole	good	yes	1995	yes	yes	no		no	no	shelf/slope	yes	yes	
English sole	good	no		yes	yes	no		no	no	shelf	yes	yes	
Gopher rockfish	poor	no		no	yes	yes	2004	no	yes	no	n/a	n/a	
Lingcod	good	yes	1997	yes	yes	no		yes	yes	shelf	yes	yes	
Longspine thornyhead	moderate-poor	no		no	yes	no		no	no	slope	no	yes	
Kelp greenling	poor	no		no	yes	yes	2002	no	yes	no	n/a	n/a	
Pacific whiting	good	no		yes	yes	no		no	no	shelf	yes	yes	acoustic, rec
Pacific ocean perch	good	yes	1974	yes	yes	no		no	no	shelf/slope	yes	yes	
Petrale sole	moderate	yes	1999	yes	yes	no		no	no	shelf	no	yes	
Sablefish	good	yes	1988	yes	yes	no		no	no	shelf/slope	yes	yes	pot
Shortspine thornyhead	moderate-poor	no		no	yes	no		no	no	shelf/slope	no	yes	
Starry flounder	poor	yes	2004	no		no		no	yes	no	n/a	n/a	pre-rec
Widow rockfish	moderate	yes	1999	yes	yes	no		no	no	shelf	no	no	pre-rec
Yelloweye rockfish	poor	no		yes	yes	yes	2000	yes	yes	no	no	no	
Yellowtail rockfish	good	yes	1999	yes	yes	no		no	no	shelf	yes	yes	

a/ This refers solely to the richness of data and the internal consistency of the data within the assessment, as interpreted subjectively from the assessments, STAR Panel reports, SSC reports, and GMT discussions; in no way is this intended to be a reflection of the abilities of assessment authors or teams

b/ The use of age composition data infers that sufficient age data were available to be used to tune the age composition of the modeled population, this does not include age data used to fit growth curves or estimate natural mortality rates

c/ Larval surveys refer to indices of larval abundance from California Cooperative Oceanic Fisheries Investigations (CalCOFI) plankton surveys, generally used as a relative index of spawning biomass, pre recruit surveys are from the Southwest Fisheries Science Center's juvenile rockfish survey or other sources, and submersible surveys refer to biomass estimates derived from visual observations.

4.1.1 Depleted Groundfish Species

4.1.1.1 Bocaccio

Distribution and Life History

Bocaccio (*Sebastes paucispinis*) is a rockfish species that ranges from Krozoff and Kodiak Islands in the Gulf of Alaska to central Baja California, Mexico (Hart 1988; Miller and Lea 1972). Love, et al. (2002) and Thomas and MacCall (2001) describe bocaccio distribution and life history. Bocaccio are historically most abundant in waters off central and southern California. The southern bocaccio stock is most prevalent at the 54-82 fm depth zone (Casillas, *et al.* 1998).

Bocaccio are found in a wide variety of habitats, often on or near bottom features, but sometimes over muddy bottoms. They are found both nearshore and offshore (Sakuma and Ralston 1995). Larvae and small juveniles are pelagic (Garrison and Miller 1982) and are commonly found in the upper 100 m of the water column, often far from shore (MBC 1987). Large juveniles and adults are semi-demersal and are most often found in shallow coastal waters over rocky bottoms associated with algae (Sakuma and Ralston 1995). Adults are commonly found in eelgrass beds, or congregated around floating kelp beds (Love, *et al.* 1990; Sakuma and Ralston 1995). Young and adult bocaccio also occur around artificial structures, such as piers and oil platforms (MBC 1987). Although juveniles and adults are usually found around vertical relief, adult aggregations also occur over firm sand-mud bottoms (MBC 1987). Bocaccio move into shallow waters during their first year of life (Hart 1988), then move into deeper water with increased size and age (Garrison and Miller 1982).

Bocaccio are ovoviviparous (live young are produced from eggs that hatch within the female's body) (Garrison and Miller 1982; Hart 1988). Love et al. (1990) reported the spawning season to last nearly an entire year (>10 months). Parturition occurs during January to April off Washington, November to March off Northern and Central California, and October to March off Southern California (MBC 1987). Fecundity ranges from 20,000 to 2,300,000 eggs. In California, two or more broods may be born per year (Love, *et al.* 1990). The spawning season is not well known in northern waters. Males mature at three to seven years, with about half maturing in four to five years. Females mature at three to eight years, with about half maturing in four to six years (MBC 1987).

Maximum age of bocaccio was radiometrically determined to be at least 40 years, and perhaps more than 50 years. Bocaccio are difficult to age, and stock assessments used length measurement data and growth curves to estimate the age composition of the stock. Although recent assessments have described the true natural mortality rate as a key unknown for estimating stock status, recent assessments have used a value of 0.15 (which is associated with an 86 percent adult annual survival rate in the absence of fishing mortality).

Larval bocaccio eat diatoms, dinoflagellates, tintinnids, and cladocerans (Sumida and Moser 1984). Copepods and euphausiids of all life stages (adults, nauplii and egg masses) are common prey for juveniles (Sumida and Moser 1984). Both Phillips (1964) and Love et al. (2002) described bocaccio rockfish as almost exclusively piscivorous, and include other rockfish, Pacific whiting, sablefish, anchovy, mesopelagic fishes and squid as the key prey for large juvenile and adult bocaccio. Bocaccio are eaten by sharks, salmon, other rockfishes, lingcod, albacore, sea lions, porpoises, and whales (MBC 1987). Adult bocaccio are often caught with chilipepper rockfish and have been observed schooling with speckled, vermilion, widow, and yellowtail rockfish (Love, *et al.* 2002). As pelagic juveniles, they may compete with chilipepper, widow, yellowtail, shortbelly and other pelagic juvenile rockfishes for both food and habitat (Reilly, *et al.* 1992).

Stock Status and Management History

There are two separate West Coast bocaccio populations. The southern stock exists south of Cape Mendocino and the northern stock north of 48° N latitude in northern Washington (off Cape Flattery). It is unclear whether this stock separation implies stock structure. The distribution of the two populations and evidence of lack of genetic intermixing suggests stock structure, although MacCall (2002b) sees some recent evidence for limited genetic mixing of the two populations. Nonetheless, assessment scientists and managers have treated the two populations as independent stocks north and south of Cape Mendocino. The northern stock of bocaccio has not been assessed.

Bocaccio have long been an important component of California rockfish fisheries. Catches increased to high levels in the 1970s and early 1980s as relatively strong year-classes recruited to the stock. The Council began to recommend increasingly restrictive regulations after an assessment of the southern stock in 1990 (Bence and Hightower 1990) indicated that fishing rates were too high. The southern stock suffered poor recruitment during the warm water conditions that prevailed off Southern California beginning in the late 1980s. The 1996 assessment (Ralston, *et al.* 1996b) indicated the stock was in severe decline. NMFS formally declared the stock depleted in March 1999 after the groundfish FMP was amended to incorporate the tenets of the Sustainable Fisheries Act. MacCall et al. (1999) confirmed the depleted status of bocaccio and estimated spawning output of the southern stock to be 2.1 percent of its unfished biomass.

While previous assessments only used data from central and northern California, the assessment in 2002 (MacCall and He 2002) also included data for southern California. Although relative abundance increased slightly from the previous assessment (4.8 percent of unfished biomass), potential productivity (as evidenced from the steepness of the spawner/recruit relationship, which reflects the level of compensatory production at low stock sizes) appeared lower than previously thought, making for a more pessimistic outlook. Furthermore, the 2002 assessment revealed that although the 1999 year class was the strongest in several years, it was weak relative to the range of possibilities considered in the 1999 assessment.

The 2003 bocaccio assessment differed greatly from the 2002 assessment. It was affected by additional CalCOFI data that suggested an increasing abundance trend, more complete understanding of the 1999 year class and by a revised (lower) estimate of the natural mortality rate (MacCall 2003b). The results of these calculations suggested that recreational CPUE had increased dramatically in recent years and was at a record high level in central California north of Pt. Conception. The STAR Panel recommended the use of two assessment models as a means of bracketing uncertainty from the very different signals between the Triennial Survey and the recreational CPUE data. Following the STAR Panel meeting, MacCall presented a third “hybrid” model (STATc) that incorporated the data from all of the indices. The SSC recommended and the Council approved the use of this third modeling approach. This resulted in modest improvement in estimated stock size, but significantly affected the estimated productivity of the stock. These results had substantial effects on the rebuilding outlook for bocaccio, which, under the 2002 assessment, was not expected to rebuild within T_{MAX} even with no fishing related mortality. Total mortality in 2003 fisheries was restricted to less than 20 mt as a means of conserving the stock while minimizing adverse socioeconomic impacts to communities. The 2003 rebuilding analysis (MacCall 2003a), using the “hybrid” model, suggested the stock could rebuild to B_{MSY} within 25 years while sustaining an OY of approximately 300 mt in 2004.

The 2003 assessment was updated in 2005 (MacCall 2006b). The assessment used the original Stock Synthesis model (SS1), and did not develop an equivalent new Stock Synthesis 2 (SS2) version of the assessment. In addition to new length frequency data, new data points were included from both the triennial survey and the CALCOFI larval abundance index, both of which suggested an increasing upwards trajectory for the stock. The updated base-case (STATc) model forecasts a slow increase in biomass (spawning output), with depletion (current spawning output divided by unfished spawning output) increasing from a current value of 10.7 percent to approximately 20 percent over the coming decade. The estimated 2005 total biomass (age1+) was 8,561 mt. The 2004 exploitation rate of 0.0103 was well below the maximum fishing mortality threshold (F_{MSY}). The 2003 OY was set at 20 mt and the retained catch was about 12 mt. Including mortality of estimated discards, estimated total catch was 22 mt. The 2004 OY was set at 199 mt, but due to constraints of co-occurring depleted stocks, realized catch was 78 mt. Thus, recent management has shown substantial improvement in performance.

A bocaccio rebuilding plan was adopted by the Council at its April 2004 and submitted for incorporation in the groundfish FMP under Amendment 16-3. The rebuilding plan established a target rebuilding year of 2023 and the harvest control rule of F = 0.0498 (with a P_{MAX} of 70 percent). (It was later clarified in the 2005 Rebuilding Analysis (MacCall 2006a) that the target rebuilding year had been incorrectly stated in the rebuilding plan to be 2023; since the 2003 rebuilding analysis indicated that a 50 percent probability rebuilding would require 23 years, and that this assumed a beginning date of 2004 (the first simulated year), the correct value of T_{targ} is 2027.) Revision to the bocaccio rebuilding plan is under consideration by the Council and such changes to the groundfish FMP would be enacted through Amendment 16-4; the analysis of the action is a purpose of this EIS.

4.1.1.2 Canary Rockfish

Distribution and Life History

Canary rockfish (*Sebastes pinniger*) range from northern Baja California, Mexico, to southeastern Alaska (Boehlert and Kappenman 1980; Hart 1988; Love 1991; Miller and Geibel 1973; Richardson and Laroche 1979). There is a major population concentration of canary rockfish off Oregon (Richardson and Laroche 1979). Canary rockfish primarily inhabit waters 91 m to 183 m (50 fm to 100 fm) deep (Boehlert and Kappenman 1980). In general, they inhabit shallow water when they are young, and deep water as adults (Mason 1995). Adult canary rockfish are associated with pinnacles and sharp drop-offs (Love, *et al.* 1991) and are most abundant above hard bottoms (Boehlert and Kappenman 1980). In the southern part of their range, canary rockfish appear to be associated with reefs (Boehlert 1980). In Central California, newly settled canary rockfish are first observed at the seaward sand-rock interface and farther seaward in deeper water (18 m to 24 m).

Canary rockfish off the West Coast exhibit a protracted spawning period from September through March, probably peaking in December and January off Washington and Oregon (Hart 1988; Johnson, *et al.* 1982). Female canary rockfish reach sexual maturity at roughly eight years of age. Like many members of Sebastes, canary rockfish are ovoviviparous, whereby eggs are internally fertilized within females, and hatched eggs are released as live young (Bond 1979; Golden and Demory 1984; Kendall, Jr. and Lenarz 1986). Canary rockfish are a relatively fecund species, with egg production being correlated with size (e.g., a 49-cm female can produce roughly 0.8 million eggs, and a female that has realized maximum length (approximately 60 cm) produces approximately 1.5 million eggs (Gunderson 1971)).

Very little is known about the early life history strategies of canary rockfish. The limited research that has been conducted indicates that larvae are strictly pelagic (near the ocean surface) for a short period of time and begin to migrate to demersal waters during the summer of their first year of life. Larvae develop into juveniles around nearshore rocky reefs, where they may congregate for up to three years (Boehlert 1980; Sampson 1996). Evaluations of length distributions by depth demonstrate an increasing trend in mean size of fish with depth (Methot and Stewart 2006). Since 1990, stock assessments have assumed a base natural mortality rate of 0.06 (94 percent adult annual survival when there is no fishing mortality). Due to the rarity of old females in both survey and catch data, female canary rockfish have long been assumed to have increasing natural mortality rates with age (Golden and Wood 1990).

Little is known about ecological relationships between canary rockfish and other organisms. Adult canary rockfish are often caught with bocaccio, sharpchin, yelloweye, and yellowtail rockfishes, and lingcod. Researchers have also observed canary rockfish associated with silvergray and widow rockfish. Young-of-the-year feed on copepods, amphipods, and young stages of euphausiids. Adult canary rockfish feed primarily on euphausiids, as well as pelagic shrimp, cephalopods, mesopelagic fishes and other prey (Brodeur and Percy 1984; Lee 2002; Phillips 1964). Small canary rockfish are consumed by seabirds, Chinook salmon, lingcod, and marine mammals.

Stock Status and Management History

Canary rockfish have long been an important component of rockfish fisheries. The Council began to recommend increasingly restrictive regulations after an assessment in 1994 (Sampson and Stewart 1994) indicated that fishing rates were too high. In hindsight, work has estimated that the abundance of the canary rockfish stock dropped below $B_{40\%}$ (an abundance level used as a proxy for MSY) in about 1980, at which time the annual catch was more than double the current estimate of the MSY level. Harvest rates in excess of the current fishing mortality target for rockfish ($SPR_{50\%}$) is estimated to have begun in the late 1970s and persisted through 1999. Recent management actions appear to have curtailed the rate of removal such that overfishing has not occurred since 1999, and recent SPR values are in excess of 90 percent.

A 1999 stock assessment showed the stock had declined below the depleted level ($B_{25\%}$) in the northern area (Columbia and U.S. Vancouver management areas), (Crone, *et al.* 1999) and in the southern area (Conception, Monterey, and Eureka areas) (Williams, *et al.* 1999). The stock was declared depleted in January 2000. The first rebuilding analysis (Methot 2000) used results from the northern area assessment to project rates of potential stock recovery. The stock was found to have extremely low productivity, defined as production of recruits in excess of the level necessary to maintain the stock at its current, low level. Rates of recovery were highly dependent upon the level of recent recruitment, which could not be estimated with high certainty. The initial rebuilding OY for 2001 and 2002 was set at 93 mt based upon a 50 percent probability of rebuilding by the year 2057, a medium level for these recent recruitments, and maintaining a constant annual catch of 93 mt through 2002.

In 2002, a coastwide assessment of canary rockfish was conducted (Methot and Piner 2002), treating the stock as a single unit from the Monterey management area north through the U.S. Vancouver area. This was a departure from the methodologies of past assessments. Although there is some evidence of genetic separation of the northern and southern stocks (Boehlert and Kappenman 1980; Wishard, *et al.* 1980), the observed variability in growth rate by sex and area was not significantly different at small versus large spatial scales.

A critical uncertainty in past and current canary rockfish assessments is the lack of older, mature females in surveys and other assessment indices. There are two competing explanations for this observation. Older females could have a higher natural mortality rate, resulting in their disproportionate disappearance from the population. Alternatively, survey and fishing gears may be less effective at catching them, perhaps because older females are associated with habitat inaccessible to most trawl gear. If this is the case, then these fish (which, because of their higher spawning output, may make an important contribution to future recruitment) are part of the population, but remain poorly sampled. The most recent assessment assumed a linear increase in female natural mortality from 0.06 at age 6 to approximately 0.09 at age 14 (Methot and Stewart 2006). . The 2005 assessment was based on two equally plausible assessment models (as recommended by the SSC); one with differential male and female gear selectivities and one without gender-specific selectivities. The approved canary rockfish rebuilding analysis blended the two models by alternately re-sampling between the two input parameter sets. Both laboratory-based physiological studies and habitat-specific studies of the distribution of older male and female canary rockfish could better inform managers of the significance of these patterns and assumptions.

A full canary rockfish assessment was done in 2005 (Methot and Stewart 2006). As explained above, the assessment was based on two equally plausible models. In the base model (differential male-female selectivity) SB_0 is estimated to be 34,798 mt, resulting in a depletion level of 5.7 percent. In the alternate model (no difference in selectivity) SB_0 is estimated to be 33,872 mt, with a depletion level of 11.3 percent. The steepness of the spawner-recruitment relationship, which largely determines the rate of increase in recruitment as the stock rebuilds, was estimated to be 0.33 in the base model, and 0.45 in the alternate model,

A new rebuilding analysis was also completed in 2005 (Methot 2006). Using the integrated ("blended") model explained above, the analysis estimated SB_0 to be 34,155 mt of female spawning biomass at the beginning of 2005 (corresponding to a depletion level of 9.4 percent). In this analysis, it was noted that following the constant harvest rate established under the canary rockfish rebuilding plan would produce an OY of 43 mt in 2007 and has a 57.4 percent probability of rebuilding by the current Ttarget (2074) and a 58.5 percent probability of rebuilding by the current Tmax (2076). The new structure of the analysis allowed for the incorporation of three sources of uncertainty, rather than one; the result of this is that it would take a large change in the constant harvest rate harvest rate (and short-term OY) to make a large change in the probability of rebuilding. For example, the harvest rate that would produce a 50 percent probability of rebuilding by the target rebuilding year (2074) is twice the level that would produce a 60 percent probability of rebuilding by T_{max} (2076).

A canary rockfish rebuilding plan was adopted by the Council in June 2003 and submitted for incorporation in the groundfish FMP under Amendment 16-2. The rebuilding plan established a target rebuilding year of 2074 and the harvest control rule of F = 0.022 (with a P_{MAX} of 60 percent). Revision to the canary rockfish rebuilding plan is under consideration by the Council and such changes to the groundfish FMP would be enacted through Amendment 16-4; the analysis of the action is a purpose of this EIS.

4.1.1.3 Cowcod

Distribution and Life History

Relatively little is known about cowcod (*Sebastes levis*), a species of large rockfish that ranges from Ranger Bank and Guadalupe Island in central Baja California to Usal, Mendocino County, California (Miller and Lea 1972), and may infrequently occur as far north as Newport, Oregon.

Love et al. (2002) and Barnes (2001) described cowcod distribution and life history. Cowcod are most abundant in waters off central and southern California. They range from 22-491 m in depth and are considered to be parademersal (transitional between a midwater pelagic and benthic species). Adults are commonly found at depths of 180 m to 235 m and juveniles are most often found in 30 m to 149 m of water (Love, *et al.* 1990).

MacGregor (1986) found that larval cowcod are almost exclusively found in Southern California and may occur many miles offshore. Cowcod have always been among the rarest of *Sebastes* species larvae identifiable to species in the southern California Bight (the core CalCOFI survey area), with estimates of abundance as much as two orders of magnitude less than more abundant species (Moser, *et al.* 2000). Juveniles occur over sandy bottom areas, and solitary ones have been observed resting within a few centimeters of soft-bottom areas where gravel or other low relief was found (Allen 1982). Young-of-the-year have been observed on fine sand and clay sediment as well as oil platform shell mounds and other complex bottom features at depths ranging from 22-122 fm (40-224 m). Adult cowcod are primarily found over high relief rocky areas (Allen 1982). They are generally solitary, but occasionally aggregate (Love, *et al.* 1990). Although cowcod are generally not migratory, they may move, to some extent, to follow food (Love 1991).

Cowcod can live to be at least 55 years old. Maximum size is 94 cm (37 in) and 13 kg (28.5 lb). The instantaneous rate of natural mortality is believed to be 0.08 (92 percent adult annual survival when there is no fishing mortality) (Butler, *et al.* 1999b). Average size at age of mature females is similar to males. Females reach 90 percent of their maximum expected size by 40 years (Butler, *et al.* 1999b).

Cowcod are ovoviviparous, and large females may produce up to three broods per season (Love, *et al.* 1990). Spawning peaks in January in the Southern California Bight (MacGregor 1986). Fecundity is dependent on size and ranges from 181,000 to 1,925,000 eggs. Larvae emerge at about 5.0 mm (MacGregor 1986).

Little is known about ecological relationships between cowcod and other organisms. Small cowcod feed on planktonic organisms such as copepods. Juveniles eat shrimp and crabs, and adults eat fish, octopus, and squid (Allen 1982). Adults consume a wide range of prey items, but are primarily piscivorous (Love, *et al.* 2002).

Stock Status and Management History

While cowcod are not a major component of the groundfish fishery, they are highly desired by both recreational and commercial fishers because of their bright color and large size. The cowcod stock in the Conception area was first assessed in 1998 (Butler, *et al.* 1999b). Abundance indices decreased approximately tenfold between the 1960s and the 1990s, based on commercial passenger fishing vessel (CPFV) logs (Butler, *et al.* 1999b). Recreational and commercial catch also declined substantially from peaks in the 1970s and 1980s, respectively.

NMFS declared cowcod in the Conception and Monterey management areas depleted in January 2000, after Butler et al. (1999b) estimated the 1998 spawning biomass to be at 7 percent of B_0, well below the 25 percent overfishing threshold. Because cowcod is a fairly sedentary species, closed areas were established in 2002 to reduce cowcod mortality. These CCAs, located in the Southern California Bight, were selected due to their high density of cowcod; while fishing for nearshore rockfish and pelagic species is allowed within the CCAs, fishing with most gear types that could catch cowcod is prohibited.

A cowcod rebuilding analysis was completed in 2003 which validated the assumption that non-retention regulations and area closures had been effective in constraining cowcod fishing mortality (Butler, *et al.* 2003). These encouraging results were based on cowcod fishery-related landings in recreational and commercial fisheries, although the assessment included discard information only with respect to CPFV observations (which indicated negligible discards in that sector). This rebuilding review pointed out a common problem among the analyses of depleted species: reliance on landings (fishery-dependent) data for providing relative abundance values becomes increasingly difficult as the allowable catch is decreased and fishery observer data remains low. Monitoring stock status and recovery thus becomes increasingly difficult in the absence of fishery-independent surveys.

As in the 1999 assessment, the 2005 cowcod assessment (Piner, *et al.* 2006) considered only the cowcod population in Southern California Bight (from the US-Mexico border north to Point Conception) population, as this is the area in which cowcod are most abundant, adult habitat is most common, and catches are highest.. The 2005 assessment used only two data sources, the CPFV time series and the visual survey estimate data. The model was developed in Stock Synthesis 2, and although the base model estimated only three parameters (two of which were "nuisance parameters," the other was equilibrium recruitment), the STAR Panel determined that this simplicity was appropriate given the paucity of data. The assessment provides a set of results corresponding to three different values for assumed steepness (h), the key parameter in the S-R relationship (h=0.4, 0.5, and 0.6). Although the model with assumed h=0.5 was deemed the most likely by the STAR Panel, there is still considerable uncertainty around both this value and the overall results of the assessment itself. The assessment estimated that the 2005 spawning biomass was 18 percent of unfished levels, within a range of 14 to 21 percent depending on the value assumed for steepness, a considerably more optimistic result than the 1999 assessment.

The rebuilding analysis (Piner 2006) estimated a new T_{max} of 2074, 25 years earlier than the 2099 date estimated previously (Butler and Barnes 2000). It is noted in the rebuilding analysis, however, that rebuilding scenarios are extremely uncertain for this data-poor species, particularly with respect to steepness. Moreover, there is widespread concern about the ability to monitor the stock, and consequently to evaluate progress towards rebuilding in the future.

A cowcod rebuilding plan was adopted by the Council in April 2004 and submitted for incorporation in the groundfish FMP under Amendment 16-3. The rebuilding plan established a target rebuilding year of 2090 and the harvest control rule of F = 0.009 (with a P_{MAX} of 60 percent). Revision to the cowcod rebuilding plan is under consideration by the Council and such changes to the groundfish FMP would be enacted through Amendment 16-4; the analysis of the action is a purpose of this EIS.

4.1.1.4 Darkblotched Rockfish

Distribution and Life History

Darkblotched rockfish (*Sebastes crameri*) are found from Santa Catalina Island off Southern California to the Bering Sea (Miller and Lea 1972; Richardson and Laroche 1979). They are most abundant from Oregon to British Columbia. Off Oregon, Washington, and British Columbia, darkblotched rockfish occur primarily on the outer shelf and upper slope (Richardson and Laroche 1979). Distinct population groups have been found off the Oregon coast between 44°30' N latitude and 45°20' N latitude (Richardson and Laroche 1979).

Young-of-the-year recruit to bottom at depths ranging from 55-200 m after spending up to five months as pelagic larvae and juveniles in offshore waters (Love, *et al.* 2002). Off central California, young darkblotched rockfish recruit to soft substrate and low (<1 m) relief reefs (Love 1991). Darkblotched rockfish make limited migrations after they become adults (Gunderson 1977). Adults occur in depths of 25 m to 600 m, and 95 percent are found between 50 m and 400 m (Allen and Smith 1988). Adults are often found on mud near cobble or boulders. Fish tend to move to deeper waters as they age.

Maximum age of darkblotched rockfish is 64 years, and maximum size is 58 cm (23 in) and 2.3 kg (5.1 lb). Rogers, et al. (2000) estimated that the instantaneous rate of natural mortality was about 0.05 (95 percent adult annual survival when there is no fishing mortality). Females tend to be larger than males of the same age, and reach 90 percent of their maximum expected size by 13 years (Rogers, *et al.* 2000).

Darkblotched rockfish are ovoviviparous (Nichol and Pikitch 1994). Insemination of female darkblotched rockfish occurs from August to December, and fertilization and parturition occur from December to March off Oregon and California, and primarily in February off Oregon and Washington (Hart 1988; Nichol and Pikitch 1994; Richardson and Laroche 1979). Fecundity is dependent on size and ranges from 20,000 to 610,000 eggs.

Little is known about ecological relationships between darkblotched rockfish and other organisms. Pelagic juveniles feed on planktonic organisms such as copepods. Adults are often caught with other fish such as Pacific ocean perch and splitnose rockfish. Midwater animals such as euphausiids and amphipods dominate the diet of adult fish. Albacore and Chinook salmon consume pelagic juveniles (Hart 1988). Little is known about predation of adults.

Stock Status and Management History

Darkblotched rockfish has always been caught primarily with commercial trawl gear, as part of a complex of slope rockfish. Catch of darkblotched rockfish very likely first became significant in the mid-to-late 1940's, during which time it accelerated dramatically due to increases in gear efficiency and demand (Harry and Morgan 1963; Scofield 1948). During the mid 1960's to mid 1970's darkblotched rockfish were caught by both domestic and foreign fleets (Rogers 2003b). Domestic landings rose from late 1970's until the late 1980's, although limits on rockfish catch were first instituted in 1983, when darkblotched was rockfish managed as part of a group of around 50 species (designated as the Sebastes complex) (Rogers, *et al.* 2000). During the 2000's, progressive steps have been taken to reduce the catch of darkblotched rockfish, following the declaration of its depleted status in 2001. However, management goals (ABC or OY) for darkblotched rockfish were exceeded from 1997 through 2002. Although the 1996 assessment produced an ABC calculation for darkblotched, from 1997 through 2000 that amount was combined with yields for other species for purposes of managing a complex of species to combined ABC and OY amounts. Separate ABCs and OYs for darkblotched have been specified since 2001; however the species continues to be managed as part of a slope rockfish trip limit. Based on discard estimates now available from observer and logbook data for 2000-2003, the species-specific ABC was exceeded during 1997-2000 and the OY was exceeded in 2001 and 2002. However in 2004, the OY was not exceeded (based on the final estimate of total mortality, including discards).

Rogers et al. (2000) completed an assessment in 2000 that employed a more extensive length-based stock synthesis modeling than had been used in the previous (1996) assessment (which had followed a simple F=M methodology verified by limited modeling using length based stock synthesis). This assessment determined the stock was at 14–31 percent of its unfished level, depending on assumptions regarding the historic catch of darkblotched rockfish in the foreign fishery from 1965-1978. More than any other issue of uncertainty, the uncertainty of historical foreign catch compositions had the greatest influence on the assessment model's calculation of stock status; as the proportion of the overall catch assumed to be composed of darkblotched was increased in the model, the estimates of B_0 also increased, bringing the current stock size estimate closer to a depleted level. Four accepted model runs varied the assumed foreign catch proportion from 0–20 percent, which resulted in significant differences in B_0 and the spawning index. Only one of those model runs (assuming 0 percent foreign catch of darkblotched) estimated the stock was not depleted. The STAR Panel (PFMC 2000a) and the GMT were unable to resolve the uncertainty in foreign catch composition. Therefore, the Stock Assessment Team's (STAT) assumption that 10 percent of foreign catch was comprised of darkblotched (Rogers, *et al.* 2000) was accepted, leading to the conclusion that the spawning stock biomass was 22 percent of its unfished level.

Given that the stock was estimated to be below the depleted threshold ($B_{25\%}$), NMFS declared darkblotched rockfish to be depleted in 2001; the same year, the Council adopted a rebuilding analysis for the stock (Methot and Rogers 2001). On the earlier recommendation of the SSC (June 2001 Council meeting), the authors incorporated results of the 2000 triennial slope trawl survey conducted by the Alaska Fishery Science Center and modeled a more recent time series of recruitments. Incorporating these data resulted in a downward revision of the estimated recruitment and abundance, throughout the time series, compared to what had been used in the Rogers et al. (2000) assessment. For example, the mean recruitment in the 1983-1996 period was estimated to be about 67 percent of earlier estimates. Overall, this led to a revised estimate of spawning stock biomass at the beginning of 2002 of 14 percent of its unfished level. The minimum time to rebuild (T_{MIN}) in the absence of fishing was estimated to be 14 years with a median rebuilding year of 2014. The maximum time to rebuild (T_{MAX}) in accordance with the National Standard 1 Guidelines was 47 years (2047).

An assessment update for darkblotched rockfish, completed in 2003, suggested that the stock had not changed significantly from the previous assessment, but there was evidence of strong recent recruitment (Rogers 2003a). However these high numbers of fish added to the exploitable stock had not been validated by indices used in the assessment, so the spawning stock biomass was determined to be at 11 percent of it unfished level ($B_{11\%}$). New information in this update included revised estimates of the darkblotched rockfish catch in historical foreign fisheries, new fishery length and age composition information, a new Triennial Survey data point, and new slope survey data. Unresolved data discrepancies between these data sources, related to length and age composition, limited the amount of new data used in this assessment update. The SSC STAR Lite Panel requested progressive inclusion of 1997-1999, 2000, and 2001 recruitment estimates (Ralston, *et al.* 2003). Risk of error progressively increased from including those recruitment estimates because they were based on increasingly limited data. Rebuilding results were sensitive to the high 2000 and 2001 recruitment estimates and including them allowed much greater 2004 OYs because those recruits enter the fishery and help rebuild the stock before the maximum allowable year; based on the recommendations of the SSC STAR Lite Panel, the assessment was amended to include the recruitment estimate for 2000.

The 2005 assessment (Rogers 2006) was a full assessment. It incorporated data from a large number of sources, allowing for the estimation of landings back to 1928. The major sources of uncertainty in this stock assessment include: 1) the assumed natural mortality rate (M), 2) the age-length relationship, 3) noisy survey indices and length compositions due to a few large survey catches which tend to have larger than average fish, 4) steepness (h) parameter for the spawner-recruit curve, and 5) the amount of historical landings prior to 1978. Uncertainty in the model results were explored primarily through examination of alternative natural mortality values. Estimates for M varied depending on the calculation method chosen, ranging from 0.025-0.5 (based on Hoenig's method (Hoenig 1983)) to 0.107 (from a linear relationship with reproductive effort). Investigating the range from 0.05 to 0.10, Rogers found that the best fitting M value conflicted among the different data sources; the primary source of this conflict was the Alaska Fisheries Science Center (AFSC) slope survey. The STAR Panel determined that the confidence intervals produced within the models underestimated uncertainty (Ralston, *et al.* 2006). The Panel concluded that uncertainty could be bracketed by assuming that an M value of 0.07 is likely (base model), while 0.05 and 0.09 are the unlikely extremes.

Higher natural mortality values bring about calculations of smaller historical declines in stock abundance and larger current biomass levels. Applying the STAR Panel selected value of M=0.07, the assessment determined the biomass of age 1+ darkblotched rockfish to have declined by 84 percent from 1928 to 1999; since 1999, the age 1+ biomass has more than doubled. There were several strong recruitments in recent years, even though spawning stock has been at a low level. The 1999 year class is the strongest since the 1980 year class. The estimated spawning stock biomass depletion at the beginning of 2005 was 16 percent of unfished biomass ($B_{16\%}$).

A darkblotched rockfish rebuilding plan was first adopted by the Council in June 2003 and submitted for incorporation in the groundfish FMP under Amendment 16-2. The rebuilding plan established a target rebuilding year of 2030 and the harvest control rule (constant fishing rate) of F = 0.027 (with a probability of rebuilding by T_{MAX} of 80 percent). Applying the results from the 2003 rebuilding analysis (Rogers 2003a)}, the harvest control rule was changed beginning in 2004 via a regulatory amendment. The new harvest control rule of F = 0.032 was used to set annual darkblotched OYs in 2004-2006 and resulted in an updated P_{MAX} of >90 percent. Revision to the darkblotched rockfish rebuilding plan is under consideration by the Council and such changes to the groundfish FMP would be enacted through Amendment 16-4; the analysis of the action is a purpose of this EIS.

4.1.1.5 Pacific Ocean Perch

Distribution and Life History

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

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

Stock Status and Management History

POP were harvested exclusively by U.S. and Canadian vessels in the Columbia and Vancouver INPFC areas prior to 1965. Large Soviet and Japanese factory trawlers began fishing for POP in 1965 in the Vancouver area and in the Columbia area a year later. Intense fishing pressure by these foreign fleets occurred from 1966 to 1975. The MSA, passed by Congress in 1976, ended foreign fishing within 200 miles of the United States coast.

The POP resource off the West Coast was depleted before implementation of the groundfish FMP in 1982, and Council actions to conserve the resource likewise predate the FMP. Large removals of POP in the foreign trawl fishery, followed by significant declines in catch and abundance, led the Council to limit harvest beginning in 1979. A 20–year rebuilding plan for POP was adopted in 1981. Rebuilding under this original plan was largely influenced by a cohort analysis of 1966-1976 catch and age composition data (Gunderson 1979), updated with 1977-1980 data (Gunderson 1981), and an evaluation of trip limits as a management tool (Tagart, *et al.* 1980). This was the first time trip limits were used by the Council to discourage targeting and overharvest of an depleted stock, and it remains a management strategy in use today in the West Coast groundfish fishery. In addition to trip limits, the Council significantly lowered the OY for POP. After twenty years of rebuilding under the original plan, the stock stabilized at a lower equilibrium than estimated in the pre-fishing condition. While continuing stock decline was abated, rebuilding was not achieved as the stock failed to increase in abundance to B_{MSY}.

Ianelli and Zimmerman (1998) estimated POP female spawning biomass in 1997 to be at 13 percent of its unfished level, thereby confirming that the stock was depleted. NMFS formally declared POP depleted in March 1999 after the groundfish FMP was amended to incorporate the tenets of the Sustainable Fisheries Act. The Council adopted and NMFS enacted more conservative management measures in 1999 as part of a redoubled rebuilding effort.

A 2000 POP assessment suggested the stock was more productive than originally thought (Ianelli, *et al.* 2000). A revised POP rebuilding analysis was completed and adopted by the Council in 2001 (Punt and Ianelli 2001). This analysis estimated a T_{MIN} of 12 years and a T_{MAX} of 42 years. It was noted in the rebuilding analysis that the ongoing retrospective analysis of historic foreign fleet catches was likely to change projections of POP rebuilding.

The 2003 POP assessment (Hamel, *et al.* 2003) incorporating updated survey and fishery data including the retrospective of foreign fleet catches (Rogers 2003b). The assessment covered areas from southern Oregon to the U.S. border with Canada, the southern extent of POP distribution. The overall conclusion was that the stock was relatively stable at approximately 28 percent of its unfished biomass ($B_{28\%}$). Of all the changes and additions to the data, the historical catch estimates had the greatest effect, resulting in lower estimates of both equilibrium unfished biomass (B_0) and MSY.

Many cases were presented in the 2003 rebuilding analysis and, based on SSC advice, the Council chose the one based on the full Bayesian posterior distribution, in which recruits were re-sampled to project future recruitment. Re-sampling recruits rather than recruits per spawner was recommended because only the southern fringe of the stock occurs in waters off the U.S. West Coast. One would want to resample recruits per spawner if measured recruitment is a function of measured stock size. However, it is unlikely that the recruitment measured off the U.S. West Coast is wholly from the portion of the parental stock occurring in these same waters.

The 2005 assessment (Hamel 2006b) is an update and uses the same model as in the 2003 assessment, a forward projection age-structured model (Hamel, *et al.* 2003). The assessment incorporates new data and changes to the data used in the previous assessment. As was the case in the previous assessment, a number of sources of uncertainty are explicitly accounted for, such as that associated with natural mortality, the parameters of the stock-recruitment relationship, and catchability coefficients for the different surveys. However, sensitivity analyses based upon alternative model structures/data set choices suggested that the overall uncertainty may be greater than that predicted by a single model specification, as was also the case in the 2003 assessment. There are also other sources of uncertainty that are not included in the current model. These include the degree of connection between the stocks of Pacific ocean perch off British Columbia and those in Council waters; the effect of the PDO, ENSO and other climatic variables on recruitment, growth and survival of Pacific ocean perch; gender differences in growth and survival; a possible non-linear relationship between individual spawner biomass and effective spawning output and more complicated relationship between age and maturity. In order to provide the Council with a means to incorporate this uncertainty into its decision making, Hamel undertook the following analysis: he estimated, based on a reference case, the Bayesian posterior distributions for key management and rebuilding variables. These distributions best reflect the uncertainty of the assessment's analysis, and are suitable for probabilistic decision making. The assessment estimated the following values based on the maximum of the posterior density function (MPD) point estimate: spawning biomass depletion at the start of 2005 equal to 23.4 percent and a 2007 ABC equal to 746 mt. Overfishing for POP is considered to be occurring when F is above F_{MSY} = 0.0310 according to the current assessment base model. The 2005 rebuilding analysis (Hamel 2006a) re-estimated T_{MIN} to be 2015.

A Pacific ocean perch rebuilding plan was adopted by the Council in June 2003 and submitted for incorporation in the groundfish FMP under Amendment 16-2 (approved by NMFS in January 2004). The rebuilding plan established a target rebuilding year of 2027 and a harvest control rule of F = 0.0082 (with a P_{MAX} of 70 percent). The 2003 assessment (Hamel, *et al.* 2003) and rebuilding analysis (Punt, *et al.* 2003) was used to amend the harvest control rule and set annual POP OYs for the 2004-2006 period. The amended harvest control rule was F = 0.0257, which increased the estimated P_{MAX} to slightly greater than 70 percent. Revision to the Pacific ocean perch rebuilding plan is under consideration by the Council and such changes to the groundfish FMP would be enacted through Amendment 16-4; the analysis of the action is a purpose of this EIS.

4.1.1.6 Widow Rockfish

Distribution and Life History

Widow rockfish (*Sebastes entomelas*) range from Albatross Bank off Kodiak Island to Todos Santos Bay, Baja California, Mexico (Eschmeyer, *et al.* 1983; Miller and Lea 1972; NOAA 1990). They occur over hard bottoms along the continental shelf (NOAA 1990) and prefer rocky banks, seamounts, ridges near canyons, headlands, and muddy bottoms near rocks. Large widow rockfish concentrations occur off headlands such as Cape Blanco, Cape Mendocino, Point Reyes, and Point Sur. Adults form dense, irregular, midwater and semi-demersal schools deeper than 100 m at night and disperse during the day (Eschmeyer, *et al.* 1983; NOAA 1990; Wilkins 1986). All life stages are pelagic, but older juveniles and adults are often associated with the bottom (NOAA 1990). All life stages are fairly common from Washington to California (NOAA 1990). Pelagic larvae and juveniles co-occur with yellowtail rockfish, chilipepper, shortbelly rockfish, and bocaccio larvae and juveniles off Central California (Reilly, *et al.* 1992).

Widow rockfish are ovoviviparous, have internal fertilization, and brood their eggs until released as larvae (NOAA 1990; Reilly, *et al.* 1992). Mating occurs from late fall-early winter. Larval release occurs from December through February off California, and from February through March off Oregon. Juveniles are 21 mm to 31 mm at metamorphosis, and they grow to 25 cm to 26 cm over three years. Age and size at sexual maturity varies by region and sex, generally increasing northward and at older ages and larger sizes for females. Some mature in three years (25 cm to 26 cm), 50 percent are mature by four years to five years (25 cm to 35 cm), and most are mature in eight years (39 cm to 40 cm) (NOAA 1990). The maximum age of widow rockfish is 28 years, but rarely over 20 years for females and 15 years for males (NOAA 1990). The largest size is 53 cm and about 2.1 kg (Eschmeyer, *et al.* 1983; NOAA 1990).

Widow rockfish are carnivorous. Adults feed on small pelagic crustaceans, midwater fishes (such as age-one or younger Pacific whiting), salps, caridean shrimp, and small squids (Adams 1987a; NOAA 1990). During spring, the most important prey item is salps, during the fall fish are more important, and during the winter widow rockfish primarily eat sergestid shrimp (Adams 1987a). Feeding is most intense in the spring after spawning (NOAA 1990). Pelagic juveniles are opportunistic feeders, and their prey consists of various life stages of calanoid copepods, and euphausiids (Reilly, *et al.* 1992).

Stock Status and Management History

Widow rockfish are an important commercial species from British Columbia to central California, particularly since 1979, when Oregon trawl fisherman demonstrated the ability to make large catches at night using midwater trawl gear. Many more participants have entered the fishery since that time, and landings of widow rockfish have increased rapidly (Love, *et al.* 2002). Widow rockfish are a minor component of the recreational groundfish fisheries.

Williams et al. (2000) assessed the coastwide stock of widow rockfish in 2000. The spawning output level (8,223 mt eggs), based on that assessment and a revised rebuilding analysis (Punt and MacCall 2002) adopted by the Council in June 2001, was at 23.6 percent of the unfished level (33,490 mt eggs) in 1999.

The 2003 assessment (He, *et al.* 2003b) concluded that the widow rockfish stock size was at 24.65 percent of the unfished biomass, but indicated that stock productivity was considerably lower than previously thought. Data sparseness was a significant problem in this widow rockfish assessment (Conser, *et al.* 2003; He, *et al.* 2003b).

A full assessment was completed in 2005 for widow rockfish (He, *et al.* 2006a). In addition to including the new data from 2003 to 2004, this assessment added an index of relative abundance based on the triennial survey data and estimated the power coefficient of the midwater juvenile survey index instead of using a fixed value. The base model estimated that spawning biomass declined steadily since the early 1980s and that spawning output in 2004 was 31 percent of the unexploited level, above the Council's depleted threshold. Further, spawning output in the base model was estimated to have never dropped below the 25 percent depleted threshold. Alternative model runs, which were considered to be only slightly less plausible than the base model, however, indicated that the stock had been below $B_{25\%}$. The 2005 rebuilding analysis indicated that the stock was much closer to reaching a rebuilt biomass than previously estimated: under the current rebuilding analysis T_{MIN} is estimated to be 2013, compared to a T_{MIN} of 2026 in the 2003 analysis (He, *et al.* 2003a).

Using estimates from the 2003 widow rockfish rebuilding analysis (He, *et al.* 2003a), the Council adopted a rebuilding plan in April 2004 that was subsequently incorporated into the groundfish FMP under Amendment 16-3. The rebuilding plan established a target rebuilding year of 2038 and a harvest control rule of F = 0.0093 (with a P_{MAX} of 60 percent). Revision to the widow rockfish rebuilding plan is under consideration by the Council and such changes to the groundfish FMP would be enacted through Amendment 16-4; the analysis of the action is a purpose of this EIS.

4.1.1.7 Yelloweye Rockfish

Distribution and Life History

Yelloweye rockfish (*Sebastes ruberrimus*) range from the Aleutian Islands, Alaska, to northern Baja California, Mexico, and are common from Central California northward to the Gulf of Alaska (Eschmeyer, *et al.* 1983; Hart 1988; Love 1991; Miller and Lea 1972; O'Connell and Funk 1986). Yelloweye rockfish occur in water 25 m to 550 m deep with 95 percent of survey catches occurring from 50 m to 400 m (Allen and Smith 1988). Yelloweye rockfish are bottom dwelling, generally solitary, rocky reef fish, found either on or just over reefs (Eschmeyer, *et al.* 1983; Love 1991; Miller and Lea 1972; O'Connell and Funk 1986). Boulder areas in deep water (>180 m) are the most densely populated habitat type, and juveniles prefer shallow-zone broken-rock habitat (O'Connell and Carlile 1993). They also reportedly occur around steep cliffs and offshore pinnacles (Rosenthal, *et al.* 1982). The presence of refuge spaces is an important factor affecting their occurrence (O'Connell and Carlile 1993).

Yelloweye rockfish are ovoviviparous and give birth to live young in June off Washington (Hart 1988). The age of first maturity is estimated at six years and all are estimated to be mature by eight years (Wyllie Echeverria 1987). They can grow to 91 cm (Eschmeyer, *et al.* 1983; Hart 1988) and males and females probably grow at the same rates (Love 1991; O'Connell and Funk 1986). The growth rate levels off at approximately 30 years of age (O'Connell and Funk 1986) but they can live to be 114 years old (Love 1991; O'Connell and Funk 1986). Yelloweye rockfish are a large predatory reef fish that usually feeds close to the bottom (Rosenthal, *et al.* 1982). They have a widely varied diet, including fish, crabs, shrimps and snails, rockfish, cods, sand lances, and herring (Love 1991). Yelloweye rockfish have been observed underwater capturing smaller rockfish with rapid bursts of speed and agility. Off Oregon the major food items of the yelloweye rockfish include cancroid crabs, cottids, righteye flounders, adult rockfishes, and pandalid shrimps (Steiner 1978). Quillback and yelloweye rockfish have many trophic features in common (Rosenthal, *et al.* 1982).

Stock Status and Management History

The first ever yelloweye rockfish stock assessment was conducted in 2001 (Wallace 2002). This assessment incorporated two area assessments: one from Northern California using CPUE indices constructed from Marine Recreational Fisheries Statistical Survey (MRFSS) sample data and CDFG data collected on board commercial passenger fishing vessels, and the other from Oregon using Oregon Department of Fish and Wildlife (ODFW) sampling data. The assessment concluded yelloweye rockfish stock biomass in 2001 was at about 7 percent of unexploited biomass in Northern California and 13 percent of unexploited biomass in Oregon. The assessment revealed a thirty-year declining biomass trend in both areas with the last above average recruitment occurring in the late 1980s. The assessment's conclusion that yelloweye rockfish biomass was well below the 25 percent of unexploited biomass threshold for depleted stocks led to this stock being separated from the rockfish complexes in which it was previously listed. Until 2002, when yelloweye rockfish were declared depleted, they were listed in the "remaining rockfish" complex on the shelf in the Vancouver, Columbia, and Eureka INPFC areas and the "other rockfish" complex on the shelf in the Monterey and Conception areas. As with the other depleted stocks, yelloweye rockfish harvest is now tracked separately.

In June 2002 the SSC recommended that managers should conduct a new assessment incorporating Washington catch and age data. This recommendation was based on evidence that the biomass distribution of yelloweye rockfish on the West Coast was centered in waters off Washington and that useable data from Washington were available. Based on that testimony, the Council recommended completing a new assessment in the summer of 2002, before a final decision was made on 2003 management measures. Methot et al. (2003) did the assessment, which was reviewed by a STAR Panel in August 2002. The assessment result was much more optimistic than the one prepared by Wallace (2002), largely due to the incorporation of Washington fishery data. While the depleted status of the stock was confirmed (24 percent of unfished biomass), Methot et al. (2003) provided evidence of higher stock productivity than originally assumed. The assessment also treated the stock as a coastwide assemblage. This assessment was reviewed and approved by the SSC and the Council at the September 2002 Council meeting.

A yelloweye rockfish assessment was among those completed as part of the 2005 assessment cycle (Wallace and Tsou 2005). While the assessment was scheduled to be an update, it migrated to a new modeling platform, which is allowed only in full assessments. At their November 2005 meeting, the Council heard testimony that there were additional data sources that might inform a yelloweye assessment, but had not been included due to the terms of reference constraints on update assessments. Therefore, the Council asked the assessment team to undertake a further, full assessment effort that would include all possible sources of information.

The re-assessment of the stock (Wallace, *et al.* 2006) used the Stock Synthesis 2 model that had been introduced in the 2005 assessment. The assessment updated all data sources in the previous model, including a substantial effort to examine multiple data sources to further define and extend the historical catch stream. New data sources were also included (WDFW 2002 submersible survey and the International Pacific Halibut Commission annual longline survey). Further revisions in the assessment included reducing natural mortality from 0.045 to 0.036 and increasing steepness from 0.437 to 0.45. The assessment model treated the West Coast population of yelloweye rockfish in two different ways: as a single coastwide stock (consistent with the 2002 and 2005 assessments) and as separate and distinct sub-populations for the States of California, Oregon and Washington. The assessment is considered to be data poor, however the sparseness of data is particularly acute in the Washington model. As such, the SSC recommended to the Council that the coastwide model be used for setting the OY of the stock. During the March 2006 meeting, the Council deliberated over which of the past assessments represented the best available science for use in decision-making; the Council selected the coastwide model from the 2006 assessment. Under this model, the 2006 coastwide biomass is calculated to be at 17.7 percent of the unfished level (with depletion rates of 8.5 percent, 21.8 percent and 20.8 percent for California, Oregon, and Washington respectively). The rebuilding analysis (Tsou and Wallace 2006) re-estimated other parameters: Tmax increased to 2096 with a harvest control rule of F=0.0101, and a projected OY in 2007 of 12.6 mt.

The yelloweye assessment can be categorized as quite data poor; it relies primarily on recreational CPUE information with varying data gaps even in those data series among the three states. Very little fishery independent information exists. Additionally, since retention of yelloweye has been prohibited in recreational fisheries; even the limited CPUE series that do exist were truncated in 2001. In order to resolve the uncertainty in the current assessment as well as to track rebuilding, it will be necessary to implement additional strategies to collect yelloweye abundance information.

In 2004, a yelloweye rebuilding plan was adopted by the Council and submitted for incorporation in the groundfish FMP under Amendment 16-3. The rebuilding plan established a target rebuilding year of 2058 and a harvest control rule of F = 0.0153 (with a P_{MAX} of 80 percent). Revision to the yelloweye rockfish rebuilding plan is under consideration by the Council and such changes to the groundfish FMP would be enacted through Amendment 16-4; the analysis of the action is a purpose of this EIS.

4.1.2 Precautionary Zone Groundfish Species

Groundfish species managed under the FMP with an estimated spawning stock biomass less than 40 percent of its unfished level, but greater than 25 percent of its unfished level are categorized as species managed in the “precautionary zone”. A depleted species is managed under its rebuilding plan even if it has partially rebuilt to above $B_{25\%}$; it remains under its rebuilding plan until it is assessed to have attained the B_{MSY} abundance level of 40 percent of unfished biomass. Precautionary zone species are managed using the 40-10 adjustment in which the OY is set less than the ABC, as described earlier in this chapter; depleted species are managed under the mortality schedule specified in rebuilding plans.

4.1.2.1 Cabezon (in Waters off California)

Distribution and Life History

Cabezon (*Scorpaenichthys marmoratus*) are distributed along the entire West Coast of the continental United States. They range from central Baja California north to Sitka, Alaska (Love 1996; Miller and Lea 1972). Cabezon are primarily a nearshore species found intertidally and among jetty rocks, out to depths of greater than 100 m (Love 1996; Miller and Lea 1972).

Cabezon are known to spawn in recesses of natural and manmade objects, and males are reported to show nest-guarding behavior (Garrison and Miller 1982). Spawning is protracted, and there appears to be a seasonal progression of spawning that begins off California in winter and proceeds northward to Washington by spring. Spawning off California peaks in January and February (O'Connell 1953) while spawning in Puget Sound (Washington State) occurs for up to 10 months (November-August), peaking in March–April (Lauth 1987). Laid eggs are sticky and adhere to the surface where deposited. After hatching, the young of the year spend 3–4 months as pelagic larvae and juveniles. Settlement takes place after the young fish have attained 3–5 cm in length (Lauth 1987; O'Connell 1953). It is apparent that females lay multiple batches in different nests, but whether these eggs are temporally distinct enough to qualify for separate spawning events is not understood (Lauth 1987; O'Connell 1953).

Stock Status and Management History

The status and future prospects of cabezon were first assessed in 2003 (Cope, *et al.* 2004). The assessment delineated two stocks (north and south) at the Oregon-California border, a distinction based on differences in the catch history, CPUE trends and biological parameters (mainly growth) between the two areas. Due to the lack of data on the northern population, the assessment focused on only the southern population. As with most nearshore groundfish stocks, this assessment lacked a fishery-independent index of abundance, and consequently relied on recreational CPUE indices and information about larval abundance. The 2003 depletion level of cabezon off California was estimated at 34.7 percent (under the base-case posterior density function, or MPD, point estimate).

In the 2005 assessment (Cope and Punt 2006), the California cabezon stock was further divided north and south of Point Conception into the northern California substock (NCS) and the southern California substock (SCS). Historically, the recreational fishery has been the primary source of removals of cabezon in California; however commercial catches have become a major source of removals in the last ten years because of the developing live-fish fishery. Recreational removals were reconstructed back to 1916, when the commercial fishery began. When investigating the uncertainty related to the various data sources, Cope and Punt determined that excluding the mean weight value for the recreational man-made fleet for 2000 led to a major reduction in the status of the SCS (to 5.8 percent of virgin biomass in 2005); the use of this data point may be the most important uncertainty of the SCS assessment. The unfished spawning biomass of the California cabezon substocks were estimated to be 1110 (NCS) and 251 (SCS) mt, with estimated reproductive outputs of 445 (NCS) and 71 (SCS) mt in 2005; this leads to an estimated depletion level of 40.1 percent (NCS) and 28.3 percent (SCS). Although the assessment provides information on two substocks within California, cabezon are managed on a coastwide basis for the state. The assessment authors noted that regional management is an important consideration for relatively sedentary nearshore reef species such as cabezon and that future assessments should continue to provide scientific analyses on increasingly finer spatial scales in order to investigate such a potential shift in management.

4.1.2.2 Petrale Sole

Distribution and Life History

Petrale sole (*Eopsetta jordani*) are found from Cape Saint Elias, Alaska to Coronado Island, Baja California, Mexico. The range may possibly extend into the Bering Sea, but the species is rare north and west of southeast Alaska and in the inside waters of British Columbia (Garrison and Miller 1982; Hart 1988). Nine separate breeding stocks have been identified, although stocks intermingle on summer feeding grounds (Hart 1988; NOAA 1990). Of these nine, one occurs off British Columbia, two off Washington, two off Oregon, and four off California. Adults are found from the surf line to 550 m depth, but their highest abundance is deeper than 300 m. Adults migrate seasonally between deepwater winter spawning areas to shallower spring feeding grounds. They show an affinity to sand, sandy mud, and occasionally muddy substrates (NOAA 1990).

Spawning occurs over the continental shelf and continental slope to as deep as 550 m. Spawning occurs in large spawning aggregations in the winter. Eggs are pelagic and juveniles and adults are demersal (Garrison and Miller 1982). Eggs and larvae are transported from offshore spawning areas to nearshore nursery areas by oceanic currents and wind. Larvae metamorphose into juveniles at six months (22 cm) and settle to the bottom of the inner continental shelf (Pearcy, *et al.* 1977). Petrale sole tend to move into deeper water with increased age and size. Petrale sole begin maturing at three years. Half of males mature by seven years (29 cm to 43 cm) and half of the females are mature by eight years (>44 cm) (Pearcy, *et al.* 1977; Pedersen 1975a; Pedersen 1975b). Near the Columbia River, petrale sole mature one to two years earlier (Pedersen 1975a; Pedersen 1975b).

Larvae are planktivorous. Small juveniles eat mysids, sculpins, and other juvenile flatfishes. Large juveniles and adults eat shrimps and other decapod crustaceans, as well as euphausiids, pelagic fishes, ophiuroids, and juvenile petrale sole (Garrison and Miller 1982; Hart 1988; Pearcy, *et al.* 1977; Pedersen 1975a; Pedersen 1975b). Petrale sole eggs and larvae are eaten by planktivorous invertebrates and pelagic fishes. Juveniles are preyed upon (sometimes heavily) by adult petrale sole, as well as other large flatfishes. Adults are preyed upon by sharks, demersally feeding marine mammals, and larger flatfishes and pelagic fishes (NOAA 1990). Petrale sole competes with other large flatfishes. It has the same summer feeding grounds as lingcod, English sole, rex sole, and Dover sole (NOAA 1990).

Stock Status and Management History

Petrale sole are harvested almost exclusively by bottom trawls in the U.S. West Coast groundfish fisheries. Petrale sole fishing grounds range from Cape Flattery off northern Washington, to Point Conception off southern California. Recent petrale sole catch statistics exhibit marked seasonal variation, with substantial portions of the annual harvest taken from the spawning grounds in December and January. Petrale sole off the U.S. West Coast have been managed historically using a coastwide ABC which represents the sum of ABCs calculated for the four INPFC areas.

In 2005, an assessment of the petrale sole stock in U.S. waters off California, Oregon, and Washington was completed (Lai, *et al.* 2006). Previous assessments of petrale sole in the U.S. Vancouver and Columbia INPFC areas had been conducted by Demory (1984), Turnock et al. (1993), and Sampson and Lee (1999). In this assessment, petrale sole in the Eureka, Monterey and Conception INPFC areas (the Southern assessment area) are assessed separately from those in the U.S. Vancouver and Columbia areas (the Northern assessment area). Although genetic information and stock structure are not well known for this species, the available data on growth, CPUE, and geographical distribution along the U.S.

Pacific coast support the use of two separate assessment areas. The assessment used the length-and-age structured Stock Synthesis 2 (SS2) Model.

Petrale sole in the north was estimated to be at 34 percent of unfished spawning stock biomass in 2005. In the south, the stock was estimated to be at 29 percent of unfished spawning stock biomass. Biomass trends were qualitatively similar in both areas, and also showed consistency with petrale sole trends in Canadian waters. Both stocks were estimated to have been below the Pacific Council's depleted threshold of 25 percent of unfished biomass from the mid-1970s until very recently. Estimated harvest rates were in excess of the target fishing mortality rate of $F_{40\%}$ during this period as well. Petrale sole in both areas showed large recent increases in stock size, which is consistent with the strong upward trend in the shelf survey biomass index. In comparison to previous assessments of petrale sole, this assessment represents a significant change in our perception of petrale sole stock status. For example, in the 1999 assessment, spawning biomass stock biomass in 1998 was estimated to be at 39 percent of unfished stock biomass. The current assessment now estimates biomass in 1998 to have been at 12 percent of unfished stock biomass.

4.1.2.3 Sablefish

Distribution and Life History

Sablefish, or black cod, (*Anoplopoma fimbria*) are distributed in the northeastern Pacific ocean from the southern tip of Baja California, northward to the north-central Bering Sea and in the Northwestern Pacific ocean from Kamchatka, southward to the northeastern coast of Japan. Although few studies have critically evaluated issues regarding the stock structure of this species, it appears there may exist at least three different stocks of sablefish along the West Coast of North America: (1) a stock that exhibits relatively slow growth and small maximum size that is found south of Monterey Bay (Cailliet, *et al.* 1988; Philips and Inamura 1954); (2) a stock that is characterized by moderately fast growth and large maximum size that occurs from northern California to Washington; and (3) a stock that grows very quickly and contains individuals that reach the largest maximum size of all sablefish in the northeastern Pacific ocean, distributed off British Columbia, Canada and in the Gulf of Alaska (Mason, *et al.* 1983; McFarlane and Beamish 1990; Methot, *et al.* 2000). Large adults are uncommon south of Point Conception (Hart 1988; Love 1991; McFarlane and Beamish 1983a; McFarlane and Beamish 1983b; NOAA 1990). Adults are found as deep as 1,900 m, but are most abundant between 200 m and 1,000 m (Beamish and McFarlane 1988; Kendall, Jr. and Matarese 1987; Mason, *et al.* 1983). Off southern California , sablefish are abundant to depths of 1,500 m (MBC 1987). Adults and large juveniles commonly occur over sand and mud (McFarlane and Beamish 1983b; NOAA 1990) in deep marine waters. They were also reported on hard-packed mud and clay bottoms in the vicinity of submarine canyons (MBC 1987).

Spawning occurs annually in the late fall through winter in waters greater than 300 m (Hart 1988; NOAA 1990). Sablefish are oviparous with external fertilization (NOAA 1990). Eggs hatch in about 15 days (Mason, *et al.* 1983; NOAA 1990) and are demersal until the yolk sac is absorbed (Mason, *et al.* 1983). Age-zero juveniles become pelagic after the yolk sac is absorbed. Older juveniles and adults are benthopelagic. Larvae and small juveniles move inshore after spawning and may rear for up to four years (Boehlert and Yoklavich 1985; Mason, *et al.* 1983). Older juveniles and adults inhabit progressively deeper waters. Estimates indicate that 50 percent of females are mature at five years to six years (24 inches) and 50 percent of males are mature at five years (20 inches).

Sablefish larvae prey on copepods and copepod nauplii. Pelagic juveniles feed on small fishes and cephalopods—mainly squids (Hart 1988; Mason, *et al.* 1983). Demersal juveniles eat small demersal fishes, amphipods, and krill (NOAA 1990). Adult sablefish feed on fishes like rockfishes and octopus (Hart 1988; McFarlane and Beamish 1983b). Larvae and pelagic juvenile sablefish are heavily preyed upon by seabirds and pelagic fishes. Juveniles are eaten by Pacific cod, Pacific halibut, lingcod, spiny dogfish, and marine mammals, such as Orca whales (Cailliet, *et al.* 1988; Hart 1988; Love 1991; Mason, *et al.* 1983; NOAA 1990). Sablefish compete with many other co-occurring species for food, mainly Pacific cod and spiny dogfish (Allen 1982).

Stock Status and Management History

Formal stock assessments of sablefish began in 1984. The first coastwide-established regulations on the sablefish fishery off the U.S. Pacific coast were implemented as trip limits in October 1982. Since 1982, the sablefish fishery has been managed intensively, with limited-entry and open-access programs used in various manners to limit catches.

In 2001, two assessments were completed and reviewed by a STAR Panel: one by NMFS (Schirripa and Methot 2001) and one by the Pacific Groundfish Conservation Trust (Hilborn, *et al.* 2001). The two assessments were in agreement, and the Council adopted the NMFS assessment for management purposes. The Schirripa and Methot assessment focused on evaluating the sensitivity of the model and the outcomes to changes in the survey data. These changes include the combining of the AFSC slope survey data and the NWFSC Industry Co-operative Survey data using a statistical GLM procedure. This analysis made it possible to extend the southern boundary of the assessment south to Point Conception (34°27' N latitude) rather than 36° N latitude, used in previous assessments. The assessment indicated a normal decline in biomass since the late 1970s due to the fishing down of the unfished stock and an unexpected decline in recruitment during the early 1990s. It introduced, for the first time, the possibility that sablefish recruitment may be linked to environmental factors. A seemingly meaningful relationship was demonstrated between changes in northern and southern copepod abundances and sablefish recruitment. Conditions and projections in the model considered two competing “states of nature” to calculate the mean virgin recruitment: a “density-dependent” state that used the average of 1975-1991 recruitments, and a “regime shift” state that used the 1975-2000 recruitments. To account for this uncertainty, the Council adopted a 2002 ABC based on the proxy harvest rate ($F_{45\%}$,) adjusted to reflect the distribution north and south of 36° N latitude. This was done because a plan amendment would be needed to change the management area since groundfish FMP Amendment 14, permit stacking, specified only the area north of 36° N latitude.

The Council also wanted to verify industry reports of a large abundance of juvenile sablefish, an observation that was confirmed to some extent by preliminary results from the 2001 NMFS slope survey. Based on these considerations, the Council recommended a new expedited assessment be done in 2002. This update assessment (Schirripa 2002), by definition, sought to document changes in the estimates of the status of the stock by only considering newly available data for 2001 while not considering any new changes in the model structure or model assumptions. The expedited assessment confirmed fishermen’s anecdotal reports of a large 1999 year class, which was also apparent in the preliminary results of the 2001 slope survey. This assessment also suggested that a relatively strong year class was produced in 2000.

The 2005 assessment (Schirripa and Colbert 2006) made several changes to the format used in the previous full assessment. Landings were either taken from written records or reconstructed back to the year 1900 (the assumed model start date of the fishery). Inspection of length compositions from the AFSC and the NWFSC slope surveys led to the conclusion that the two surveys had different gear selectivities. Consequently, a separation of the data was maintained and the surveys used individually. Sufficient observer data was available in which to estimate discards from all three fisheries. To compliment these discards rates, a release mortality function based on sea surface temperature was developed from which to estimate dead discards by each of the three fisheries. Pursuing the connection between ocean conditions and recruitment, the model fit a relationship between sea level and recruitment deviations for the period 1973-2003 and used that relationship to hindcast recruitment variability back to 1925. The 2005 assessment found that spawning stock biomass has steadily declined since 1900 and suggested that there is little evidence that recruitment from 2001-2005 was as high as that for the strong 1999 and 2000 year classes. As a result, the assessment's biomass projections indicate a short-term increase, followed by a continued decline. With an estimate of current spawning biomass of 75,070 mt (compared to an unfished spawning biomass of 218,860 mt), the 2005 depletion is estimated to be 34.3 percent

4.1.3 Healthy Groundfish Species

4.1.3.1 Arrowtooth Flounder

Distribution and Life History

Arrowtooth flounder (*Atheresthes stomias*) range from the southern coast of Kamchatka to the northwest Bering Sea and Aleutian Islands to San Simeon, California. Arrowtooth flounder is the dominant flounder species on the outer continental shelf from the western Gulf of Alaska to Oregon. Eggs and larvae are pelagic; juveniles and adults are demersal (Garrison and Miller 1982; NOAA 1990). Juveniles and adults are most commonly found on sand or sandy gravel substrates, but occasionally occur over low-relief rock-sponge bottoms. Arrowtooth flounder exhibit a strong migration from shallow water summer feeding grounds on the continental shelf to deep water spawning grounds over the continental slope (NOAA 1990). Depth distribution may vary from as little as 50 m in summer to more than 500 m in the winter (Garrison and Miller 1982; NOAA 1990; Rickey 1995).

Arrowtooth flounder are oviparous with external fertilization. Spawning may occur deeper than 500 m off Washington (Rickey 1995). Larvae eat copepods, their eggs, and copepod nauplii (Yang 1995; Yang and Livingston 1985). Juveniles and adults feed on crustaceans (mainly ocean pink shrimp and krill) and fish (mainly gadids, herring, and pollock) (Hart 1988; NOAA 1990). Arrowtooth flounder exhibit two feeding peaks, at noon and midnight.

Stock Status and Management History

The West Coast stock of arrowtooth flounder was last assessed in 1993 (Rickey 1993). The stock is scheduled for a full assessment in the 2007–08 stock assessment cycle, which will inform the 2009–10 management specifications process.

4.1.3.2 Bank Rockfish

Distribution and Life History

Bank rockfish (*Sebastes rufus*) are found from Newport, Oregon, to central Baja California, Mexico, most commonly from Fort Bragg southward (Love 1992). Bank rockfish occur offshore (Eschmeyer, *et al.* 1983) from depths of 31 m to 247 m (Love 1992), although adults prefer depths over 210 m (Love, *et al.* 1990). Observations of commercial catches indicate juveniles occupy the shallower part of the species range (Love et al. 1990). Bank rockfish are a midwater, aggregating species and are found over hard bottoms (Love 1992), over high relief or on bank edges (Love, *et al.* 1990), and along the ledge of Monterey Canyon (Sullivan 1995). They also frequent deep water over muddy or sandy bottoms (Miller and Lea 1972). Spawning occurs from December to May (Love, *et al.* 1990). Peak spawning of bank rockfish in the Southern California Bight occurs in January and a month later in Central and Northern California. Off California, bank rockfish are multiple brooders (Love, *et al.* 1990). Females grow to a larger maximum size (50 cm) than males (44 cm), but grow at a slightly slower rate (Cailliet, *et al.* 1996). Males reach first maturity at 28 cm, 50 percent maturity at 31 cm, and 100 percent at 38 cm. Females reach first maturity at 31 cm, 50 percent at 36 cm, and 100 percent maturity at 39 cm (Love, *et al.* 1990). Bank rockfish are midwater feeders, eating mostly gelatinous planktonic organisms such as tunicates, but also preying on small fishes and krill (Love 1992).

4.1.3.3 Black Rockfish

Distribution and Life History

Black rockfish (*Sebastes melanops*) are found from Southern California (San Miguel Island) to the Aleutian Islands (Amchitka Island) and they occur most commonly from San Francisco northward (Hart 1988; Miller and Lea 1972; Phillips 1957; Stein and Hassler 1989). Black rockfish occur from the surface to greater than 366 m; however, they are most abundant at depths less than 54 m (Stein and Hassler 1989). Off California, black rockfish are found along with the blue, olive, kelp, black-and-yellow, and gopher rockfishes (Hallacher and Roberts 1985). The abundance of black rockfish in shallow water declines in the winter and increases in the summer (Stein and Hassler 1989). Densities of black rockfish decrease with depth during both the upwelling and non-upwelling seasons (Hallacher and Roberts 1985; PFMC 1996). Off Oregon, larger fish seem to be found in deeper water (20 m to 50 m) (Stein and Hassler 1989). Black rockfish off the northern Washington coast and outer Strait of Juan de Fuca exhibit no significant movement. However, fish appear to move from the central Washington coast southward to the Columbia River, but not into waters off Oregon. Movement displayed by black rockfish off the northern Oregon coast is primarily northward to the Columbia River (Culver 1986). Black rockfish form mixed sex, midwater schools, especially in shallow water (Hart 1988; Stein and Hassler 1989). Black rockfish larvae and young juveniles (<40 mm to 50 mm) are pelagic, but are benthic at larger sizes (Laroche and Richardson 1980).

Black rockfish have internal fertilization and annual spawning (Stein and Hassler 1989). Parturition occurs from February through April off British Columbia, January through March off Oregon, and January through May off California (Stein and Hassler 1989). Spawning areas are unknown, but spawning may occur in offshore waters because gravid (egg-carrying) females have been caught well offshore (Dunn and Hitz 1969; Hart 1988; Stein and Hassler 1989). Black rockfish can live to be more than 20 years in age. The maximum length attained by the black rockfish is 60 cm (Hart 1988; Stein and Hassler 1989). Off Oregon, black rockfish primarily prey on pelagic nekton (anchovies and smelt) and zooplankton such as salps, mysids, and crab megalops. Off Central California, juveniles eat copepods and zoea, while adults prey on juvenile rockfish, euphausiids, and amphipods during upwelling periods. During periods without upwelling they primarily consume invertebrates. Black rockfish feed almost exclusively in the water column (Culver 1986). Black rockfish are known to be eaten by lingcod and yelloweye rockfish (Stein and Hassler 1989).

Stock Status and Management History

The most recent black rockfish assessment was completed in 2003 and pertains to the portion of the coastwide stock occurring off the coasts of Oregon and California (Ralston and Dick 2003). Previous assessments had been completed for the portion of the stock occurring in waters between Cape Falcon (Oregon) and the US-Canada border. Alternative harvest levels in the 2003 assessment were ranged to capture the major uncertainty of historical landings prior to 1978. Black rockfish catches prior to 1945 were assumed to be zero in the assessment. Many gaps in historical landings of black rockfish since 1945 were evident, and these landings were reconstructed using a variety of data sources. The base model assumed cumulative landings of black rockfish from all fisheries was 17,100 mt from 1945 to 1977. The projected 2005–06 harvest specifications for black rockfish in the waters off Oregon and California used this base case catch scenario. The northern California-Oregon stock of black rockfish was concluded to be in healthy condition; its 2002 spawning output, estimated to be at 49 percent of its unexploited spawning level, meant that the stock as well above the management target level of $B_{40\%}$.

Black rockfish are scheduled to be assessed in the 2007–08 stock assessment cycle, which will inform the 2009–10 management specifications process.

4.1.3.5 California Scorpionfish

Distribution and Life History

California scorpionfish (*Scorpaena guttata*), also known locally as sculpin, is a generally benthic species found from central California to the Gulf of California in depths between the inter-tidal and about 170 m (Eschmeyer, *et al.* 1983; Love, *et al.* 1987). It generally inhabits rocky reefs, but in certain areas and seasons it aggregates over sandy or muddy substrate (Frey 1971; Love, *et al.* 1987). Catch rate analysis and tagging studies show that most, but not all, California scorpionfish migrate to deeper water to spawn during May-September (Love, *et al.* 1987). Tagging data suggest that they return to the same spawning site (Love, *et al.* 1987), but information is not available on non-spawning season site fidelity. California scorpionfish are quite mobile and may not be permanently tied to a particular reef (Love, *et al.* 1987).

California scorpionfish spawn from May through August, peaking in July (Love, *et al.* 1987). The species is oviparous, producing floating, gelatinous egg masses in which the eggs are embedded in a single layer (Orton 1955). California scorpionfish utilize the "explosive breeding assemblage" reproductive mode in which fish migrate to, and aggregate at traditional spawning sites for brief periods (Love, *et al.* 1987). These spawning aggregations have been targeted by fishermen. Few California scorpionfish are mature at 1 year of age, but over 50 percent are mature by age two and most are mature by age three (Love, *et al.* 1987).

The species feeds on a wide variety of foods, including crabs, fishes, octopi, isopods and shrimp, but juvenile *Cancer* crabs are the most important prey (Limbaugh 1955; Love, *et al.* 1987).

Stock Status and Management History

Before the 2005 assessment (Maunder et al. 2006), no assessment had been carried out for California scorpionfish. Given that in most years, 99 percent or more of the landings occur in the southern California ports, only the stock off of southern California is assessed. Although a substantial, but unknown, proportion of the stock is in Mexican waters, this assessment truncates the stock to the south at the international border. Data used in the model (SS2 version 1.18) included commercial and recreational landings, a fishery dependent CPUE statistic determined from analysis of CPFV logbook trip data from 1980-1999, a fishery independent index of abundance determined from trawl surveys carried out by the sanitation districts, and length-frequency data from the hook and line and trawl commercial fisheries, the recreational fishery, and the sanitation district trawl surveys. Based on the life history characteristics of the species (e.g. using "explosive" breeding assemblages), and limited information on related species, a steepness value of 0.7 was assumed for the assessment. The assessment noted that there is a large amount of variation in recruitment levels and recent recruitments are estimated to be substantially higher than average. Predictions of future biomass will be dependent on what recruitment level is assumed in the future. The estimate of the 2004 stock status was sensitive to the inclusion of the sanitation index in the stock assessment; removing the sanitation index reduced the current biomass level. The STAR Panel and STAT Team gave relative probabilities to models including and excluding the sanitation index of 74 percent and 26 percent, respectively. Including the sanitation index, the assessment estimated the 2005 biomass to be at 80 percent of its unfished level.

4.1.3.6 Chilipepper Rockfish

Distribution and Life History

Chilipepper rockfish (*Sebastes goodei*) are found from Magdalena Bay, Baja California, Mexico, to as far north as the northwest coast of Vancouver Island, British Columbia (Allen 1982; Hart 1988; Miller and Lea 1972). Chilipepper have been taken as deep as 425 m, but nearly all in survey catches were taken between 50 and 350 m (Allen and Smith 1988). Adults and older juveniles usually occur over the shelf and slope; larvae and small juveniles are generally found near the surface. In California, chilipepper are most commonly found associated with deep, high relief rocky areas and along cliff drop-offs (Love, *et al.* 1990), as well as on sand and mud bottoms (MBC 1987). They are occasionally found over flat, hard substrates (Love, *et al.* 1990). Love (1991) does not consider this to be a migratory species. Chilipepper may travel as far as 45 m off the bottom during the day to feed (Love 1991).

Chilipeppers are ovoviviparous and eggs are fertilized internally (Reilly, *et al.* 1992). Chilipepper school by sex just prior to spawning (MBC 1987). In California, fertilization of eggs begins in October and spawning occurs from September to April (Oda 1992) with the peak occurring during December to January (Love, *et al.* 1990). Chilipepper may spawn multiple broods in a single season (Love, *et al.* 1990). Females of the species are significantly larger, reaching lengths of up to 56 cm (Hart 1988). Males are usually smaller than 40 cm (Dark and Wilkins 1994). Males mature at two years to six years of age, and 50 percent are mature at three years to four years. Females mature at two years to five years with 50 percent mature at three years to four years (MBC 1987). Females may attain an age of about 27 years, whereas the maximum age for males is about 12 years (MBC 1987).

Larval and juvenile chilipepper eat all life stages of copepods and euphausiids, and are considered to be somewhat opportunistic feeders (Reilly, *et al.* 1992). In California, adults prey on large euphausiids, squid, and small fishes such as anchovies, lanternfish, and young Pacific whiting (Hart 1988; Love, *et al.* 1990). Chilipepper are found with widow rockfish, greenspotted rockfish, and swordspine rockfish (Love, *et al.* 1990). Juvenile chilipepper compete for food with bocaccio, yellowtail rockfish, and shortbelly rockfish (Reilly, *et al.* 1992).

Stock Status and Management History

Chilipepper rockfish were last assessed in 1998 (Ralston, *et al.* 1998), at which time the stock was estimated to be at 46 percent to 61 percent of unfished biomass. Due to constraints of co-occurring depleted species, the catch of chilipepper rockfish has reduced to incidental levels. Chilipepper rockfish is scheduled for a full assessment in the 2008–09 stock assessment cycle.

4.1.3.7 Dover Sole

Distribution and Life History

Dover sole (*Microstomus pacificus*) are distributed from the Navarin Canyon in the northwest Bering Sea and westernmost Aleutian Islands to San Cristobal Bay, Baja California, Mexico (Hagerman 1952; Hart 1988; NOAA 1990). Dover sole are a dominant flatfish on the continental shelf and slope from Washington to Southern California. Adults are demersal and are found from 9 m to 1,450 m, with highest abundance below 200 m to 300 m (Allen and Smith 1988). Adults and juveniles show a high affinity toward soft bottoms of fine sand and mud. Juveniles are often found in deep nearshore waters. Dover sole are considered to be a migratory species. In the summer and fall, mature adults and juveniles can be found in shallow feeding grounds, as shallow as 55 m off British Columbia (Westrheim and Morgan 1963). By late fall, Dover sole begin moving offshore into deep waters (400 m or more) to spawn. Although there is an inshore-offshore seasonal migration, little north-south coastal migration occurs (Westrheim and Morgan 1963).

Spawning occurs from November through April off Oregon and California (Hart 1988; NOAA 1990; Pearcy, *et al.* 1977) in waters 80 m to 550 m depth at or near the bottom (Hagerman 1952; Hart 1988; Pearcy, *et al.* 1977). Dover sole are oviparous and fertilization is external. Larvae are planktonic and are transported to offshore nursery areas by ocean currents and winds for up to two years. Settlement to benthic living occurs mid-autumn to early spring off Oregon, and February through July off California (Markle, *et al.* 1992). Juvenile fish move into deeper water with age and begin seasonal spawning and feeding migrations upon reaching maturity.

Dover sole larvae eat copepods, eggs, and nauplii, as well as other plankton. Juveniles and adults eat polychaetes, bivalves, brittlestars, and small benthic crustaceans. Dover sole feed diurnally by sight and smell (Dark and Wilkins 1994; Gabriel and Pearcy 1981; Hart 1988; NOAA 1990). Dover sole larvae are eaten by pelagic fishes like albacore, jack mackerel and tuna, as well as sea birds. Juveniles and adults are preyed upon by sharks, demersally feeding marine mammals, and to some extent by sablefish (NOAA 1990). Dover sole compete with various eelpout species, rex sole, English sole, and other fishes of the mixed species flatfish assemblage (NOAA 1990).

Stock Status and Management History

Dover sole have been the target of trawl operations along the West Coast of North America since World War II and were almost certainly caught prior to the war as incidental take in directed fisheries for English sole and petrale sole. Almost all of the harvests have been taken by groundfish trawl, and in particular as part of the Dover sole, shortspine thornyhead, longspine thornyhead, and sablefish (DTS) trawl fishery. Annual landings from U.S. waters averaged 6,700 mt during the 1960s, 12,800 mt during the 1970s, 18,400 mt during the 1980s, 12,400 mt during the 1990s, and 7,200 mt since 2000. Discarding of small, unmarketable fish is an important, but poorly documented feature of the fishery.

The 1997 Dover sole stock assessment (Brodziak, *et al.* 1997) treated the entire population from the Monterey area through the U.S./Vancouver area as a single stock based on research addressing the genetic structure of the population. Under a range of harvest policies and recruitment scenarios, the 1997 model projected that spawning biomass would increase from the estimated year-end level in 1997 through the year 2000 due to growth of the exceptionally large 1991 year class and to the lower catches observed in the fishery since 1991.Dover sole were next assessed in 2001, resulting in an estimated spawning stock size of 29 percent of the unexploited biomass (Sampson and Wood 2001). Although there was no clear trend in abundance, stocks steadily declined from the 1950s until the mid-1990s. The

1991 year class was the last strong one, consistent with the 1997 assessment. The 2001 assessment authors projected five years of Dover sole harvest levels based on preferred, optimistic, and pessimistic projections of recruitment. These options varied the harvest rate from $F_{40\%}$ (the current F_{MSY} proxy) to $F_{50\%}$. The Council adopted an ABC of 8,510 mt and an OY of 7,440 mt in 2005 and 2006, which was calculated using the current F_{MSY} proxy and the 40-10 adjustment.

A new Dover sole assessment was done in 2005 (Sampson 2006) which indicated the stock was above target levels and had an increasing abundance trend. The final base model estimated the unexploited spawning stock biomass to be slightly less than 300,000 mt and spawning biomass at the start of 2005 was estimated to be about 189,000 mt, equivalent to 63 percent of the unexploited level. Spawning biomass and age 5+ biomass (roughly corresponding to the exploitable biomass) were estimated to have reached their lowest points in the mid-1990s and have been rising steadily since. The estimated increases in biomass since the mid-1990s are due primarily to strong year classes in 1990 and 1991, and exceptionally strong year classes in 1997 and 2000.

4.1.3.8 English Sole

Distribution and Life History

English sole (*Parophrys vetulus*) are found from Nunivak Island in the southeast Bering Sea and Agattu Island in the Aleutian Islands, to San Cristobal Bay, Baja California Sur, Mexico (Allen and Smith 1988). In research survey data, nearly all occurred at depths greater than 250 m (Allen and Smith 1988). Adults and juveniles prefer soft bottoms composed of fine sands and mud (Ketchen 1956), but also occur in eelgrass habitats (Pearson and Owen 1992). English sole use nearshore coastal and estuarine waters as nursery areas (Krygier and Pearcy 1986; Rogers, *et al.* 1988). Adults make limited migrations. Those off Washington show a northward post-spawning migration in the spring on their way to summer feeding grounds and a southerly movement in the fall (Garrison and Miller 1982). Tagging studies have identified separate stocks based on this species' limited movements and meristic characteristics (Jow 1969).

Spawning occurs over soft-bottom mud substrates (Ketchen 1956) from winter to early spring, depending on the stock. Eggs are neritic and buoyant, but sink just before hatching (Hart 1988); juveniles and adults are demersal (Garrison and Miller 1982). Small juveniles settle in the estuarine and shallow nearshore areas all along the coast, but are less common in southerly areas, particularly south of Point Conception. Large juveniles commonly occur up to depths of 150 m. Although many postlarvae may settle outside of estuaries, most will enter estuaries during some part of their first year of life (Gunderson, *et al.* 1990). Some females mature as three-year-olds (26 cm), but all females over 35 cm long are mature. Males mature at two years (21 cm).

Larvae are planktivorous. Juveniles and adults are carnivorous, eating copepods, amphipods, cumaceans, mysids, polychaetes, small bivalves, clam siphons, and other benthic invertebrates (Allen 1982; Becker 1984; Hogue and Carey 1982; Simenstad, *et al.* 1979). English sole feed primarily by day, using sight and smell, and sometimes dig for prey (Allen 1982; Hulberg and Oliver 1979). A juvenile English sole's main predators are probably piscivorous birds such as great blue heron (*Ardia herodias*), larger fishes, and marine mammals. Adults may be eaten by marine mammals, sharks, and other large fishes.

Stock Status and Management History

English sole have been captured by the bottom trawl fishery operating off the western coast of North America for over a century. Stewart (2006) found that peak catches from the southern area occurred in the 1920s with a maximum of 3,976 mt of English sole landed in 1929, and peak catches from the northern area occurred in the 1940s to the 1960s with a maximum of 4,008 mt landed in 1948. Landings from both areas have generally declined since the mid 1960s and have been at nearly historical lows in recent years

The most recent stock assessment of English sole prior the current 2005 assessment was performed in 1993 (Sampson and Stewart 1993), using an earlier version of the Stock Synthesis program (Methot 1989). That assessment considered the female portion of the stock off Oregon and Washington during the years 1977-1993. The English sole spawning biomass was found to be increasing and it was concluded that the fishery was sustainable at (then) contemporary harvest levels.

The 2005 assessment of English sole (Stewart 2006) modeled a single coastwide stock, although both commercial and fishery independent data sources were treated separately for a southern (INPFC Conception and Monterey) and a northern (INPFC Eureka, Columbia and U.S. Vancouver) area. The assessment found that English sole spawning biomass has increased rapidly over the last decade after a period of poor recruitments from the mid 1970s to the mid 1990s, which left the stock at nearly historically low levels. Strong year classes were estimated for 1995, 1996, and 1999. The data indicate that the 1999 year class may be the largest in the time-series, although the magnitude is somewhat uncertain because the assessment contains no age data subsequent to 2000. There is substantial uncertainty related to certain parameters in the assessment, specifically biomass, recruitment, and relative depletion, as indicated by the wide confidence intervals for those parameters. Nevertheless, sensitivity analyses indicated that the conclusion that current spawning biomass exceeds the target level ($B_{40\%}$) was robust to all three of these sources of uncertainty. The spawning biomass at the beginning of 2005 was estimated to be 31,379 mt, which corresponds to 91.5 percent of the unexploited equilibrium level. Current (2004) total catches were estimated to be 1,341 mt, of which 950 mt were landed.

4.1.3.9 Lingcod

Distribution and Life History

Lingcod (*Ophiodon elongatus*), a top order predator of the family Hexagrammidae, ranges from Baja California, Mexico, to Kodiak Island in the Gulf of Alaska. Lingcod are demersal at all life stages (Allen and Smith 1988; NOAA 1990; Shaw and Hassler 1989). Adult lingcod prefer two main habitat types: slopes of submerged banks 10 m to 70 m below the surface with seaweed, kelp, and eelgrass beds and channels with swift currents that flow around rocky reefs (Emmett, *et al.* 1991; Giorgi and Congleton 1984; NOAA 1990; Shaw and Hassler 1989). Juveniles prefer sandy substrates in estuaries and shallow subtidal zones (Emmett, *et al.* 1991; Forrester and Thomson 1969; Hart 1988; NOAA 1990). As the juveniles grow they move to deeper waters. Adult lingcod are considered a relatively sedentary species, but there are reports of migrations of greater than 100 km by sexually immature fish (Jagielo 1990; Mathews and LaRiviere 1987; Matthews 1992; Smith, *et al.* 1990).

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

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

Stock Status and Management History

Lingcod have been a target of commercial fisheries since the early 1900's in California, and since the late 1930's in Oregon and Washington waters. Recreational fishermen have targeted lingcod since the 1920's in California. A smaller recreational fishery has taken place in Washington and Oregon since at least the 1970's. Although historically the catches of lingcod have been greater in the commercial sector than in the recreational sector, this pattern has been reversed since the late 1990's.

In 1997, U.S. scientists assessed the size and condition of the portion of the stock in the Columbia and Vancouver areas (including the Canadian portion of the Vancouver management area), and concluded the stock had fallen to below 10 percent of its unfished size (Jagielo, *et al.* 1997). The Council responded by imposing substantial harvest reductions coastwide, reducing the harvest targets for the Eureka, Monterey, and Conception areas by the same percentage as in the north. In 1999, scientists assessed the southern portion of the stock and concluded the condition of the southern stock was similar to the northern stock, thus confirming the Council had taken appropriate action to reduce harvest coastwide (Adams, *et al.* 1999). Based on these assessments, the lingcod stock was declared depleted in 1999.

Jagielo et al. (2000) conducted a coastwide lingcod assessment and determined the total biomass increased from 6,500 mt in the mid-1990s to about 8,900 mt in 2000. In the south, the population had also increased slightly from 5,600 mt in 1998 to 6,200 mt in 2000. In addition, the assessment concluded previous aging methods portrayed an older population; whereas new aging efforts showed the stock to be younger and more productive. Therefore, the ABC and OY were increased in 2001 on the basis of the new assessment. A revised rebuilding analysis of coastwide lingcod (Jagielo and Hastie 2001) was adopted by the Council in September 2001. It confirmed the major conclusions of the 2000 assessment and rebuilding analysis, but slightly modified recruitment projections to stay on the rebuilding trajectory to reach target biomass in 2009. This modification resulted in a slight decrease in the 2002 ABC and OY.

A coastwide assessment for lingcod was completed in 2003 (Jagielo, *et al.* 2004) and approved by the Council in March 2004 for use in setting harvest specifications for the 2005–06 biennium. This assessment updated the previous coastwide lingcod assessment (Jagielo, *et al.* 2000). As in the previous assessment, separate age-structured assessment models were constructed for northern areas (Columbia and U.S.-Vancouver areas) and southern areas (Conception, Monterey, and Eureka areas). Results from these two models were combined to obtain coastwide estimates of spawning biomass, the depletion level, and other relevant assessment outputs. This assessment indicated that the lingcod stock had achieved the rebuilding objective of $B_{40\%}$ in the north (actually 28 percent above $B_{40\%}$), but was at $B_{31\%}$ in the south. However, the adopted lingcod rebuilding plan specified a coastwide rebuilding objective. The Council's SSC, working in concert with the lead assessment author, recalculated the coastwide lingcod stock status in March 2004 using actual 2003 harvests (the assessment, which was completed during 2003, assumed harvest would be equal to the specified OY in 2003). Their calculations indicated that the spawning biomass at the start of 2004 was within 99.3 percent of B_{MSY} (or $B_{40\%}$) on a coastwide basis. Therefore, the Council could not recommend to NMFS that the stock should be declared rebuilt. The lingcod rebuilding plan was adopted by the Council and incorporated into the groundfish FMP under Amendment 16-2. The rebuilding plan had established a target rebuilding year of 2009 and the harvest control rule of $F = 0.0531$ for fisheries in the northern areas and $F = 0.0610$ for fisheries in the southern areas (with a PMAX of 60 percent). However the 2003 assessment (Jagielo, *et al.* 2004) was then used to recalculate the harvest control rule .to be $F = 0.17$ for fisheries in the northern areas and $F = 0.15$ for fisheries in the southern areas.

The 2005 assessment (Jagielo and Wallace 2006) used the Stock Synthesis II program and, as in previous lingcod assessments, constructed separate models of the stock for northern and southern areas. With respect to uncertainty within the assessment, the authors pointed in particular to the estimation of assessment parameters for the southern (LCS) model due to the sparseness of data (in particular, the short time series of fishery age data and small sample sizes). On a coastwide basis, the lingcod population was concluded to be fully rebuilt, given that the spawning biomass in 2005 was estimated to be 64 percent of its unfished level (B_{2005}=34,017 mt; B_0= 52,850 mt). Within the separate area models, current biomass is closer to unfished biomass in the north (87 percent of B_0) than in the south (24 percent of B_0). Given that the lingcod stock is managed on a coastwide basis, the Council announced the lingcod stock to be fully rebuilt in 2005, which is four years earlier than the target rebuilding year established in the rebuilding plan.

4.1.3.10 Longspine Thornyhead

Distribution and Life History

Longspine thornyhead (*Sebastolobus altivelis*) are found from the southern tip of Baja California, Mexico, to the Aleutian Islands (Eschmeyer, *et al.* 1983; Jacobson and Vetter 1996; Love 1991; Miller and Lea 1972; Smith and Brown 1983), but are abundant from Southern California northward (Love 1991). Juvenile and adult longspine thornyhead are demersal and occupy the benthic surface (Smith and Brown 1983). Off Oregon and California, longspine thornyhead mainly occur at depths of 400 m to 1,400 plus m, most between 600 m and 1,000 m in the oxygen minimum zone (Jacobson and Vetter 1996). Thornyhead larvae (*Sebastolobus* spp.) have been taken in research surveys up to 560 km off the California coast (Cross 1987; Moser, *et al.* 1993). Juveniles settle on the continental slope at about 600 m to 1,200 m (Jacobson and Vetter 1996). Longspine thornyhead live on soft bottoms, preferably sand or mud (Eschmeyer, *et al.* 1983; Jacobson and Vetter 1996; Love 1991). Longspine thornyheads neither school nor aggregate (Jacobson and Vetter 1996).

Spawning occurs in February and March at 600 m to 1,000 m (Jacobson and Vetter 1996; Wakefield and Smith 1990). Longspine thornyhead are oviparous and are multiple spawners, spawning two to four batches per season (Love 1991; Wakefield and Smith 1990). Eggs rise to the surface to develop and hatch. Floating egg masses can be seen at the surface in March, April, and May (Wakefield and Smith 1990). Juveniles (<5.1 cm long) occur in midwater (Eschmeyer, *et al.* 1983). After settling, longspine thornyhead are completely benthic (Jacobson and Vetter 1996). Longspine thornyhead can grow to 38 cm (Eschmeyer, *et al.* 1983; Jacobson and Vetter 1996; Miller and Lea 1972) and live more than 40 years (Jacobson and Vetter 1996). Longspine thornyhead reach the onset of sexual maturity at 17 cm to 19 cm total length (10 percent of females mature) and 90 percent are mature by 25 cm to 27 cm (Jacobson and Vetter 1996).

Longspine thornyhead are ambush predators (Jacobson and Vetter 1996). They consume fish fragments, crustaceans, bivalves, and polychaetes and occupy a tertiary consumer level in the food web. Pelagic juveniles prey largely on herbivorous euphausiids and occupy a secondary consumer level in the food web (Love 1991; Smith and Brown 1983). Longspine thornyhead are commonly found in shortspine thornyhead stomachs. Cannibalism in newly settled longspine thornyhead may occur, because juveniles settle directly onto adult habitat (Jacobson and Vetter 1996). Sablefish commonly prey on longspine thornyhead.

Stock Status and Management History

Longspine thornyhead are exploited in the limited entry deep-water trawl fishery operating on the continental slope that also targets shortspine thornyhead, Dover sole and sablefish (called the DTS fishery). A very small proportion of longspine landings is due to non-trawl gears (gillnet, hook and line). Longspine and shortspine thornyhead make up a single market category, however they have been managed under separate harvest specifications since 1992. The thornyhead fishery developed in Northern California during the 1960s. The fishery then expanded north and south, and the majority of the landings of longspine thornyhead have since been in the Monterey, Eureka, and Columbia INPFC areas, with some increase in landings from the Conception (southern CA) and Vancouver (northern WA) INPFC areas in recent years (Fay 2006).

Longspine thornyhead were assessed for the fourth time in 2005 (Fay 2006); the previous assessment was conducted in 1997 (Rogers, *et al.* 1997). The model assumed one coastwide stock with one coastwide trawl fishery. Data sources included commercial landings and length composition, three sources of discard rates, and biomass indices and length composition information from the Alaska Fisheries Science Center (AFSC) and Northwest Fisheries Science Center slope surveys. Results from the base model suggested that the length compositions from the slope surveys were influencing recruitment in the model, such that the model estimated slightly higher recruitment in the early 1990s, which then declined in the mid to late 1990s. The spawning biomass in 2005 was approximately 71 percent of unfished spawning biomass, but this estimate is highly uncertain as is evident in the comparatively large 95 percent confidence interval for the spawning biomass. A suite of sensitivity analyses bracketed some of the areas of uncertainty in catchability, selectivity, mortality and steepness that formed a basis for considering and discussing major areas of uncertainty for the decision table.

4.1.3.11 Pacific Whiting

Distribution and Life History

Pacific whiting (*Merluccius productus*), also known as Pacific hake, are a semi-pelagic merlucciid (a cod-like fish species) that range from Sanak Island in the western Gulf of Alaska to Magdalena Bay, Baja California Sur, Mexico. They are most abundant in the California Current System (Bailey 1982; Hart 1988; Love 1991; NOAA 1990). Smaller populations of Pacific whiting occur in several of the larger semi-enclosed inlets of the northeast Pacific ocean, including the Strait of Georgia, Puget Sound, and the Gulf of California (Bailey, *et al.* 1982; Stauffer 1985). The highest densities of Pacific whiting are usually between 50 m and 500 m, but adults occur as deep as 920 m and as far offshore as 400 km

(Bailey 1982; Bailey, *et al.* 1982; Dark and Wilkins 1994; Dorn 1995; Hart 1988; NOAA 1990). Pacific whiting school at depth during the day, then move to the surface and disband at night for feeding (McFarlane and Beamish 1986; Sumida and Moser 1984; Tanasich, *et al.* 1991). Coastal stocks spawn off Baja, California in the winter, then the mature adults begin moving northward and inshore following food supply and Davidson Currents (NOAA 1990). Pacific whiting reach as far north as southern British Columbia by fall. They then begin a southern migration to spawning grounds further offshore (Bailey, *et al.* 1982; Dorn 1995; Smith 1995; Stauffer 1985).

Spawning occurs from December through March, peaking in late January (Smith 1995). Pacific whiting are oviparous with external fertilization. Eggs of the Pacific whiting are neritic and float to neutral buoyancy (Bailey 1982; Bailey, *et al.* 1982; NOAA 1990). Hatching occurs in five days to six days, and within three months to four months juveniles are typically 35 mm (Hollowed 1992). Juveniles move to deeper water as they get older (NOAA 1990). Females mature at three years to four years (34 cm to 40 cm) and nearly all males are mature by three years (28 cm). Females grow more rapidly than males after four years; growth ceases for both sexes at 10 years to 13 years (Bailey, *et al.* 1982).

All life stages feed near the surface late at night and early in the morning (Sumida and Moser 1984). Larvae eat calanoid copepods, as well as their eggs and nauplii (McFarlane and Beamish 1986; Sumida and Moser 1984). Juveniles and small adults feed chiefly on euphausiids (NOAA 1990). Large adults also eat amphipods, squid, herring, smelt, crabs, and sometimes juvenile whiting (Bailey 1982; Dark and Wilkins 1994; McFarlane and Beamish 1986; NOAA 1990). Eggs and larvae of Pacific whiting are eaten by pollock, herring, invertebrates, and sometimes Pacific whiting. Juveniles are eaten by lingcod, Pacific cod, and rockfish species. Adults are preyed on by sablefish, albacore, pollock, Pacific cod, marine mammals, soupfin sharks, and spiny dogfish (Fiscus 1979; McFarlane and Beamish 1986; NOAA 1990).

Stock Status and Management History

The history of the coastal whiting fishery is characterized by rapid changes brought about by the development of foreign fisheries in 1966, joint-venture fisheries in the early 1980s, and domestic fisheries in 1990s. The coastwide (U.S. and Canada) whiting stock is assessed annually by a joint technical team of scientists from both countries. The 2001 assessment (Helser, *et al.* 2002) incorporated 2001 hydroacoustic survey data and showed the spawning stock biomass declined substantially and had been lower during the past several years than previously estimated. The stock assessment estimated the biomass in 2001 was 0.7 million mt, and the female spawning biomass was less than 20 percent of the unfished biomass. This was substantially lower than indicated in the 1998 assessment (Dorn, *et al.* 1999), which estimated the biomass to be at 39 percent of its unfished biomass. Therefore, NMFS declared the whiting stock depleted in April 2002. The stock was projected to be near 25 percent of the unfished biomass in 2002 and above $B_{25\%}$ in 2003.

The 2004 whiting stock assessment (Helser, *et al.* 2004), incorporating new data from the 2003 hydro-acoustic survey, estimated the spawning stock biomass at the beginning of 2004 between 47 percent and 51 percent of unfished biomass; the stock was therefore declared rebuilt. Furthermore, because the 1999 year class was larger than previously estimated, estimates of the 2001 biomass in this assessment ranged from 27 percent to 33 percent of unfished biomass, indicating that the stock approached, but never fell below, the $B_{25\%}$ minimum stock size threshold (Whiting STAR Panel 2004).

The 2005 whiting stock assessment considered two alternative and equally plausible models based on the value for the catchability coefficient (*q*) for the hydroacoustic survey, q=1 and q=0.6. Within a stock assessment model, a higher catchability coefficient brings about a lower the estimate of current biomass. Under the base model (q=1), which the Council adopted, the 2004 coastwide depletion level was estimated to be 0.50 (given that age 3+ biomass was estimated to be 2.5 million mt in 2004).

Unlike the 2005 assessment, the 2006 assessment was based on the stock assessment package Stock Synthesis 2. The assessment considered two alternative and equally plausible models based on the value for the catchability coefficient (*q*) for the hydroacoustic survey, q=1 and q=0.69. One of these values (*q*=1) is the same as that included in the 2005 assessment. The second value, q=0.69, was estimated taking into account a prior distribution on *q* selected by the STAR Panel. Although the SSC endorsed the option of combining of results from both models (giving each model equal weight) to form the basis for management advice, the Council adopted 2006 ABC and OY values based on the base model that used the more conservative q=1 value. The base model estimated the depletion level of the coastwide stock to be 31 percent. The assessment reinforced the importance of the 1999 year class, noting that it was the single most dominate cohort since the late 1980s and it in large part supported fishery catches during the last few years; over the coming years its proportion within the overall stock will decrease, however, and therefore the spawning biomass is predicted to decline in the future for almost any level of harvest.

4.1.3.12 Shortbelly Rockfish

Distribution and Life History

Shortbelly rockfish (*Sebastes jordani*) are found from San Benito Islands, Baja California, Mexico, to La Perouse Bank, British Columbia (Eschmeyer, *et al.* 1983; Lenarz 1980). The habitat of the shortbelly rockfish is wide ranging (Eschmeyer, *et al.* 1983). Shortbelly rockfish inhabit waters from 50 m to 350 m in depth (Allen and Smith 1988) on the continental shelf (Chess, *et al.* 1988) and upper-slope (Stull and Tang 1996). Adults commonly form very large schools over smooth bottoms near the shelf break (Lenarz 1992). Shortbelly rockfish have also been observed along the Monterey Canyon ledge (Sullivan 1995). During the day shortbelly rockfish are found near the bottom in dense aggregations. At night they are more dispersed (Chess, *et al.* 1988). During the summer shortbelly rockfish tend to move into deeper waters and to the north as they grow, but they do not make long return migrations to the south in the winter to spawn (Lenarz 1980).

Shortbelly rockfish are viviparous, bearing advanced yolk sac larvae (Ralston, *et al.* 1996a). Shortbelly rockfish spawn off California during January through April (Lenarz 1992). Larvae metamorphose to juveniles at 27 mm and appear to begin forming schools at the surface at that time (Laidig, *et al.* 1991; Lenarz 1980). A few shortbelly rockfish mature at age two, while 50 percent are mature at age three, and nearly all are mature by age four (Lenarz 1992). They live to be about ten years old (Lenarz 1980; MacGregor 1986) with the maximum recorded age being 22 years (Lenarz 1992).

Shortbelly rockfish feed primarily on various life stages of euphausiids and calanoid copepods both during the day and night (Chess, *et al.* 1988; Lenarz, *et al.* 1991). Shortbelly rockfish play a key role in the food chain as they are preyed upon by Chinook and coho salmon, lingcod, black rockfish, Pacific whiting, bocaccio, chilipepper, pigeon guillemots, western gull, marine mammals, and other taxa (Chess, *et al.* 1988; Eschmeyer, *et al.* 1983; Hobson and Howard 1989; Lenarz 1980).

4.1.3.13 Shortspine Thornyhead

Distribution and Life History

Shortspine thornyhead (*Sebastolobus alascanus*) are found from northern Baja California, Mexico, to the Bering Sea and occasionally to the Commander Islands north of Japan (Jacobson and Vetter 1996). They are common from Southern California northward (Love 1991). Shortspine thornyhead inhabit areas over the continental shelf and slope (Erickson and Pikitch 1993; Wakefield and Smith 1990). Although they can occur as shallow as 26 m (Eschmeyer, *et al.* 1983), shortspine thornyhead mainly occur in depths between 100 m and 1,400 m off Oregon and California, most commonly between 100 m to 1,000 m (Jacobson and Vetter 1996).

Spawning occurs in February and March off California (Wakefield and Smith 1990). Shortspine thornyhead are thought to be oviparous (Wakefield and Smith 1990), although there is no clear evidence to substantiate this (Erickson and Pikitch 1993). Eggs rise to the surface to develop and hatch. Larvae are pelagic for about 12 months to 15 months. During January to June, juveniles settle onto the continental shelf and then move into deeper water as they become adults (Jacobson and Vetter 1996). Off California, they begin to mature at five years; 50 percent are mature by 12 years to 13 years; and all are mature by 28 years (Owen and Jacobson 1992). Although it is difficult to determine the age of older individuals, Owen and Jacobson (Owen and Jacobson 1992) report that off California, they may live to over 100 years of age. The mean size of shortspine thornyhead increases with depth and is greatest at 1,000 m to 1,400 m (Jacobson and Vetter 1996).

Benthic individuals are ambush predators that rest on the bottom and remain motionless for extended periods of time (Jacobson and Vetter 1996). Off Alaska, shortspine thornyhead eat a variety of invertebrates such as shrimps, crabs, and amphipods, as well as fishes and worms (Owen and Jacobson 1992). Longspine thornyhead are a common item found in the stomachs of shortspine thornyhead. Cannibalism of newly settled juveniles is important in the life history of thornyheads (Jacobson and Vetter 1996).

Stock Status and Management History

Shortspine thornyhead are a major component of the deepwater fishery on the continental slope, especially the trawl fishery for Dover sole, thornyheads, and sablefish (referred to as the DTS complex). The species is one of the most numerous components of the slope ecosystem; however, this is an especially long-lived species and cannot sustain aggressive harvest rates. It is taken coincidentally with Dover sole, sablefish, and longspine thornyhead, especially in the upper slope and lower shelf; in deeper water, longspine thornyhead is a more predominate species. The two thornyhead species are often difficult to distinguish, and historical landings data combine the two into a single category; nevertheless, the species have been managed under separate harvest specifications since 1992.

The assessment of shortspine thornyhead in 1997 covered the area from Central California at 36° N latitude to the U.S./Canada border (Rogers, *et al.* 1997). The STAR Panel expressed concern that management requires more detailed information on thornyheads than could be obtained from the available data. In 1998, two separate stock assessments covering the area north of 36°N latitude were prepared and accepted by the Council (NMFS STAT and OT STAT 1998; Rogers, *et al.* 1998). A synthesis of these two assessments was used to set the harvest specifications 1999 and 2000; given that the synthesis estimated 1999 depletion at 32 percent of virgin biomass, the Council used the precautionary 40-10 policy to set the OYs for those two years.

There were a range of uncertainties in the 2001 assessment of shortspine thornyhead, in 2001, not the least of which was the estimated biomass (Piner and Methot 2001). The assessment was extended south to Point Conception (in contrast to past surveys, which were limited to stocks north of the 36° N latitude management area boundary). The authors concluded the 2001 spawning biomass ranged between 25 percent and 50 percent of unexploited spawning biomass. As was also the case in the 1998 assessment (Rogers, *et al.* 1998), the uncertainty in abundance largely revolved around the uncertainty in recruitment and survey *q*, or catchability, of shortspine thornyhead in slope surveys. The authors also concluded that the trend in stock biomass was increasing and the stock was not depleted. Based on estimated biomass and application of the GMT-recommended F=0.75M principle (which approximates an $F_{50\%}$ proxy harvest rate for shortspine thornyhead), the assessment authors and GMT recommended a slight increase in the ABC and OY for 2002. They also recommended that the harvest specifications be set for two areas divided by Pt. Conception (34°27'N latitude), rather than the previous policy to separate the management areas at the Conception-Monterey border (36° N latitude). Despite the uncertainty in biomass estimates and determination of whether shortspine thornyhead should be treated as a "precautionary zone" stock, these recommendations did treat the stock as such by applying the 40-10 adjustment.

The 2005 assessment (Hamel 2006c) extended the southern border of the assessment area from Pt. Conception to the Mexican border (32.5ºN latitude). Including the entire Conception area resulted in a larger basis for unfished biomass, given that this area was estimated to contain nearly half of the stock's total West Coast biomass. Another key modeling change from the previous assessment was to model the slope surveys as having dome-shaped selectivity. Because of the sparseness and quality of the data, natural mortality, steepness and the catchability coefficient were all fixed. The catchability coefficient for the slope survey was fixed at q=1 based on findings by Lauth et al. (2004). The STAR Panel (Barnes, *et al.* 2006b) noted that because the supporting data and subsequent assessment were just marginally sufficient to estimate the resource status, the biological reference points (e.g. biomass levels) should be considered with caution. The assessment estimated the spawning biomass for 2005 to be 63 percent of unfished abundance, with a weakly falling recent trend. It was also noted that there could be regional management concerns with this stock because while the assessment OY is coastwide, there are differences in historic exploitation rates north and south of Point Conception.

4.1.3.14 Splitnose Rockfish

Distribution and Life History

Splitnose rockfish (*Sebastes diploproa*) occur from Prince William Sound, Alaska to San Martin Island, Baja California, Mexico (Miller and Lea 1972)). Splitnose rockfish occur from zero m to 800 m, with most survey catches occurring in depths of 100 m to 450 m (Allen and Smith 1988). The relative abundance of juveniles (<21 cm) is quite high in the 91 m to 272 m depth zone and then decreases sharply in the 274 m to 475 m depth zone (Boehlert and Kappenman 1980). Splitnose rockfish have a pelagic larval stage, a prejuvenile stage, and a benthic juvenile stage (Boehlert 1977). Benthic splitnose rockfish associate with mud habitats (Boehlert 1980). Young occur in shallow water, often at the surface under drifting kelp (Eschmeyer, *et al.* 1983). The major types of vegetation juveniles are found under are *Fucus* spp. (dominant), eelgrass, and bull kelp (Shaffer, *et al.* 1995). Juvenile splitnose rockfish off Southern California are the dominant rockfish species found under drifting kelp (Boehlert 1977).

Splitnose rockfish are ovoviviparous and release yolk sac larvae (Boehlert 1977). They may have two parturition seasons, or may possibly release larvae throughout the year (Boehlert 1977). In general, the main parturition season get progressively shorter and later toward the north (Boehlert 1977). Splitnose rockfish growth rates vary with latitude, being generally faster in the north. Splitnose rockfish mean sizes increase with depth in a given latitudinal area. Mean lengths of females are generally greater than males (Boehlert 1980). Off California, 50 percent maturity occurs at 21 cm, or five years of age, whereas off British Columbia 50 percent of males and females are mature at 27 cm (Hart 1988). Adults can achieve a maximum size of 46 cm (Boehlert and Kappenman 1980; Eschmeyer, *et al.* 1983; Hart 1988). Females have surface ages to 55 years and section ages to 81 years.

Adult splitnose rockfish off Southern California feed on midwater plankton, primarily euphausiids (Allen 1982). Juveniles feed mainly on planktonic organisms, including copepods and cladocerans during June and August. In October, their diets shift to larger epiphytic prey and are dominated by a single amphipod species. Juvenile splitnose rockfish actively select prey (Shaffer, *et al.* 1995) and are probably diurnally active (Allen 1982). Adults are probably nocturnally active, at least in part (Allen 1982).

4.1.3.15 Starry Flounder

Distribution and Life History

Starry flounder have a very broad geographic distribution around the rim of the north Pacific ocean and have been recorded from Los Angeles to the Aleutian Islands, although they are rare south of Point Conception (Kramer and O'Connell 1995; Orcutt 1950). Off the West Coast of the United States starry flounder are found commonly in nearshore waters, especially in the vicinity of estuaries (Baxter 1999; Kimmerer 2002; NOAA 1991; Orcutt 1950; Pearson 1989; Sopher 1974). It has a quite shallow bathymetric distribution, with most individuals occurring in waters less than 80 m, although specimens have been collected off the continental shelf in excess of 350 m (Kramer and O'Connell 1995; Orcutt 1950). They are most often found on gravel, clean shifting sand, hard stable sand, and mud substrata.

Spawning occurs primarily during the winter months of December and January, at least in central California (Orcutt 1950); it may occur somewhat later in the year (February-April) off British Columbia and Washington (Hart 1988; Love 1996). Egg/larval development apparently takes about 2-3 months to occur. Offspring principally remain within the estuaries until age 2, when many have migrated to the adjacent ocean habitats (Baxter 1999; Kimmerer 2002; Orcutt 1950). Reproductive maturity occurs at age-2 yr for males and age-3 yr for females, when the fish are 28 cm and 35 cm, respectively. Tagging studies have shown that fish are relatively sedentary and move little during their adult lives (Love 1996), however there is little information on regional variation in stock structure.

Starry flounder consume crabs, shrimps, worms, clams and clam siphons, other small mollusks, small fish, nemertean worms, and brittle stars (Hart 1988).

Stock Status and Management History

The U.S. West Coast starry flounder stock was first assessed in 2005 (Ralston 2006). The assessment is based on the assumption of separate biological populations north and south of the CA/OR border; it uses catch data, relative abundance indices derived from trawl logbook data, and an index of age-1 abundance from trawl surveys in the San Francisco Bay and Sacramento-San Joaquin River estuary. Unlike most other groundfish stock assessments, no age- or length-composition data are directly used in the assessment. Both the northern and southern populations are estimated to be above the target level of 40 percent of virgin spawning biomass (44 percent of SB_0 in Washington-Oregon and 62 percent in California), although the status of this data-poor species remains fairly uncertain compared to that of many other groundfish species. One of the most significant areas of uncertainty in the assessment is the estimate of natural mortality rate, which was quite high (0.30 yr_{-1} for females and 0.45 yr_{-1} for males).

4.1.3.16 Yellowtail Rockfish

Distribution and Life History

Yellowtail rockfish (*Sebastes flavidus*) range from San Diego, California, to Kodiak Island, Alaska (Fraidenburg 1980; Gotshall 1981; Lorz, *et al.* 1983; Love 1991; Miller and Lea 1972; Norton and MacFarlane 1995). The center of yellowtail rockfish abundance is from Oregon to British Columbia (Fraidenburg 1980). Yellowtail rockfish are a common, demersal species abundant over the middle shelf (Carlson and Haight 1972; Fraidenburg 1980; Tagart 1991; Weinberg 1994). Yellowtail rockfish are most common near the bottom, but not on the bottom (Love 1991; Stanley, *et al.* 1994). Yellowtail rockfish adults are considered semi-pelagic (Stanley, *et al.* 1994; Stein, *et al.* 1992) or pelagic, which allows them to range over wider areas than benthic rockfish (Pearcy 1992). Adult yellowtail rockfish occur along steeply sloping shores or above rocky reefs (Love 1991). They can be found above mud with cobble, boulder and rock ridges, and sand habitats; they are not, however, found on mud, mud with boulder, or flat rock (Love 1991; Stein, *et al.* 1992). Yellowtail rockfish form large (sometimes greater than 1,000 fish) schools and can be found alone or in association with other rockfishes (Love 1991; Pearcy 1992; Rosenthal, *et al.* 1982; Stein, *et al.* 1992; Tagart 1991). These schools may persist at the same location for many years (Pearcy 1992).

Yellowtail rockfish are viviparous (Norton and MacFarlane 1995) and mate from October to December. Parturition peaks in February and March and from November to March off California (Westrheim 1975). Young-of-the-year pelagic juveniles often appear in kelp beds beginning in April and live in and around kelp in midwater during the day, descending to the bottom at night (Love 1991; Tagart 1991). Male yellowtail rockfish are 34 cm to 41 cm in length (five years to nine years) at 50 percent maturity, females are 37 cm to 45 cm (six years to ten years) (Tagart 1991). Yellowtail rockfish are long-lived and slow-growing; the oldest recorded individual was 64 years old (Fraidenburg 1981; Tagart 1991). Yellowtail rockfish have a high growth rate relative to other rockfish species (Tagart 1991). They reach a maximum size of about 55 cm in approximately 15 years (Tagart 1991). Yellowtail rockfish feed mainly on pelagic animals, but are opportunistic, occasionally eating benthic animals as well (Lorz, *et al.* 1983). Large juveniles and adults eat fish (small Pacific whiting, Pacific herring, smelt, anchovies, lanternfishes, and others), along with squid, krill, and other planktonic organisms (euphausiids, salps, and pyrosomes) (Love 1991; Phillips 1964; Rosenthal, *et al.* 1982; Tagart 1991).

Stock Status and Management History

Until the late 1990's, yellowtail rockfish were harvested as part of a directed midwater trawl fishery. However because it co-occurs with several other rockfishes, including the depleted species canary rockfish and widow rockfish (Nagtegaal 1983; Rogers and Pikitch 1992; Tagart 1987), yellowtail rockfish fishing opportunity has been substantially curtailed. Since the end of 2002, there have been no landings limits that provide directed mid-water fishing opportunities for yellowtail rockfish in non-tribal trawl fisheries.

The stock assessment of yellowtail rockfish was most recently updated 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 Council manages the U.S. fishery as two stocks separated at Cape Mendocino, California; as in the past, the 2005 update assessment includes only the northern stock (which is divided for assessment purposes into three areas: South Vancouver, Northern

Columbia, and Eureka/South Columbia). The purpose of an assessment update is to add the most recent data into the model used in the full assessment. This update, therefore, continued the use of the age-structured model written with AD Model Builder software and extended the various data time series. Abundance trends were estimated to be somewhat different by area (little trend in South Vancouver and declining trends in the other areas). However following the recommendations of the SSC and 2003 STAR Panel, the coastwide estimates of biomass and ABC/OY are the summation of estimates from the three assessed areas. The estimated age-4+ biomass in year 2004 was 72,152 mt with a 26 percent CV, which is an increase from 58,025 mt in 2003. Since 1995 the spawning biomass has remained above 40 percent of unfished levels.

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

4.1.4.1 Minor Rockfish South

Southern Nearshore Species

The complex, Minor Nearshore Rockfish south of 40°10' N latitude, is further subdivided into the following management categories: 1) shallow nearshore rockfish [comprised of black and yellow rockfish (*S. chrysomelas*); China rockfish (*S. nebulosus*); gopher rockfish (*S. carnatus*); grass rockfish (*S. rastrelliger*), and kelp rockfish (*S. atrovirens*)]; 2) deeper nearshore rockfish: [comprised of black rockfish (*S. melanops*), blue rockfish (*S. mystinus*); brown rockfish (*S. auriculatus*); calico rockfish (*S. dalli*); copper rockfish (*S. caurinus*); olive rockfish (*S. serranoides*); quillback rockfish (*S. maliger*); and treefish (*S. serriceps*)] and 3) California scorpionfish (*Scorpaena guttata*).

Of the species listed above, two were assessed for the first time in 2005, gopher rockfish, and California scorpionfish. Because of this new information, California scorpionfish has been removed from the stock complex and will be managed under its individual harvest specifications beginning in 2007. However gopher rockfish cannot be managed separately from other nearshore rockfish species without significantly increasing bycatch; in addition, the assessment is considered uncertain due to its poor data quality. Gopher rockfish, therefore, will continue to be managed from within the southern minor nearshore rockfish species complex, but the information provided in the stock assessment will be used to inform the harvest specifications set for that complex.

Gopher rockfish was assessed for the first time in 2005 (Key, *et al.* 2006). Although the distribution of gopher rockfish extends south into the Southern California Bight, the assessment was restricted to the stock north of Pt. Conception. The assessment is based on landings and length composition data from commercial and recreational fisheries (primarily hook and line gear) and an index of relative abundance (CPUE) from the CPFV Sportfish Survey database. These data sources were used to estimate population trends from 1965 to 2004. There are no fishery-independent indices of stock biomass for gopher rockfish. Assessment results indicate an upward trend in gopher rockfish biomass since the 1980s and estimates of 2005 abundance ranged between 60 percent and 110 percent of average unfished stock size; this range of depletion levels is the result of alternative emphases in the model given to the CPFV in the CPUE index, a data element identified as a major source of uncertainty. Recent exploitation rates are estimated to have been well below the F_{MSY} proxy for rockfish.

Southern Shelf Species

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

In 2005, vermilion rockfish was assessed for the first time. However there were significant concerns about the reliability of the assessment. Given these concerns, the SSC did not endorse the results as being suitable for setting OYs and the Council did not accept the assessment for use in management. Vermilion rockfish, therefore, is still managed within the southern minor shelf rockfish complex.

Southern Slope Species

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

Although blackgill rockfish has been formally assessed, it is still managed as part of the southern Sebastes complex; aggregate ABCs and OYs are established from this complex using the harvest targets of some component individual species, such as blackgill rockfish.

Blackgill rockfish landings can be attributed almost entirely to the commercial fishery in California. Since the late 1970’s, hook and line has accounted for 56 percent of total landings in California, set nets has accounted for 12 percent; and trawl has accounted for 32 percent. The first assessment for blackgill rockfish was conducted in 1998 (Butler, *et al.* 1999b). That assessment assumed a unit stock in southern and central California (Conception INPFC area) and was based on a stock reduction analysis assuming constant recruitment. The dynamics of the simple model were tuned to average mortality rates from catch curves and landings data. Fishery selectivity was assumed to mirror maturity at size/age; trends in fishable/mature biomass were then estimated.

In 2005, the second and most recent stock assessment of blackgill rockfish was completed (Helser 2006). This assessment expanded the geographic range of that in Butler et al. (1999a), including both the Monterey and Conception INPFC areas, where over 90 percent of the landings have occurred. The assessment is based on catch and length composition data from commercial fisheries and indices of relative abundance and size composition from the AFSC shelf trawl survey and the AFSC slope survey. The modeling approach, Stock Synthesis 2 (Ver. 1.19), takes advantage of fishery and survey length compositions to explicitly estimate selectivity. The base model estimated depletion to be 52.3 percent of the unfished spawning biomass, within a range of 36 percent to 67 percent depending upon the assumed natural mortality rate (identified as a key axis of uncertainty for this stock). Assessment results indicate that recent exploitation rates have been slightly below the F_{MSY} proxy for rockfish.

4.1.4.2 Minor Rockfish North

Northern Nearshore Species

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

Northern Shelf Species

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

Northern Slope Species

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

4.1.4.3 Pacific Cod

Distribution and Life History

Pacific cod (*Gadus macrocephalus*) are widely distributed in the coastal north Pacific, from the Bering Sea to Southern California in the east, and to the Sea of Japan in the west. Adult Pacific cod occur as deep as 875 m (Allen and Smith 1988), but the vast majority occurs between 50 m and 300 m (Allen and Smith 1988; Love 1991; NOAA 1990). Along the West Coast, Pacific cod prefer shallow, soft-bottom habitats in marine and estuarine environments (Garrison and Miller 1982), although adults have been found associated with coarse sand and gravel substrates (Garrison and Miller 1982; Palsson 1990). Larvae and small juveniles are pelagic; large juveniles and adults are parademersal (Dunn and Matarese 1987; NOAA 1990). Adult Pacific cod are not considered to be a migratory species. There is, however, a seasonal bathymetric movement from deep spawning areas of the outer shelf and upper slope in fall and winter to shallow middle-upper shelf feeding grounds in the spring (Dunn and Matarese 1987; Hart 1988; NOAA 1990; Shimada and Kimura 1994).

Pacific cod have external fertilization (Hart 1988; NOAA 1990) with spawning occurring from late fall to early spring. Their eggs are demersal. Larvae may be transported to nursery areas by tidal currents (Garrison and Miller 1982). Half of females are mature by three years (55 cm) and half of males are mature by two years (45 cm) (Dunn and Matarese 1987; Hart 1988). Juveniles and adults are carnivorous and feed at night (Allen and Smith 1988; Palsson 1990) with the main part of the adult Pacific cod diet being whatever prey species is most abundant (Kihara and Shimada 1988; Klovach, *et al.* 1995). Larval feeding is poorly understood. Pelagic fish and sea birds eat Pacific cod larvae, while juveniles are eaten by larger demersal fish, including Pacific cod. Adults are preyed upon by toothed whales, Pacific halibut, salmon shark, and larger Pacific cod (Hart 1988; Love 1991; NOAA 1990; Palsson 1990). The closest competitor of the Pacific cod for resources is the sablefish (Allen 1982).

4.1.4.4 Other Fish

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

Kelp greenling was assessed for the first time in 2005. Although the assessment covered both California and Oregon, the Council adopted only the Oregon substock assessment for use in management. Due to the considerable uncertainty associated with the assessment, the Council furthermore decided not to set independent harvest specifications for kelp greenling.

The first and only assessment of kelp greenling was completed in 2005 by Cope and MacCall (2006). The assessment treated the stock as two completely independent sub-stocks divided at the California-Oregon border (excluding Washington, as there have been no substantial fisheries off its coast). There are substantial differences between the two assessments with respect to assessment period, model assumptions, results, and uncertainties. An important difference between the two sub-stocks is the first year for which historical catch data are available (1916 for California and 1981 for Oregon). The Oregon sub-stock has some age-at-length data, which were included in the assessment. The estimate of depletion for the Oregon sub-stock (the current biomass is at 49 percent of its unfished) is more certain than estimates of absolute abundance, which are highly imprecise. For the California sub-stock, substantial uncertainty could not be resolved regarding growth and natural mortality rates, as well as the shape of the selectivity pattern for the shore mode fishery. Due to these factors, it was not possible to formulate a model for California.

Longnose skate and spiny dogfish are each scheduled to be assessed in 2007; this will be the first stock assessment for each of these species.

4.1.4.5 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*).

Starry flounder (*Platichthys stellatus*) has been managed as part of the Other Flatfish complex (through 2006). However, with the first assessment of starry flounder in 2005 (Ralston 2006), the Council intends to manage this species, under the current action, with its own stock-specific ABC and OY.

4.1.5 Non-Groundfish Species

Non-groundfish species and the fisheries that target them often need to be considered in groundfish management for two reasons. First, these species may be caught incidentally in directed groundfish fisheries. Thus, management measures that change total fishing effort in groundfish fisheries could increase or decrease fishing mortality on the incidentally-caught species. Second, those fisheries targeting non-groundfish species may also incidentally catch groundfish. This source of groundfish mortality cannot be directly regulated through the groundfish FMP, as such vessels do not hold federal groundfish permits; however, its impact still must be subtracted from the overall OY for that groundfish species. Such catch accounting is particularly critical for depleted species. This section briefly describes these non-groundfish species and associated fisheries, and for certain fisheries, notes mitigation measures that have been introduced to decrease their incidental take of groundfish.

Since vessels operating within the incidental groundfish Open Access fleet do not hold licenses under the Groundfish FMP, it has been difficult to assure their compliance with closed areas established to protect depleted rockfish species (i.e. the Rockfish Conservation Areas). However a new technology adopted by the Council has made this accounting easier. Beginning in 2007, 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 must employ VMS. VMS is further discussed in Chapter 6.

Observer programs within the groundfish fishery are important contributions toward the accurate monitoring and recording of incidental take, including that of non-groundfish species. Standardized bycatch reporting methodologies are discussed in Section 6.1.2. However one program, the Shoreside Whiting Observer Program (SWOP), is of particular relevance here. SWOP was established in 1992 to examine bycatch in the directed Pacific whiting fishery. Participating vessels must carry an exempted fishing permit (EFP) issued by NMFS, and are required to retain all catch and to land unsorted catch at designated shoreside processing plants. In return, permitted vessels are not penalized for landing prohibited species (e.g., Pacific salmon, Pacific halibut, Dungeness crab), nor are they held liable for exceeding groundfish trip limits.

4.1.5.1 Salmon

Salmon are anadromous fish, spending a part of their life in ocean waters, but returning to freshwater rivers and streams to spawn and then die. Council-managed ocean salmon fisheries mainly catch Chinook and coho salmon (*Oncorhynchus tshawytscha* and *O. kisutch*); pink salmon (*O. gorbuscha*) are also caught in odd-numbered years, principally off of Washington. For further information on the species, as well as management actions and harvest levels, see the *Review of 2005 Ocean Salmon Fisheries* (PFMC 2006b).

The salmon troll fishery has an incidental catch of Pacific halibut and groundfish; this is of particular significance with respect to canary rockfish catch and is further discussed in Section 4.3.5.1. In addition, to account for yellowtail rockfish landed incidentally while not promoting targeting on the species, a federal regulation was adopted in 2001 that allowed salmon trollers to land up to one pound of yellowtail per two pounds of salmon, not to exceed 300 pounds per month (north of Cape Mendocino).

Groundfish fisheries catch salmon incidentally. Chapter 5 (Protected Species) discusses the impacts on ESA-listed salmon in further detail. For both ESA-listed and non ESA-listed salmon species, incidental catch is highest in the limited entry groundfish trawl (whiting and non-whiting) sector. Bycatch of salmon by the groundfish trawl fleet is generally restricted to encounters with Chinook. Data from the West Coast Groundfish Observer Program indicated an order of magnitude drop in coastwide Chinook bycatch for non-whiting LE trawl between 2003 to 2004; the reduction can be attributed to a large degree to a decrease in nearshore trawl effort, where salmon bycatch is usually highest (Hastie 2005). On the other hand, there was an order of magnitude increase in bycatch by the whiting fishery between 2004 and 2005.

4.1.5.2 Pacific Halibut

Pacific halibut (*Hippoglossus stenolepis*) belong to a family of flounders called *Pleuronectidae*. Pacific halibut are managed by the bilateral (U.S./Canada) International Pacific Halibut Commission (IPHC) with implementing regulations set by Canada and the U.S. in their own waters. The Pacific Halibut Catch Sharing Plan for waters off Washington, Oregon, and California (Area 2A) specifies IPHC management measures for Pacific halibut on the West Coast. Implementation of IPHC catch levels and regulations is the responsibility of the Council, the states of Washington, Oregon, and California, and the Pacific halibut treaty tribes.

Of groundfish fisheries, the fixed gear sablefish fishery is responsible for the most catch of Pacific halibut. To allow landing of these halibut, the Catch Sharing Plan stipulates that when the Area 2A total allowable catch (TAC) is above 900,000 pounds, halibut may be retained in the limited entry primary sablefish fishery north of Point Chehalis, Washington (46° 53' 18" N latitude). Rockfish have been commonly caught historically in the halibut fishery. However, encounters have been significantly reduced over recent years by restricting the fishery to set depth greater than 100 fm.

4.1.5.3 Coastal Pelagic Species

Coastal pelagic species (CPS) are schooling fish, not associated with the ocean bottom, that migrate in coastal waters. These species include: northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinops sagax*), Pacific (chub) mackerel (*Scomber japonicus*), jack mackerel (*Trachurus symmetricus*), and market squid (Decapoda spp.). For further information on the species, as well as management actions and harvest levels, see the 2005 CPS Stock Assessment and Fishery Evaluation (SAFE) document (PFMC 2005).

The catch of groundfish in CPS fisheries is negligible, and retention is prohibited. The whiting fishery accounts for a minor proportion of the catch of Pacific mackerel and jack mackerel; the federal harvest guideline for these mackerel species has not been met in recent years.

4.1.5.4 Highly Migratory Species

Highly migratory species (HMS) include tunas, billfish, dorado, and sharks—species that range great distances during their lifetime, extending beyond national boundaries into international waters and among the EEZs of many nations in the Pacific. In 2003, the Council adopted a Highly Migratory Species FMP to federally regulate the take of HMS within and outside the U.S. West Coast EEZ. The FMP (PFMC 2003b) describes management unit species in detail; these are five tuna species, five shark species, striped marlin, swordfish, and dorado (dolphinfish).

The catch of HMS in groundfish fisheries are considered to be negligible.

Using federal observer data, it was concluded that bycatch of Pacific whiting and yellowtail rockfish in the drift gillnet fishery is considered "major" (greater than ten individuals per 100 sets observed) for the period of 2001–04 (PFMC, *et al.* 2006). Also, a notable source of groundfish species mortality within the HMS fishery has been due to "mixed trips," in which a vessel operating under a VMS license also targets groundfish during a single trip. The expansion of VMS coverage into the Open Access sector has contributed significantly to the reduction of mixed trip impact on depleted species. Without the VMS requirement (which will go into effect in 2007), the activity of vessels under HMS permits within RCAs is unknown, and it is possible that the vessels are targeting groundfish within these restricted areas. VMS is discussed in further detail in Chapter 6.

4.1.5.5 Dungeness Crab

The Dungeness crab (*Cancer magister*) is distributed from the Aleutian Islands, Alaska, to Monterey Bay, California. It lives in bays, inlets, around estuaries, and on the continental shelf. Dungeness crab is found to a depth of about 180 m. Although it is found at times on mud and gravel, this crab is most abundant on sand bottoms; frequently it occurs among eelgrass. It is typically harvested using traps (crab pots), ring nets, by hand (scuba divers), or dip nets. Dungeness crab are managed by the states of Oregon and California, and by the State of Washington in cooperation with Washington Coast treaty tribes, and with inter-state coordination through the Pacific States Marine Fisheries Commission.

Dungeness crab is taken incidentally, or harmed unintentionally, by groundfish gears. In some areas, encounter with Dungeness crab by nearshore flatfish trawls is common. These encounter rates were one of criteria the Council considered when deciding to set the nearshore RCA boundary as seaward as possible. The incidental catch of depleted groundfish species is considered to be negligible.

4.1.5.6 Greenlings (other than kelp greenling), Ocean Whitefish, and California Sheephead

California sheephead (*Semicossyphus pulcher*) are a large member of the wrasse family *Labridae*. They range from Monterey Bay south to Guadalupe Island in central Baja California and the Gulf of California, in Mexico, but are uncommon north of Point Conception. They are associated with rocky bottom habitats, particularly in kelp beds to 55 m, but more commonly at depths of 3 m to 30 m. They can live to 50 years of age and a maximum length of 91 cm (16 kg). Like some other wrasse species, California sheephead change sex starting first as a female, but changing to a male at about 30 cm in length.

Ocean whitefish (*Caulolatilus princeps)* occur as far north as Vancouver Island in British Columbia, but are rare north of Central California. A solitary species, they inhabit rocky bottoms and are also found on soft sand and mud bottoms. Whitefish dig into the substrate for food.

In California, California sheephead and ocean whitefish are each managed by CDFG. Both are predominantly caught by the recreational fishery. Catch of California sheephead and ocean whitefish in the recreational fishery are restricted within the CCA to minimize interaction with cowcod.

While kelp greenling, managed under the groundfish FMP, represents the majority of the greenling that are caught; the other species, rock, painted, and white spotted greenling, are managed by the states. Minimal take of rock greenling occurs in the commercial and recreational fisheries in California. It is often taken in conjunction with fishing for federally managed groundfish, primarily nearshore rockfish and cabezon.

4.1.5.7 Pink Shrimp

Pacific pink shrimp (*Pandalus jordani*) are found from Unalaska in the Aleutian Islands to San Diego, California, at depths of 25 fm to 200 fm (46 m to 366 m). Off the U.S. West Coast these shrimp are harvested with trawl gear from Northern Washington to Central California, with the majority of the catch taken off the coast of Oregon. Pacific shrimp fisheries are managed by the states of Washington, Oregon, and California; the Council has no direct management authority.

Concentrations of pink shrimp are associated with well-defined areas of green mud and muddy-sand bottoms. Shrimp trawl nets are usually constructed with net mesh sizes smaller than the net mesh sizes for legal groundfish trawl gear. Thus, it is shrimp trawlers that commonly take groundfish in association with shrimp, rather than the reverse. In the past, the pink shrimp fishery had been responsible in some years for a significant proportion of canary rockfish incidental catch. However, such impact has been reduced to a negligible amount because of bycatch reduction devices (BRDs) that are now required on all vessels in this fishery. BRDs are added to the trawl net and divert finfish out of the codend of the net, where the shrimp catch is accumulated.

4.1.5.8 California Halibut

California halibut (*Paralichthys californicus*) are a left-eyed flatfish of the family *Bothidae*. They range from Northern Washington to southern Baja California, Mexico, (Eschmeyer, *et al.* 1983), but are most common south of Oregon. The species can be targeted by trawl vessels south of Pt. Arena, CA (38°57.50' N latitude). It is a state-managed species, and participation in the open-access fishery for California halibut does not require specific permits. California halibut is, at most, an ancillary fishery for limited-entry trawlers in California (Hastie 2005). The California halibut fishery is known to take only minimal amounts of depleted groundfish species; for example, the Council's Groundfish Management Team estimated that, in 2005, the fishery was responsible for 0.1 mt mortality of bocaccio rockfish and 0.0 mt of all other depleted groundfish species.

4.1.5.9 Ridgeback and Spot Prawns

Ridgeback prawns (*Sicyonia ingentis*) are found from Monterey, California south to Baja California, Mexico, in depths of 145 metric feet to 525 metric feet (Sunada, *et al.* 2001). They are more abundant south of Point Conception and are the most common invertebrate appearing in trawls. Their preferred habitat is sand, shell and green mud substrate, and relatively sessile. They are prey for sea robins, rockfish, and lingcod. The Ridgeback prawn fishery occurs exclusively in California, centered in the Santa Barbara Channel and off Santa Monica Bay. The ridgeback prawn fishery is managed by the State of California and, similar to spot prawn and pink shrimp, is considered an "exempted" trawl gear in the federal open access groundfish fishery, entitling the fishery to groundfish trip limits. However, the catch of depleted groundfish in the ridgeback prawn fishery is considered to be negligible.

Spot prawn (*Pandalus platyceros*) are the largest of the pandalid shrimp and range from Baja California, Mexico, north to the Aleutian Islands and west to the Korean Strait (Larson 2001). They inhabit rocky or hard bottoms including coral reefs, glass sponge reefs, and the edges of marine canyons. They have a patchy distribution, which may result from active habitat selection and larval transport. Spot prawn are Hermaphroditic. Spot prawn fisheries are state-managed. The use of trawl gear to target spot prawn has been banned in all three states; the spot prawn pot fishery that remains is considered to have no incidental bycatch of depleted groundfish species.

4.1.5.10 Sea Cucumbers

Two sea cucumber species are targeted commercially: the California sea cucumber (*Parastichopus* *californicus*), also known as the giant red sea cucumber, and the warty sea cucumber (*P. parvimensis*) (Rogers-Bennett and Ono 2001). These species are tube-shaped Echinoderms, a phylum that also includes sea stars and sea urchins. The California sea cucumber occurs as far north as Alaska, while the warty sea cucumber is uncommon north of Point Conception and does not occur north of Monterey. Both species are found in the intertidal zone to as deep as 300 feet and are bottom-dwelling organisms.

Along the West Coast, sea cucumbers are harvested by diving or trawling, and the fisheries are managed by the states. The warty sea cucumber is fished almost exclusively by divers. The California sea cucumber is caught principally by trawling in Southern California, but is targeted by divers in Northern California. The sea cucumber trawl fishery occurs over sandy flat habitat off of Santa Barbara (south of Pt. Conception), an area with no rocky outcroppings. Given that habitat, the fishery is considered to have negligible bycatch of depleted species.

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 B_{MSY}. 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. 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.

4.2.2 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 (NRC 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)[19]. The results from these surveys are typically the key inputs to the stock assessments for West Coast groundfish stock assessments. For example, indices of abundance from the triennial trawl survey were used in 15 of the 22 assessments in Table 4-2, and 7 assessments used slope survey data. 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.

As illustrated throughout section 4.1, 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 overfished 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 (2003) 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

[19] The AFSC originally implemented a full trawl survey completed every three years on the West Coast and hence called the "triennial" survey, data from this survey span from 1977 to 2004. The Alaska Center also conducted slope surveys beginning in 1984, although these surveys had varying temporal and spatial coverage. Since 1998, the NMFS Northwest Fisheries Science Center has conducted an annual bottom trawl survey of the West Coast slope, and since 2003 this survey has sampled both shelf and slope habitats. This survey (referred to as the "combined" survey) will be the key source of fishery independent information in the future. Currently, information from all of these surveys are typically used to tune West Coast groundfish stock assessments.

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.

4.2.3 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.

4.2.4 Rebuilding Probability

The predicted times to rebuild the seven depleted species subject to FMP Amendment 16-4 relative to the amount of allowable harvest (to avoid significant or disastrous socioeconomic impacts to fishing communities) are determined in new rebuilding analyses recommended by the SSC in 2005 or, in the case of yelloweye rockfish, in 2006. These rebuilding analyses probabilistically evaluate allowable harvest vs. rebuilding duration relative to the maximum allowable time to rebuild (T_{MAX}) under the current National Standard Guidelines. 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. Therefore, the range of allowable rebuilding periods is bounded by the biological limit of T_{MIN} or $T_{F=0}$[20], where all stock mortality is natural mortality and a scientifically-derived upper limit linked to stock productivity. Stocks exhibiting low productivity will necessarily have longer predicted 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.

4.2.5 Extended Duration of Rebuilding

However, given the guidance from the Ninth Circuit District Court not to follow a formulaic approach for deciding a stock's rebuilding plan, another criterion for evaluating alternative rebuilding plans is to

[20] T_{MIN} and $T_{F=0}$ are both predicted rebuilding periods in the absence of fishing-related mortality to the stock. These terms are distinguished by when the F=0 strategy is considered. T_{MIN} is the predicted time to rebuild if all fishing-related mortality is eliminated from the onset of rebuilding (usually the year after the stock is declared overfished) and $T_{F=0}$ is the predicted duration of rebuilding if all fishing-related mortality to the stock is eliminated starting at the onset of the next available management cycle. $T_{F=0}$ is typically longer than T_{MIN} since some fishing-related mortality is typically allowed under a Council's rebuilding plan to avoid disastrous short term economic impacts from eliminating harvest. However, unless the stock has just been declared overfished, $T_{F=0}$ is the shortest possible time to rebuild the stock given our current understanding of the stock's productivity.

use the extended duration of the predicted rebuilding period relative to $T_{F=0}$. This criterion may be more responsive to the court order to rebuild as quickly as possible (i.e., $T_{F=0}$) while considering the needs of fishing communities. The needs of fishing communities are considered by allowing some harvest of a depleted species as unavoidable bycatch while targeting 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 sensible evaluation criterion.

4.3 Discussion of Direct and Indirect Impacts

This section evaluates and discusses direct and indirect impacts of OY alternatives and action alternatives (management measures) 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 2004 West Coast groundfish fisheries (Table 4-6) and "near-final" 2005 total catch estimates (Table 4-7). The reason 2005 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 2004 fisheries. 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 2005 catch estimates will be available by the end of 2006, which is too late to be incorporated in the final EIS.

Impacts of OY alternatives are also compared between action alternatives and with the No Action Alternative and evaluated using the criteria described in Section 4.2.

Table 4-5. Estimated total mortality (mt) of major West Coast groundfish species from commercial, tribal, and recreational fishing during 2003.

	LANDINGS AND MORTALITY			TARGETS	
Species	Estimated Total Catch	**PRELIMINARY** Estimated Commercial Fishery Discard Mortality b/	Actual Landings c/	Total Catch ABC	Total Catch OY
Lingcod	1,355.6	70.7	1,284.9	841	651
Pacific Cod	1,323.1	73.5	1,249.6	3,200	3,200
Pacific Whiting d/	142,913.8	1,422.7	141,491.1	188,000	148,200
Sablefish (north)	6,386.6	1,126.1	5,260.5	8,209	6,500
Sablefish (south)	204.0		204.0	441	294
Dover sole	8,342.2	956.6	7,385.7	8,510	7,440
English sole	1,241.4	339.0	902.4	3,100	
Petrale sole	2,160.6	144.4	2,016.2	2,762	
Arrowtooth flounder	3,243.5	904.8	2,338.7	5,800	
Other flatfish	2,093.5	490.7	1,602.8	7,700	
Pacific ocean Perch	160.1	21.9	138.2	689	377
Shortbelly	9.3	2.3	7.0	13,900	13,900
Widow	57.9	16.1	41.8	3,871	832
Canary	48.5	14.2	34.3	272	44
Chilipepper	49.5	15.4	34.1	2,700	2,000
Bocaccio	29.1	8.5	20.6	198	20
Splitnose	118.8	9.3	109.5	615	461
Yellowtail	504.5	22.1	482.4	3,146	3,146
Shortspine Thornyheads e/	1,220.2	387.8	832.4	1,004	955
Longspine Thds. North e/	1,834.8	323.9	1,510.9	2,461	2,461
Longspine Thds. South	0.0			390	195
Cowcod, Monterey	0.4	0.2	0.1	19	2
Cowcod, Conception	0.0		0.0	5	2
Yelloweye	8.1	1.5	6.6	52	22
Darkblotched	139.9	51.8	88.1	205	172
Black Rockfish (north)				615	
Black Rockfish (south)				500	
Black Rockfish Total	1,150.1		1,150.1	1,115	

a/ Preliminary estimates of total catch mortality based on species discard assumptions used when the OYs were set. These assumptions are currently being revised using data from the West Coast Groundfish Observer Program.

b/ Preliminary estimated discard mortality in the commercial fishery. Preliminary trawl discard calculated by applying discard mortality rates from combined 2001-03 West Coast Groundfish Observer data to 2002 trawl logbook data, by area and depth strata. Discard totals estimated for tows recorded in logbooks is expanded using state-specific ratios of fish ticket landings to retained logbook catch. Because tows conducted under EFPs could not currently be completely removed from logbooks and fish tickets, applying fleetwide discard rates to these tows may overstate discard for some shelf species.

In an effort to minimize this problem, rockfish discard from target tonnage caught within the RCA off Oregon was estimated using bycatch rates from that EFP. Since the Washington EFP included full retention of shelf rockfish, no at-sea discard of these species was estimated for tows occurring within the RCA off Washington, or on tows that exceeded the 2-month allowance of arrowtooth flounder outside the EFP. This column also includes at-sea discards of rebuilding species. Preliminary fixed-gear discard in the directed sablefish fisheries is calculated by applying discard mortality rates from combined 2001-03 West Coast Groundfish Observer data to northern sablefish landings data. No logbooks are available for fixed-gear vessels. Because of limited geographic coverage of available data, fixed-gear discard amounts for species off central California are not well estimated at this time.

c/ Includes shoreside commercial and tribal landings from PacFIN, observed total catch including estimated discards in the at-sea whiting fishery, and RecFIN recreational catch plus observed discard mortality (A+B1).

d/ Discards of whiting are estimated from observer data and counted towards the OY inseason.

e/ Includes "unspecified thornyheads" allocated based on ratios estimated from California landings and At Sea north/south ABCs.

Table 4-6. Estimated total mortality (mt) of major West Coast groundfish species from commercial, tribal, and recreational fishing during 2004.

	2004 metric tons											Management reference points	
	Shore-side commercial fisheries						State estimates of total recreational fishing mortality						
	Total landed catch	Estimated trawl discard	Estimated non-trawl discard [a]	Estimated total mortality	At-sea landings and discard	Shore-side WA tribal	WA	OR	CA	Remaining GMT scorecard values [b]	Estimated total fishing mortality	Total catch OY	ABC
Target species													
Sablefish [c]		642	446										
mortality	5,079	321	89	5,489	29	712	0	5			6,235	7,510	8,185
Shortspine [d]	582	174		756	5	6	0	0			767	983	1,030
Longspine [c]	658	137		795	0		0	0			795	2,443	2,461
Dover	6,777	355		7,132	0	81	0	0			7,213	7,440	8,510
Petrale	1,961	76		2,037	0	82	0	0			2,119	2,762	2,762
English	956	193		1,149	0	80					1,229	na	3,100
Arrowtooth	2,328	3,255		5,583	3	82					5,668	na	5,800
Other Flatfish	1,371	497		1,868	2	19					1,889	na	7,700
Slope rockfish	1,073	634		1,707	24	23					1,754	na	na
Yellowtail rockfish [e]	576	80		655	48	352	24	12			1,091	4,320	4,320
Chilipepper [f]	43	102		145	2		0	0	6		153	2,000	2,700
Pacific hake	96,365	2,666		99,031	120,736	6,848					226,615	250,000	514,441
Rebuilding species (as of 2004)													
Lingcod		161.9											
mortality	178.8	80.9	4.5	264.2	1.4	25.0	64.2	107.2	130.0	27.1	619.1	735.0	1,385
Canary	15.9	8.5	3.5	27.9	5.2	3.0	1.7	3.9	9.0	7.3	58.0	47.3	256
Widow	72.9	4.8	0.1	77.8	21.1	21.0	0.0	0.7	15.0	40.6	176.2	284.0	3,460
Yelloweye	1.7	0.4	3.7	5.7	0.0	1.0	3.7	2.4	0.6	2.3	15.7	22.0	53
Bocaccio [f]	12.1	8.7	0.0	20.8	0.0		0.0	0.0	71.0	13.3	105.1	250.0	400
Cowcod [f]	0.0	0.8	0.0	0.9	0.0		0.0	0.0	1.0	0.5	2.4	4.8	24
POP [e]	120.6	23.4	0.0	144.1	1.0	3.0	0.0			7.6	155.7	444.0	980
Darkblotched	191.7	37.1	0.5	229.3	7.4		0.0			4.9	241.6	240.0	240

a/ Non-trawl discard includes estimates for the fixed gear nearshore and sablefish fisheries. Sablefish fishery estimates are based on observations of the primary limited entry, fixed gear season. Since few observations were made in this fishery south of Ft. Bragg, CA, discard estimates for southern species, such as bocaccio and cowcod, should not be viewed as complete.

b/ The Pacific Council's Groundfish Management Team produces a bycatch scorecard with the purpose to account for all sources of expected mortality for species that are managed under rebuilding plans. Remaining values are estimates of total mortality in EFPs and research catches.

c/ Area north of 36° N. Lat.

d/ Area north of 34°27' N. Lat.

e/ Area north of 40°10' N. Lat.

f/ Area south of 40°10' N. Lat.

Table 4-7. Estimated total mortality (mt) of major West Coast groundfish species from commercial, tribal, and recreational fishing during 2005.

Species	Landings	Discard Estimate	Tribal	At-Sea	Recreational	Remaining GMT Scorecard Values	Estimated total fishing mortality	Total catch OY	ABC
Arrowtooth Flounder	2,082	2,854	161	1			5,098		5,800
Dover sole	6,767	707	145				7,619	7,476	8,522
English Sole	856	279	66				1,201	3,100	3,100
Petrale	2,714	155	30				2,899	2,762	2,762
Remaining Flatfish	1,172	306	48	3	37		1,566	4,090	6,781
Shortspine (V&C&E&M)	486	194	11	7			698	999	1,055
Longspine (V&C&E&M)	588	95					683	2,461	2,461
Sablefish Coastwide							6,713		8,368
Sablefish N CP	5,351	485	700	15			6,551	7,486	
Sablefish Conception	144	18					162	275	
Longspine (CP)	60	10					70	195	390
Shortspine (CP)	151	68					219		
Pacific Cod	729		124				853	1,600	3,200
Chilipepper (MT&CP)	36				4		40	2,000	2,700
Yellowtail (V&C&E)	208		581	73	30		892	3,896	3,896
Spiny Dogfish	463		291	70			824		
Slope rockfish Nor	160	45	29	51			285	1,160	
Slope rockfish So	166	18					184	639	
Splitnose RF (MT&CP)	87						87	461	615
Black Rockfish Nor 46 16					271		271	540	540
Black Rockfish So 46 16	173				514		687	753	753
CA Scorpionfish So	5						5		
Cabezon	60						60		
Cabezon S 42	31				48		79	69	103
Cabezon N 42	29				25		54		
Kelp Greenling	22						22		
Kelp Greenling Nor 42	21				6		27		
Kelp Greenling So 42	1				5		6		
Lingcod	173	123	31	2		6	821		2,522
Lingcod N 42	110	78	31	2	204		426	1,801	
Lingcod S 42	63	45			282		390	612	
Canary rockfish	8	5	5	1	12	9	40	47	270
Darkblotched RCKFSH	87	46		11		4	148	269	269
POP (V&C&E)	58	11	4	2		4	79	447	966
Bocaccio	8	52			44	2	106	307	566
Widow Rockfish	81	1	30	79	4	1	196	285	3,218
Yelloweye (V&C&E&M)	1		1		12	7	22	26	54
Cowcod						2			
Cowcod CP								2	5
Cowcod N CP								2	19
Pacific Whiting	96,859	41	35,349	127,421			259,670		269,545

4.3.1 Depleted Groundfish Species

4.3.1.1 Impacts of Optimum Yield Alternatives

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 2.1.1.1 and depicted in Table 2-3 and Figure 2-2.

In their June 2006 recommendations to the Council on specifying OYs for depleted species, the GMT provided the following considerations:

> "The results of the most recent round of stock assessments for depleted species were, in general, more optimistic than the prior round of assessments. The exception to this is yelloweye rockfish, which was substantially more pessimistic. As a result of the need to restrict the fisheries based on the new yelloweye assessment, the GMT recommends the OY ramp-down strategy for this species, which results in a lower OY, but would provide time to collect much-needed additional data that could better inform new management measures for greater yelloweye protection.
>
> Cowcod may be viewed as an unproductive stock, similar to yelloweye; however the most recent round of assessments shows this stock is less depleted than previously thought. Because of the more optimistic stock assessment result, a dramatic decrease in the OY may not be necessary like the proposed decrease in the yelloweye OY. The GMT feels that the relatively unproductive nature of these stocks justifies a relatively restrictive management scheme.
>
> Canary rockfish and bocaccio may be viewed as being more productive than yelloweye and cowcod, but less productive than Pacific ocean perch, darkblotched rockfish, and widow rockfish. The GMT recommends adopting OYs for these species that are relatively close to pre-season catch predictions because of the greater depletion and lower productivity of these stocks. While setting an OY close to predicted catch is expected to result in substantial inseason actions to stay within those OYs (because of inseason deviations from pre-season catch predictions), the GMT feels that the productivity of these stocks justifies a relatively more restrictive management scheme.
>
> Pacific ocean perch, darkblotched rockfish, and widow rockfish may be viewed as being less depleted and more productive than the other four depleted species. If the Council wishes to accommodate the GMT's request to allow for uncertainty and management flexibility by building in a difference between the OY and predicted catch, the GMT feels that this difference or "buffer" should be greatest for these species. Doing so would have a relatively small impact on the rebuilding times for these species, but would accommodate management flexibility, reduce the need for inseason adjustments to management, and result in greater stability to the management regime. The GMT would also like to note that when a buffer is set between the expected (scorecard) catch and the adopted OY, the benefits realized in more rapid rebuilding times when actual catches are less than the OY are captured in subsequent stock

> assessments and assessment updates (as realized catches, rather than OYs, are entered into subsequent assessments as data).
>
> As discussed above, the Council sets harvest levels and management measures pre-season with the expectation that the management measures will adequately constrain harvest to keep total catch within established harvest levels. As each season progresses, new information becomes available, often modifying the assumptions that were made pre-season about catch and bycatch rates. When inseason catch rate estimates vary from pre-season catch rate estimates, the Council takes inseason action to either constrain the fishery to stay within OYs, or liberalize the fishery to achieve OYs for non-depleted species while staying within depleted species' OYs. Inseason revisions to management measures are necessary to maintain rebuilding schedules and to prevent overfishing, but the more inseason measures vary from those set pre-season, the less predictable fishing business management becomes for fishery participants."

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

Harvest Limits (Harvest Guidelines or Quotas)

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.

Permits, Licenses, and Endorsements

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 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.

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

Specific Bocaccio Rebuilding Strategies

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 6.5 percent of the 2006 OY), bocaccio total mortality has been well below the specified OY (Tables 4-5, 4-6 and 4-7). 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 sub-areas (referred to as Rockfish/Lingcod Management Areas) defined by latitudinal boundaries. 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 or the limited entry trawl sector is 150 fm in 2006, and the shoreward boundary varies between 75 fm and 100 fm, depending on period. Around offshore islands south of 34°27' N latitude the inner boundary extends to the shoreline. 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 sub-area 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.

Evaluation of Optimum Yield Alternatives

Table 4-8 shows the results of the evaluation of alternative bocaccio OYs analyzed for 2007–08 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 4-5, 4-6, and 4-7). 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 (2006b) 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 2005, in terms of billions of eggs produced, is estimated to be at 11 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 0-11 years relative to the shortest predicted time to rebuild the stock of 2021 (i.e., 2021-2032) (Table 4-8). Rebuilding probabilities range from 50 percent for the highest OY alternative of 424 mt, which is the legal upper limit of possible OYs that can be considered, to 95.8 percent for the zero-harvest alternative. The range of rebuilding probabilities for the preferred Low and High OYs decided by the Council in April are 77.7 percent to 94.3 percent. Last year, the SSC recommended a general rebuilding policy of establishing harvest rates that lead to rebuilding probabilities of about 80 percent[21]. The Council-preferred OY of 218 mt for bocaccio approximates this P_{MAX} "target", while higher OYs are increasingly risky using the rebuilding probability criterion.

The range of preferred Low and High OYs specified by the Council in April 2006 of 40-218 mt compares to the status quo 2006 OY of 309 mt. Rebuilding is extended by less than a year from the shortest possible time ($T_{F=0}$) under the harvest rate used to determine the 40 mt alternative to 5 years under the final Council-preferred OY alternative (also preferred High OY) of 218 mt, which is 3 years shorter than under the status quo harvest rate.

[21] This recommendation came under the consideration of rebuilding revision rules the Council and its advisors crafted in 2005. The Ninth Circuit Court of Appeals ruling on the challenge to the darkblotched rebuilding plan may have obviated the need for these revision rules by imposing a standard of specifying the shortest possible rebuilding periods while considering the needs of fishing communities. However, as described in Section 4.2, P_{MAX} is still a reasonable criterion for evaluating future risks of overharvest given a stock's relative productivity.

Table 4-8. Evaluation of alternative 2007–2008 bocaccio OYs relative to the criteria described in Section 4.2.

Evaluation Criterion	OY (mt)						
	No Action OY Alt. (2006 OY)	OY Alt. 1	Pref. Low OY Alt.	OY Alt. 2	Final Council-Pref. Alt. (OY Alt. 3; Pref. High OY)	OY Alt. 4	OY Alt. 5
	309	0	40	149	**218**	315	424
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	11%						
Rebuilding Probability (P_{MAX})	68.4%	95.8%	94.3%	84.4%	77.7%	67.8%	50%
Rebuilding Duration Beyond $T_{F=0}$ (yrs.)	8	0	<1	3	5	8	11

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.

The recent history of bocaccio assessments is one marked with volatile swings in our understanding of stock status and productivity driven largely by infrequent recruitment events. MacCall (2002b) characterized the stock as severely depleted and unlikely to rebuild within T_{MAX} under a zero-harvest strategy. However, evidence of a significant recruitment of the 1999 year class was validated in the bocaccio assessment conducted the following year (MacCall 2003b). The emerging understanding is stock productivity may better be characterized as one driven by rare large recruitments. Minimizing the mortality of these large year classes promises to rebuild the stock fastest. In the current regime of depth-based management, the stock is most vulnerable in the juvenile phase when they occur in shallow waters and are incidentally caught in nearshore commercial and recreational fisheries. However, as bocaccio mature, they migrate to deeper waters where the current RCA restricts those fisheries which are most likely to take adult bocaccio and other co-occurring depleted rockfish. There is some indication that bocaccio recruitment typically occurs from Santa Barbara to Santa Cruz, and is rare south of Ventura, with no evidence of separate southern California recruitment events (MacCall 2003b). Therefore, if this recruitment pattern persists in the future, large recruitment events may be indicated by large incidental catches in central California nearshore fisheries. As recent management experience also indicates, avoiding juvenile bocaccio in these waters during such times is difficult.

Given this recruitment dynamic, what harvest rate provides the best balance of conservation needs without overly restricting California commercial and recreational fisheries? The new bocaccio assessment (MacCall 2006b) shows exploitation rates have favored rebuilding since 1998. Those OYs fall within the preferred 2007–2008 OY range of 40-218 mt; however, only in 2003, when fisheries were severely restricted due to the pessimistic 2002 assessment result, was the annual total mortality of bocaccio ≤40 mt. The Preferred Low OY may still be difficult to manage with the same restrictive management measures used in 2003 in the event of another large recruitment. Clearly, a significant negative economic impact would be felt in California fishing communities under the Preferred Low OY harvest rate for a rebuilding "cost" of about four additional years of rebuilding under the Preferred High OY harvest rate. Even under the final Council-Preferred OY (Preferred High OY) of 218 mt, management measures would have to be restrictive, especially for nearshore commercial and recreational fisheries in central California, to stay within that harvest rate during years of large recruitments.

Evaluation of Action Alternatives

All the action alternatives contemplate a liberalization of the CCAs in the Southern California Bight. The CCAs currently protect more than just cowcod. An ongoing analysis of larval abundance data suggest that the current western CCA is a region of high abundance of bocaccio (S. Ralston, unpublished data), with the recent density particularly high relative to the long term (historical) distribution of bocaccio. Although the CCA was not implemented to protect bocaccio, the potential to increase catches of other rebuilding species that could result from modifications to CCA boundaries is presumably non-trivial.

Action Alternative 1 is the only action alternative estimated to stay within the Preferred Low OY Alternative for bocaccio. Most of the southern nearshore and shelf groundfish fisheries are constrained by the Preferred bocaccio Low OY, but especially those fisheries south of Pt. Conception. Action Alternatives 2 and 3 stay within the Council-Preferred OY Alternative for bocaccio. The Council recommends the Action Alternative 2 boundary changes for the western CCA and otherwise recommends status quo (No Action) or Action Alternative 3 management measures for groundfish sectors affecting bocaccio rebuilding (see Sections 2.2.3.5 and 4.5).

As recent experience has shown, a strong year class will initially be caught in nearshore fisheries and hard to avoid. Higher OYs or a rebuilding framework that allows one-year overages if the long term harvest rate is not exceeded should be considered for this stock due to its episodic recruitment pattern.

Canary Rockfish

Specific Canary Rockfish Rebuilding Strategies

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 tends 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 two of the last three years. The canary rockfish OY was exceeded by 4.5 mt in 2003, 11 mt in 2004, but, in 2005, total estimated mortality was less than the OY by about 7 mt. 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 (described below), 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. However, 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 selective flatfish trawls south of 40°10' N latitude through implementation of EFPs have not been successful due to lack of participation. 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 validate their use in the south. 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 as can be seen in Figure 4-2 and from Table 4-1, 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.

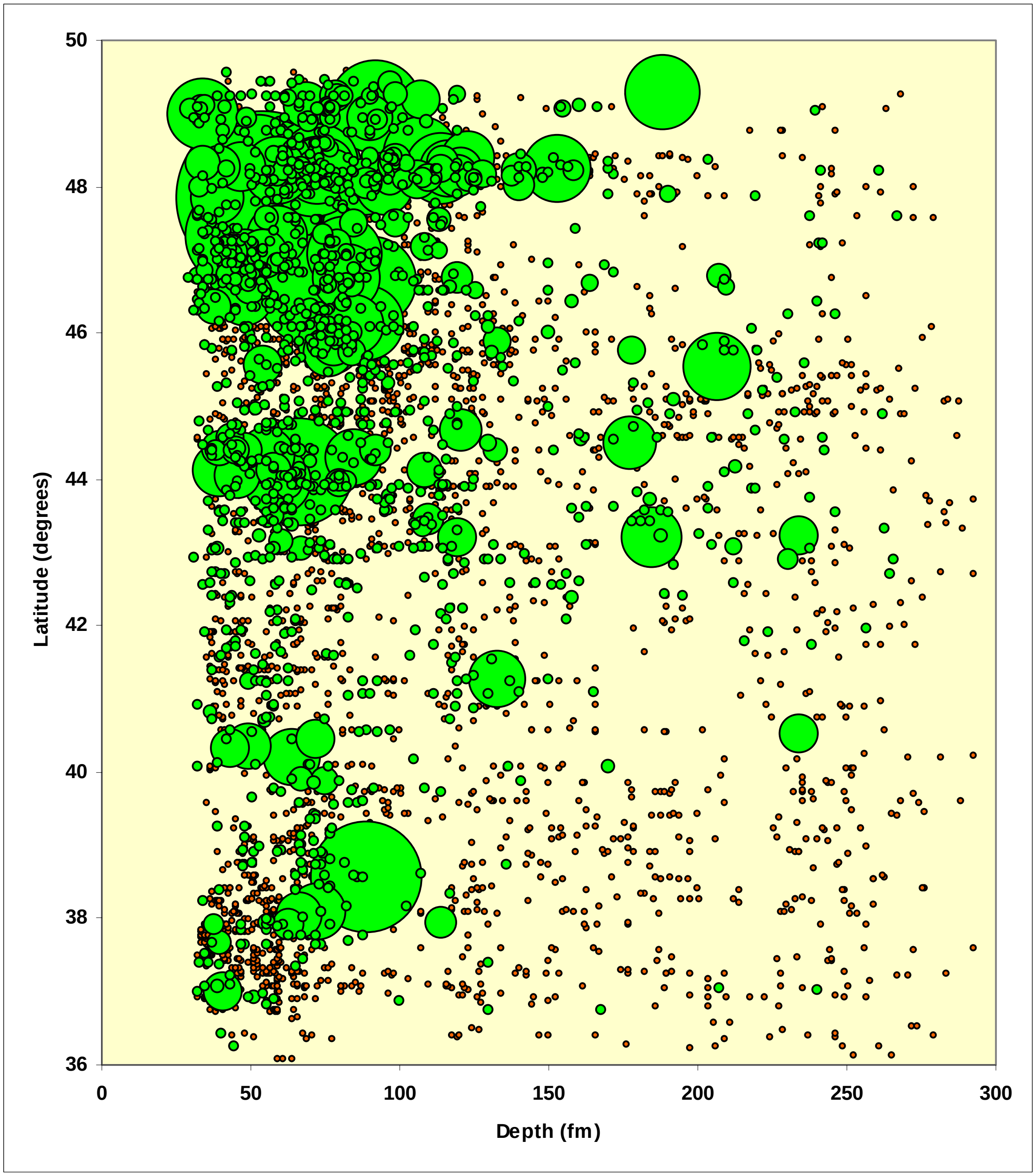


Figure 4-2. Catch per tow of canary rockfish in the NMFS triennial bottom trawl survey by latitude and depth (shaded circles are positive tows with their size proportional to CPUE, empty circles are negative tows).

Evaluation of Optimum Yield Alternatives

Table 4-9 shows the results of the evaluation of alternative canary rockfish OYs analyzed for 2007–08 using the criteria described in Section 4.2. The canary rockfish OY evaluation has a mixed score using these criteria. Relatively low scores are noted using the catch monitoring uncertainty, stock depletion, and rebuilding probability criteria, while a relatively higher score is assigned using the assessment uncertainty criterion and a moderate score using the extended duration of rebuilding criterion.

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 4-5, 4-6, and 4-7). Precautionary management of recreational fisheries to stay within the low 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 2007–08 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) and the most recent years of the NMFS Northwest Fishery Science Center combined shelf/slope bottom trawl survey were not used. The second, “mop-up” STAR Panel, which reviewed the assessment in September 2005, 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 2005 assessment received a particularly high level of scientific scrutiny.

The level of spawning stock depletion of canary rockfish, at 9 percent, rates as the lowest depletion level of all the depleted species analyzed in this EIS. Higher canary rockfish OYs are inherently risky based on this criterion.

Rebuilding probabilities (P_{MAX}) for alternative canary rockfish OYs are all low ranging from 66 percent for the zero-harvest alternative to 50 percent for the highest OY considered. The harvest rates for the Preferred Low and the Council-preferred (same as the preferred High OY alternative) OYs have a 55 percent and 58 percent probability of rebuilding by T_{MAX}, respectively, while the No Action OY predicts about a 55 percent probability of successful rebuilding by T_{MAX}. Such low rebuilding probabilities infer increased risk in canary stock rebuilding, a condition which recommends a precautionary management approach. However, in consulting with the Council’s SSC on this issue in June 2006, they made the point that it may be more informative to look at the percentage change in rebuilding probabilities, particularly for canary rockfish OY alternatives since the zero-harvest alternative has only a 66 percent P_{MAX}. With this perspective, there is an 11.7 percent difference in rebuilding probabilities between the zero-harvest alternative and the preferred Low OY alternative and a 16.1 percent difference for the Council-preferred OY alternative of 44 mt.

The estimated median time to rebuild the canary rockfish stock under the zero-harvest alternative is 2053. An additional 7 years of rebuilding is predicted under the harvest rate used to determine the Preferred Low OY of 24 mt and 10 years under the final Council-preferred OY (also the preferred High OY) of 44 mt. This compares to slightly more than 11 years under the status quo OY and an additional 18 years under the highest OY of 68 mt. Given that canary rockfish is the most constraining stock in the West Coast groundfish fishery, this tradeoff in canary OY vs. rebuilding duration is one of the more important considerations for the Council and NMFS in this EIS.

Table 4-9. Evaluation of alternative 2007–2008 canary rockfish OYs relative to the criteria described in Section 4.2.

Evaluation Criterion	OY (mt)					
	No Action OY Alt. (2006 OY)	OY Alt. 1	OY Alt. 2	Pref. Low OY Alt.	Final Council-Pref. Alt. (OY Alt. 3; Pref. High OY)	OY Alt. 4
	47	0	24	32	**44**	68
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	9%					
Rebuilding Probability (P_{MAX})	54.8%	66%	60%	58.3%	55.4%	50%
Rebuilding Duration Beyond $T_{F=0}$ (yrs.)	11	0	5	7	10	18

Evaluation of Action Alternatives

Action Alternative 1 is the only action alternative estimated to stay within the Preferred Low OY Alternative for canary rockfish. Most of the current northern fisheries primarily constrained by canary rockfish OYs, such as recreational groundfish fisheries, are predicted to be more constrained by the Preferred Low OY for yelloweye under Action Alternative 1 (Table 2-14). Likewise, the Preferred Low OY for bocaccio tends to constrain southern fisheries historically constrained by canary rockfish more than the Preferred Low OY for canary rockfish. Action Alternatives 2 and 3 are estimated to constrain fisheries adequately to stay under the Council-preferred OY Alternative for canary rockfish. While yelloweye rockfish OYs will be increasingly more constraining under the Council-preferred OY ramp-down strategy, canary rockfish OYs will continue to be the most constraining to fisheries, especially in the four-year yelloweye harvest rate ramp-down transition period under that alternative.

Cowcod

Specific Cowcod Rebuilding Strategies

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 CCAs (CCAs, Figure 2-3). Area management is a particularly effective strategy for protecting cowcod given their sedentary life style and site fidelity. Piner et al. (2006) 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.

Evaluation of Optimum Yield Alternatives

Table 4-10 shows the results of the evaluation of alternative cowcod OYs analyzed for 2007–08 using the criteria described in Section 4.2. The cowcod OY evaluation has a mixed score using these criteria. Very low scores are noted using the catch monitoring uncertainty and the assessment uncertainty criteria; moderate scores using the stock depletion and extended duration of rebuilding criteria; and a relatively higher score is assigned using the rebuilding probability criterion.

It is particularly difficult to evaluate the cowcod OY alternatives given the great uncertainty in actual total catch and stock status. While the level of spawning stock depletion of 17 percent is considered a moderate level of depletion relative to all seven species under rebuilding, the high uncertainty in the assessment should be considered when applying this criterion in the evaluation. Stock depletion may be much worse and is best characterized as highly uncertain. All of these factors compel a very precautionary approach in rebuilding this very unproductive stock. OY alternatives 3-5 may be risky given this high uncertainty and the longer rebuilding periods (17-39 years beyond $T_{F=0}$) predicted by those harvest rates.

The final Council-preferred OY (also the preferred Low OY) of 4 mt and the preferred High OY of 8 mt in the Conception and Monterey areas have much shorter predicted rebuilding periods, extending the duration of rebuilding 4-8 years beyond the time predicted under a zero-harvest strategy.

The estimated rebuilding probabilities under the Council-preferred Low OY and the preferred High OYs are also reasonably high ($P_{MAX} \geq 80$ percent), which helps mitigate the risk of managing stock rebuilding with such high uncertainty.

The final Council-preferred OY of 4 mt is a reasonably low harvest level given the significant uncertainty associated with cowcod stock status and rebuilding projections.

Table 4-10. Evaluation of alternative 2007–2008 cowcod OYs relative to the criteria described in Section 4.2.

Evaluation Criterion	OY (mt)						
	No Action OY Alt. (2006 OY)	OY Alt. 1	Final Council-Pref. Alt. (Pref. Low OY Alt.)	OY Alt. 2 (Pref. High OY)	OY Alt. 3	OY Alt. 4	OY Alt. 5
	4.2	0	4	8	14	18	22
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	17%						
Rebuilding Probability (P_{MAX})	90.2%	100%	90.6%	80%	70%	60%	50%
Rebuilding Duration Beyond $T_{F=0}$ (yrs.)	4	0	4	8	17	27	39

Evaluation of Action Alternatives

All the action alternatives, including the final Council-preferred action alternative, contemplate a liberalization of the CCAs in the Southern California Bight. The most significant risk of altering the perimeters of the CCA is the possibility that incidental catches of cowcod would increase, either as a result of incidental catches at the boundary of the fathom lines, or from incidental catches resulting from inadvertent incursions of vessels into shallower depth in the boundary lines. Such risks are associated with all of the potential alterations to both the outer and inner perimeters. Although this risk is difficult to evaluate, the steep and complex topography of the continental shelf and slope in these regions, and the corresponding complexity of the perimeter line alternatives that would be developed to exclude fishing from those depths in which cowcod are most abundant, suggests that there is significant potential for such incursions.

It is worth noting that while most cowcod are found within the 40 to 150 fm depth range, commercial catch and resource survey data demonstrate that cowcod can be found as shallow as 20 fm, in low-moderate numbers to 220 fm, and infrequently to at least 270 fm (Butler, *et al.* 1999; Love, *et al.* 2002). Consequently, even with precise adherence by commercial fishermen to the outer perimeter of 175 fm under action alternatives 1 and 2, and similar performance by recreational fishermen to the inner perimeters of either 30 fm (Alt. 1) or 40 fm (Alt 2), bycatch of cowcod would be expected to increase by some amount under any of the alternatives. Although Action Alternative 1 (the four-area alternative) would presumably have less of an impact with respect to the potential for increased cowcod mortality, all of the areas proposed in this alternative are described as areas of moderate to high densities based on CDFG fishing block catch rate data (figures 5 and 6 in Appendix IV of Piner et al. 2006). Additionally, Potato Bank (west of San Nicolas Island), as well as Cortes Bank were both observed to have high densities of adult cowcod in the recent submersible survey (Yoklavich, *et al.* In prep.). Alternatives 2 and 3 could be expected to have increasingly higher impacts on cowcod as they increase the areal extent of cowcod habitat open to fishing significantly to substantially.

Both Potato Bank and the Santa Barbara Island areas, that would be open under all alternatives but the No Action Alternative, were also recently described as areas with high concentrations of newly described species of black corals (Tissot, *et al.* 2006), for which nearly all of the high concentrations were observed within the current boundaries of the CCA. However, under the final Council-preferred action alternative, the outer boundary of the western CCA moves to a line defined by latitude/longitude waypoints approximating the 175 fm contour (Figure 2-12). The newly described species of black coral (*Antipathes dendrochristos*) was distributed in the 100-225 m (55-123 fm) depth range within the CCAs according to the Tissot et al. (2006) survey. If the survey was comprehensive enough to describe the overall depth range of this black coral species, then fishing outside the re-configured western CCA under the final Council-preferred alternative should not impact this species. Independent of the above concerns, it is worth noting that a growing amount of habitat information in the Southern California Bight may be informative with respect to altering the CCA boundaries in the near future. Additional analysis of such data, and associated habitat preferences by cowcod and other species, could more adequately ensure that habitat known to be optimal for cowcod is protected in future CCA revisions.

The magnitude of fishing that could take place under any of the action alternatives, and the extent to which such fishing could increase mortality on cowcod and other rebuilding species, will be particularly difficult to assess without adequate observer coverage on vessels that fish within these closed areas. The current cowcod OY could potentially be entirely harvested in a small number of "disaster sets", and the extent to which any observer data that was collected would over, or under, estimate cowcod mortality is difficult to detect with the limited observer coverage for this region. Consideration of the challenges associated with adequately monitoring total mortality that could result from any modification to the CCA should be a high priority in selecting a preferred alternative, including some evaluation of the amount of observer coverage that might be expected from the WCGOP under any of the alternative scenarios.

Enforcement issues are presumably challenging under the proposed alternatives to the status quo. The current boundaries have been shown to be easily understandable to fishermen and enforcement personnel, thus meeting their objectives in rebuilding the cowcod (and other) resources. The practicability of enforcement using VMS data, particularly with respect to the legal issues surrounding the ability of states to use proprietary VMS data for enforcement purposes, is another complicating factor that has yet to be resolved for the purposes of implementing the Alternatives. The Enforcement Consultants, as advisors to the Council, recommended if the Alternative 2 CCA boundary change was adopted, fishing in the newly-opened areas of the current western CCA should only be done by vessels equipped with VMS and the VMS "ping" rate (i.e., the frequency vessel positions are determined by satellite tracking) be increased from the minimum 1-hour rate, which is done at unpredictably random times, to a minimum 15-minute rate and the additional costs of more frequent "pinging" be incurred by participants in this fishery. Additionally, the Enforcement Consultants recommended straighter lines approximating the 175 fm contour than shown in Figure 2-12 and that vessel transiting in the closed areas of the CCA not be allowed. These conditions were incorporated in the final Council-preferred alternative for changing the outer boundary of the western CCA.

The GAP and other industry advisors to the Council anticipate only nine limited entry fixed gear vessels will participate in slope fisheries in the newly opened areas within the current CCA (trawling will not be allowed in this area). However, it is uncertain whether increased fishing opportunities for healthy slope groundfish species such as blackgill rockfish in this area will draw additional limited entry or open access effort. While the Council has already decided a VMS requirement for all open access vessels that land groundfish on the West Coast beginning in January 2007, there is no good approximation of the current open access effort in slope areas within the Southern California Bight. Increased activity adjacent to the re-configured bounds of the western CCA will increase the risk of unintentional incursions of deployed fishing gear in cowcod habitat, which may increase cowcod impacts.

If there is an increased mortality of cowcod due to changes in the CCA boundaries, the risk of overfishing the stock increases. The GMT estimates the total mortality of cowcod under the final Council-preferred alternative to be 3.5 mt (Table 2-24). Given the high uncertainty in cowcod catch monitoring, a 0.5 mt buffer may not be adequate. Without any further mitigation, overfishing cowcod is clearly more likely under the final Council-preferred OY of 4 mt in 2007–08, especially with a liberalization of the current CCA boundaries.

The following section is excerpted from a CDFG report to the Council in June 2006 regarding alternative CCA boundary changes, both to the inner (shallower) boundary line and to the outer (deeper) boundary. As stated before, only the Alternative 2 outer boundary line change is recommended under the final Council-preferred alternative.

Background and Purpose of CCA

The CCA closures in the area south of 34°27' N latitude were established in 2001 in response to an depleted determination for the cowcod rockfish stock, and a federal requirement to restore the population to a healthy status. The intent of the CCAs was to reduce the cowcod catch so that the rebuilding Optimum Yield/Total Allowable Catch (OY/TAC) will not be exceeded. Rebuilding analyses suggest that recovery would be jeopardized if rebuilding OY/TACs are exceeded by any significant amount. The cowcod stock was reassessed in 2005, which indicated that cowcod biomass size is in slightly better shape than the last assessment (18% versus 7% of unfished biomass). This was reflected in a higher Conception area ABC for 2007–08, though results of the new rebuilding analysis confirm suggestions from previous analysis that rebuilding of cowcod may take several decades. A new series of annual rebuilding OY/TACs have been calculated for future years, beginning in 2007–08.

The CCA closures are primarily located far offshore where cowcod catches and catch rates remained historically high, but where total groundfish effort had been much lower than for fishing grounds closer to the mainland shore. Therefore, the CCA closures were initially adopted because they were less disruptive to southern California fisheries than alternative measures that would have been applied across the board to all shelf fishing grounds. These area closures were established prior to the implementation of depth-based RCAs along the coast that provided new protection to the primary depths of depleted shelf species, such as cowcod. The biggest difference between the RCAs and the CCAs was that the CCAs were expected to remain unchanged for many years based on the need to keep cowcod mortality within the rebuilding limits from the first stock assessment, although they were never intended to serve as reserves or MPAs. Given that the recent assessment shows a more optimistic rebuilding picture, this proposal provides consideration for adjustment of the CCA boundaries.

When the CCAs were first established, enforcement concerns dictated the outer boundaries to be long, straight lines rather than following irregular depth contours so that enforcement by aircraft could be effective. This resulted in inclusion of deep water (slope) habitat in the closure, where cowcod are less commonly found, and thus access to slope fishing grounds was omitted. Since the CCA's adoption, an electronic VMS has been adopted by the Council for commercial groundfish vessels, which is intended to provide effective enforcement without the need for long straight boundaries for offshore area closures. VMS should allow for more effective enforcement of irregular offshore boundaries. And, the overly-precautionary area management should be able to accommodate some risk of bycatch on the deeper fringes of cowcod depth distribution. .

Outer CCA Perimeter Alternatives

For the 2007–08 management cycle, alternative outer boundaries for the CCAs are proposed for consideration, to preserve the original intent of maintaining cowcod fishing mortality levels within the rebuilding OY/TAC while restoring fishing access to target species generally outside of cowcod depth zones for non-trawl vessels only. Prior to implementation of the CCAs, the area was accessed by vessels fishing with hook and line gear to target primarily blackgill rockfish, along with other slope rockfish.

Three alternatives to status quo are presented for consideration.

<u>Option 1 (= "Action Alternative 2" Chapter 2, DEIS): modify depth boundaries to allow fishing deeper than 175 fm.</u>

For non-trawl vessels that employ VMS, the CCA closure areas would be limited to the primary depth range that is utilized by cowcod, which would remove current bottom fishing restrictions from a large area of fishing grounds that are too deep to be considered primary cowcod habitat. Alternative 1 redefines the CCA outer perimeters as a series of waypoints that fall within (or beyond) the cowcod depth range, centering on the 175 fathom contour. This alternative refines the area management of cowcod intended when the CCA was established while preserving the original intent of the CCA with less impact to fisheries for other healthy stocks. Some additional considerations would be necessary to provide effective enforcement for this alternative:

- Only vessels with VMS would be eligible to fish between the current CCA boundaries and the new outer perimeter lines. For all vessels except those carrying VMS, the current boundaries and restrictions for the CCAs would be maintained.
- CDFG enforcement of Alternative 1 waypoints would rely on timely access to VMS information, and the ability to use that information in state court to prosecute violations. Without VMS access, or federal enforcement of boundaries, effective enforcement and thus management integrity could not be ensured.
- Vessels intending to fish using Alternative 1 boundaries would be required to declare their intent prior to departure from port for each trip.
- End buoys for longline sets would be required to employ radar reflectors and strobe lights. Also, the practicality of employing transponders (or other technologies) similar to VMS for the end buoys would be considered as a regulatory requirement.

<u>Option 2 (= "Action Alternative 1", Chapter 2, DEIS): establish specific rockfish fishing areas within the CCA.</u>

Four deep-water rockfish fishing areas (RFAs) within the existing CCA boundaries would be specified for commercial fishing with hook and line gear. This is similar to Alternative 1, except areas open to fishing would be limited to fishing grounds within four new defined RFAs and, within those RFAs, to areas that are deeper than the 175 fathom contour, as approximated by a series of waypoints within the RFA polygons. All other conditions would be as specified under Alternative 1. The limited number of fishing locations in Alternative 2 are intended to improve enforceability of the regulations compared to Alternative 1 while providing some access to slope target species deeper than habitat preferred by cowcod.

<u>Option 3 (= "Action Alternative 3" Chapter 2, DEIS). Eliminate the CCAs and employ depth-based management under normal Rockfish Conservation Area (RCA) regulations.</u>

This alternative would provide for management of the CCA areas as part of the routine groundfish management process. Any depth and area restrictions would be developed and adopted under the RCA regulations, which are currently closed to 150 fm in the area south of 34°27' N latitude.

<u>Option 4. Status quo (no action alternative)</u>

Maintain the current boundaries and restrictions for the CCAs. This alternative provides boundaries that have been shown to be easily understandable to fishers and enforcement. Conservation for cowcod and other depleted groundfish that are found within the area is achieved. However, fishing opportunities previously afforded to fixed gear vessels for target slope species are not realized.

Analysis of Impacts for Outer Perimeter Alternatives

Available depth distribution information for cowcod and blackgill rockfish are provided in Table 4-1 in Chapter 4 of the 2007–08 DEIS contained in the June 2006 Briefing Book. The provided depth range of highest cowcod density is 100 -130 fm with an overall depth range of 22 - 203 fm. Depth distribution information for blackgill, the primary slope target species, is 125 - 300 fm for common depth (or highest density). While there is some overlap of the proposed open depths with the deeper ranges where cowcod has been observed, all of the outer perimeter alternatives would be expected to maintain the total cowcod catch within the rebuilding OY for 2007–08. Prior to adoption of the CCA, less than ten vessels fished for blackgill rockfish in these areas. While CDFG recognizes there is no way to predict the likelihood of increased open access opportunity in areas reopened to the hook and line fishery under these alternatives, few open access vessels currently participate in slope rockfish fishing in areas open outside the non-trawl RCA boundaries.

All of the Outer Perimeter Alternatives would be expected to maintain the total cowcod catch within the rebuilding OY for 2007/2008. In 2000, an OY of 2.4 mt was established for the Conception area, which was roughly one-half the level of the total commercial catch from trawl and non-trawl vessels during the preceding years when there were few if any constraints on cowcod fishing. Since then, access to shelf habitat has been restricted by implementation of depth-based RCAs, and the cowcod bycatch mortality has been coming in under the current rebuilding OY of 2.1 mt.. The majority of catch has come from the trawl sector north of Pt. Conception, which currently has a separate OY of 2.1 mt. When comparing current catch estimates from the non-trawl commercial sectors to the OYs combined from both areas are 0.2 mt, representing 5% of the two area OYs combined (=4.2mt). For 2007–08, the Council-preferred OY alternatives combine the two OY management areas for a single OY that includes a near-status quo level and a higher level (4.0 mt or 8.0 mt for both areas combined). The trawl and non-trawl RCAs have provided protection of cowcod in addition to the CCA and total catch for cowcod in all commercial and recreational sectors has successfully reduced impact to approximately 20% below the current OYs, with an RCA boundary at 150 fm. A combination of 150 fm RCA boundaries and maintained CCA closure in waters less than 175 fm (under Action Alternatives 1 and 2) should therefore preserve successful management of bycatch levels of cowcod rockfish below the proposed low OY option for 2007–08. From a biological perspective, any of the alternatives to status quo meet the intent of the CCAs; however, from an implementation perspective, the option contained in Option 2 (Action Alternative 1) best achieves enforcement goals. Relative to concerns expressed over the potential impact on continued fishery-independent research within the CCA, a new survey using submersibles to survey cowcod within the CCA was conducted and used as a survey source in the 2005 cowcod stock assessment. Some areas contained in alternatives may overlap with survey areas, although we have not compared to actual transect locations. Depending on the alternative chosen, CDFG recognizes that it might affect comparability of the one past survey with future surveys repeated in the area.

The actual impact to cowcod of any changes could be evaluated in the future to consider whether the blackgill fishery should continue in that areas, if new observer data from fishing deeper than 175 fm in the CCA became available. While the West Coast Groundfish Observer Program was implemented after the closure of the CCA, observations south of Pt. Conception have been minimal to this point.

Inner CCA Perimeter Alternatives

For 2007–08, constituents have requested the opportunity for recreational fishing deeper than the currently-specified 20 fm depth closure.

Alternative 1: Extend fishing depth from 20 fm to 30 fm.

Alternative 2: Extend fishing depth from 20 fm to 40 fm.

Sub-options for Alternatives 1 and 2: Consider allowing retention of shelf rockfish species

Alternative 3 (CDFG preferred alternative): Status quo (no action). Maintain the current boundaries and depth and species restrictions for the CCAs.

Analysis of Impacts from Inner Perimeter Alternatives

The current 0-20 fathom shallow fishing opportunity within the CCA is limited to nearshore species and does not provide for retention of shelf species. Both of these provisions were established to eliminate the risk of interactions with cowcod. Fishing deeper than 20 fathoms would not provide additional fishing opportunities unless we allowed retention of shelf species. Allowing retention of shelf species would increase the likelihood that an unquantifiable amount of cowcod would be discarded, thus undermining the intent of the CCAs. Allowing increased fishing opportunities for the recreational and commercial fisheries in an area of expected cowcod interactions is not supportable given the continued low OY options. Therefore, the CDFG does not recommend any change from status quo for inner CCA boundaries.

Darkblotched Rockfish

Specific Darkblotched Rockfish Rebuilding Strategies

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 4-3). 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. As an example, in 2004 the Council and NMFS decided to provide more opportunity to harvest healthy Dover sole, thornyheads, sablefish (DTS), and flatfish stocks in the limited entry trawl fishery while staying within the darkblotched OY of 240 mt. In May the trawl RCA was decreased by moving the seaward boundary inshore to 150 fm and increasing DTS and flatfish limits. By September it was apparent the darkblotched OY would be exceeded without a significant adjustment to the trawl fishery. The trawl RCA was then extended from the shoreline (primarily to address over-attainment of canary rockfish) out to 250 fm north of 40°10' N latitude, from the shoreline out to 200 fm between 38° N latitude and 40°10' N latitude, and trip limits were severely reduced. The very important winter petrale sole fishery was foregone among other important fishing opportunities. By the end of the year, the darkblotched OY was exceeded, but only by 1.6 mt (Table 4-6). This indicates the sensitivity of RCA boundary adjustments when managing fisheries to stay within low darkblotched rockfish rebuilding OYs.

Area management beyond adjustment of the seaward boundary of the trawl RCA may be an effective rebuilding strategy for darkblotched rockfish. Figure 4-3 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 4-3 is informative, the apparent distribution is also affected by the survey sampling regime in that not all of the combined survey data is shown, 0-catch hauls are not shown, and that 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 4-3). These large catches tended to contain larger than average fish (Rogers 2006). Closure of those areas might provide additional darkblotched conservation benefits.

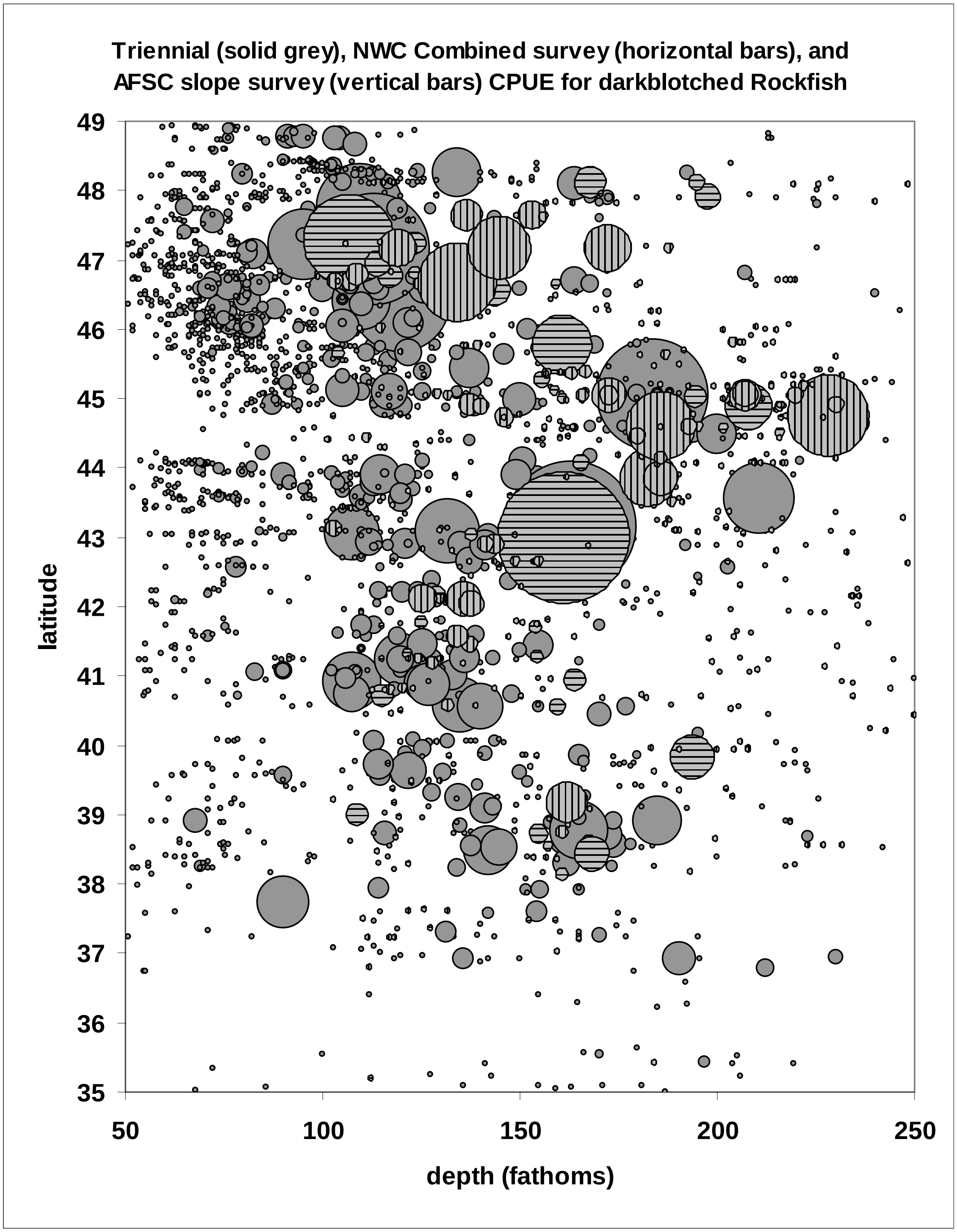


Figure 4-3. Index of West Coast distribution of darkblotched rockfish by latitude and depth as determined by catch per tow in NMFS trawl surveys. Size of circle is proportional to darkblotched rockfish density at that location. Data from NWFSC's West Coast Groundfish Survey Database and the AFSC Triennial Shelf and Slope Survey Database.

Evaluation of Optimum Yield Alternatives

Table 4-11 shows the results of the evaluation of alternative darkblotched rockfish OYs analyzed for 2007–08 using the criteria described in Section 4.2. The darkblotched rockfish OY evaluation has a mixed score using these criteria, but relative to the other six depleted stocks, ranks second highest behind POP when all the evaluation criteria are considered. That is, higher OYs for rebuilding this stock are judged to be less risky than higher OYs considered for all the depleted species other than POP. Relatively high scores are noted using the catch monitoring uncertainty, rebuilding probability, and extended duration of rebuilding criteria; while relatively moderate scores are assigned using the assessment uncertainty and stock depletion criteria.

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. The overfishing of darkblotched that occurred in 2004 (Table 4-6) may be prevented in the near future since model projections using WCGOP discard rates are better informed and landings plus discard are now tracked in near-real time in PacFIN's Quota Monitoring Species (QSM) reports[22].

The much more optimistic 2005 darkblotched assessment is largely based on validation of strong recent recruitments. These recruitments are relatively certain in the assessment input data despite the inconsistency in assigned ages of darkblotched in the sample data, which leads to the ranking of "moderate" assessment uncertainty.

The level of darkblotched stock depletion, at 17 percent, is considered a relatively moderate level of depletion. However, the outlook from the new assessment (Rogers 2006) is much more optimistic than indicated by the current estimated depletion level. According to the new assessment, both the biomass and the spawning output of darkblotched roughly doubled between 2000 and 2005. The biomass is expected to increase by an additional 40 percent from current levels by 2010, with spawning output doubling again in that period, at which point the stock is expected to be rebuilt based on the assessment point estimate.

All the darkblotched OY alternatives have exceptionally high rebuilding probabilities at or approaching 100 percent. The range of most depleted species' OYs analyzed in this EIS have an OY alternative at or close to 50 percent P_{MAX}. Conversely, the highest darkblotched OY alternative has a very high 97 percent P_{MAX} since it is capped at the ABC, which is determined using a proxy harvest rate. Therefore, all the harvest rates used to determine alternative darkblotched OYs and rebuilding strategies are considered risk-averse using this evaluation criterion.

The rebuilding periods associated with alternative darkblotched OYs are relatively short for a depleted rockfish. Under the zero-harvest alternative, rebuilding is predicted to occur by 2010. The Preferred Low OY Alternative of 130 mt extends this rebuilding duration by less than half a year, while the Preferred High OY Alternative of 229 mt extends rebuilding by slightly more than half a year. The final Council-preferred OYs (290 mt in 2007 and 330 mt in 2008) extend rebuilding by a year or less (Tables 2-3 and 4-11). This compares to rebuilding duration beyond $T_{F=0}$ under the status quo OY of slightly more than half a year (equivalent to that under the Preferred High OY) and 2.5 years of extended rebuilding under the largest OY considered of 472 mt. The tradeoff in rebuilding duration vs. allowable

[22] The GMT uses the PacFIN QSM report to track OY attainment inseason for recommending adjustments to fisheries to stay within OYs. In 2005, the GMT started incorporating projections of discard mortality in association with landings in the QSM report to better track total fishing-related mortality of managed species.

darkblotched harvest shows that a greater harvest rate than has been sustained in recent years can still successfully rebuild the darkblotched rockfish stock with a small incremental increase in the rebuilding period. While these strong, incoming year-classes to the spawning stock biomass favor expeditious rebuilding, fishery interceptions of darkblotched will likely increase making it more difficult to manage the low status quo OYs using status quo management measures.

Given the optimistic rebuilding outlook for darkblotched rockfish, evidence of strong recruitment, and evidence that darkblotched are increasingly harder to avoid despite the core depths for the species being closed to trawl fishing under current and recommended trawl RCA configurations, industry and the GMT recommended the Council adopt a higher 2007–08 OY than the preferred High OY decided for analysis in April 2006. The GMT's rationale for this recommendation was included in their written statement to the Council in June 2006 as follows:

> "This rapid darkblotched stock increase means that there would likely be increased encounter rates for darkblotched in 2007 and 2008 (i.e., the "rebuilding paradox" of not being able to avoid higher catches as the stock approaches target biomass levels.) Therefore, the GMT recommends the Council consider including a relatively high amount of OY to cover this rebuilding paradox and continued catch projection modeling uncertainty. The GMT notes that, while the Action Alternatives, including the No Action Alternative, all result in projected darkblotched mortalities that are less than the Preferred High OY (by 18.2-32.5 mt,) the amount of residual may not be sufficient to address the high variability in encounter rates as the stock rebuilds. As a potential consequence of variable encounter rates, darkblotched bycatch may jeopardize commercial slope fisheries such as the DTS and winter petrale fisheries. The Council has repeatedly heard testimony from industry on the importance of winter petrale and DTS fisheries in maintaining a permanent work force, and avoiding loss of markets to other supply sources which, once lost, can be difficult to regain. "

The Council considered the tradeoff of extended rebuilding for the OY alternatives and the estimated impacts of further constraints on the trawl fishery and associated fishing communities before agreeing with this recommendation and setting higher OYs (290 mt in 2007 and 330 mt in 2008). Recognizing the encounter rate of darkblotched is likely to increase in 2008 relative to 2007, the Council recommends the higher 2008 OY. The final Council-preferred alternative OY is projected to extend rebuilding by an additional year relative to a zero-harvest strategy (Tables 2-3 and 4-11).

Table 4-11. Evaluation of alternative 2007–2008 darkblotched rockfish OYs relative to the criteria described in Section 4.2.

Evaluation Criterion	OY (mt)						
	No Action OY Alt. (2006 OY)	OY Alt. 1	OY Alt. 2 (Pref. Low OY)	OY Alt. 3 (Pref. High OY)	**Final Council-Pref. Alt. in 2007**	**Final Council-Pref. Alt. in 2008 (OY Alt. 4)**	OY Alt. 5
	200	0	130	229	**290**	**330**	472
Catch monitoring uncertainty	Relatively certain due to a predominant trawl catch component.						
Assessment Uncertainty	Moderate uncertainty due to data inconsistency (ageing uncertainty).						
Stock depletion	17%						
Rebuilding Probability (P_{MAX})	100%	100%	100%	100%	100%	100%	97.2%
Rebuilding Duration Beyond $T_{F=0}$ (yrs.)	<1	0	<1	<1	<1	1	3

Evaluation of Action Alternatives

The more effective and accurate catch monitoring and tracking mechanisms used to manage slope trawl fisheries should significantly improve inseason management adjustments to future trawl fisheries and thus avoid the overfishing problem encountered in 2004. Inseason adjustments are anticipated to be fundamental in managing trawl fisheries to stay within the final Council-preferred darkblotched OYs chosen for 2007–08 as increased encounter rates of darkblotched are expected with the strong recruitments observed in the latest assessment.

All of the action alternatives analyzed for 2007–08 contemplate more conservative management of slope trawl fisheries than status quo. Action Alternative 1 is the only alternative estimated to stay within the Preferred Low OY Alternative for darkblotched, but as can be seen in Table 2-14, the Preferred Low OY Alternative for POP is even more constraining to slope trawl fisheries. Action Alternative 2 and 3 stay within the Preferred High OY for darkblotched, but the Preferred High OY for POP is again more constraining (Tables 2-18 and 2-21).

The Council-preferred alternative management measures are somewhat more liberal with respect to slope trawl fisheries than the action alternatives (Tables 2-15, 2-19, 2-22, and 2-25) and therefore, project a higher darkblotched impact (Tables 2-21 and 2-24). While the Council's biological and socioeconomic rationale for managing to a higher OY is explained above, the Council was interested in implementing two darkblotched RCAs (DRCAs) proposed by CDFG that could be closed year-round or seasonally to the limited entry trawl fishery. This proposal came late in the decision-making process, just prior to the June 2006 Council meeting, and was not accompanied with enough detailed analysis to consider implementing these trawl DRCAs on January 1, 2007. However, the Council was interested in further pursuing an area management strategy beyond seasonally varying the trawl RCA for minimizing darkblotched mortalities during the 2007–08 management period. The Council noted this intent during their final action on 2007–08 management measures in June 2006. An environmental assessment analyzing these and potentially other DRCAs may be developed and tiered to this EIS sometime during the 2007–08 period. A separate federal notice and comment rulemaking will precede implementation of DRCAs if this course is decided. A description of the two proposed DRCAs in waters off California follows.

Proposed Darkblotched Rockfish Conservation Areas

CDFG proposed two areas for possible new DRCAs between 40°10' N latitude and 38° N latitude. This area represents the southern end of the distribution of this rebuilding species. Although catch rates are lower in this area when compared to catch rates in the area north of 40°10' N latitude, some large catches have occurred in past years, and as a result there is uncertainty in predictability of catches in this area. Slope rockfish represents an important target species group for trawl vessels operating in this area, and cumulative trip limits previously were the same from 40°10' N latitude to the US-Mexico border. However, due to uncertainty relative to possible darkblotched rockfish encounter rates in this area when targeting slope rockfish, cumulative trip limits have been reduced to a level intermediary between low levels north of 40°10' N latitude and limits south of 38° N latitude. Available data was analyzed to evaluate whether specific areas of higher concentration (i.e., CPUE- see Figure 4-2) could be identified for potential closure to provide a reasonable expectation of lower bycatch than current rates being assumed for the area.

Data from several sources were reviewed through a collaborative effort between NMFS and CDFG. Fishery-independent data from the triennial, slope, and combined surveys were provided by AFSC and NWFSC. Fishery-dependent location data were derived from trawl logbook data. Data from identified areas was compared to observer data from the West Coast Groundfish Observer Program (WCGOP).

Five areas reflecting higher concentrations of darkblotched rockfish in one or more years from 2000-2005 were identified and analyzed. Of these, two areas appeared to have the greatest amount of overlapping data between data sources (Figures 4-4 and 4-5). WCGOP data did not conflict with these findings. Should the areas be adopted for use in 2007–08 groundfish management, their appropriate application needs to be explored. The areas could be used year-round, or part of the year, or used when needed inseason. The two areas for consideration are described as follows:

> Beginning at 40°06.22’ N latitude, 124°17.78’ W longitude;
> Then to 40°02.96’ N latitude, 124°15.49’ W longitude;
> Then to 40°02.42’ N latitude, 124°13.69’ W longitude;
> Then to 40°02.23’ N latitude, 124°16.53’ W longitude;
> Then to 40°04.85’ N latitude, 125°17.99’ W longitude;
> and back to the point of origin (Figure 4-4).

> Beginning at 38°56.36’ N latitude, 123°59.33’ W longitude;
> Then to 38°56.98’ N latitude, 123°56.73’ W longitude;
> Then to 38°53.70’ N latitude, 123°56.35’ W longitude;
> Then to 38°50.07’ N latitude, 123°53.60’ W longitude;
> Then to 38°50.02’ N latitude, 123°55.32’ W longitude;
> and back to the point of origin (Figure 4-5).

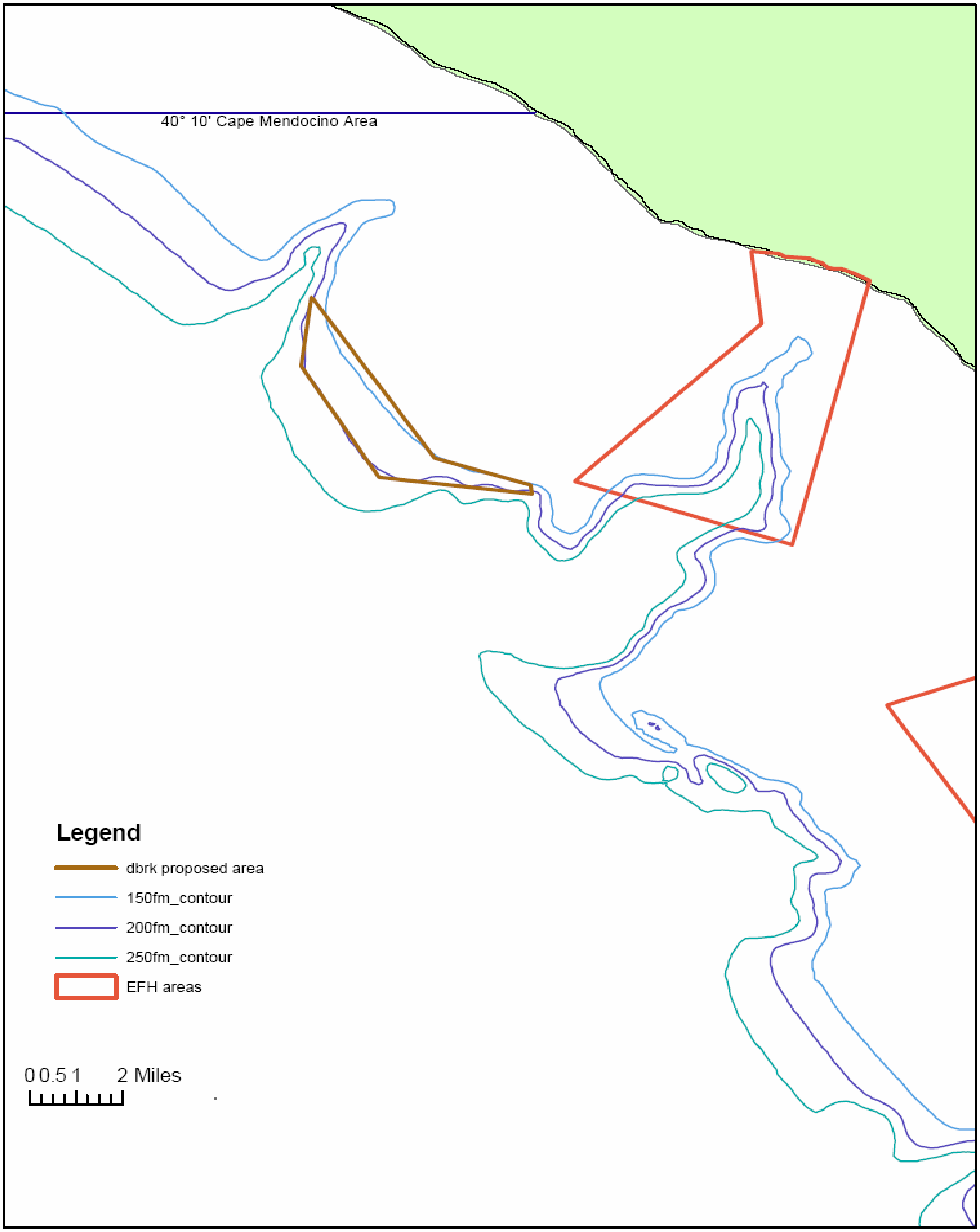


Figure 4-4. Proposed darkblotched RCA at Spanish Canyon near Shelter Cove.

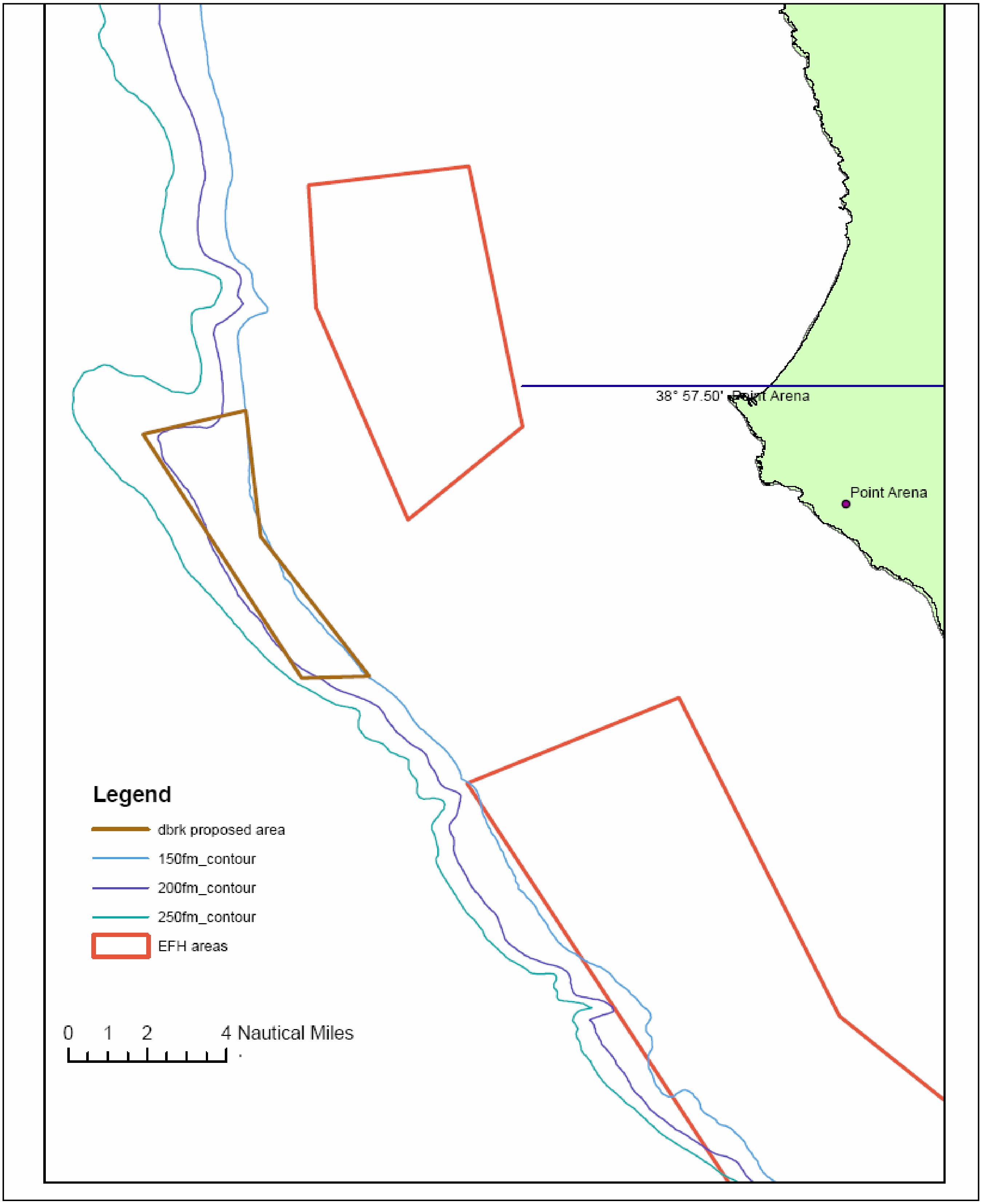


Figure 4-5. Proposed darkblotched RCA west of Point Arena.

Pacific Ocean Perch

Specific Pacific Ocean Perch Rebuilding Strategies

Pacific ocean perch have been under rebuilding since 1981. The population off the northern U.S. West Coast (Columbia and U.S.-Vanc. areas) is at the southern extreme of the stock and rebuilding potential may be more effected 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.

Evaluation of Optimum Yield Alternatives

Table 4-12 shows the results of the evaluation of alternative POP OYs analyzed for 2007–08 using the criteria described in Section 4.2. The POP OY evaluation has a high score using these criteria and ranks relative to all the depleted species when all the evaluation criteria are considered. That is, higher OYs for rebuilding this stock are judged to be less risky than higher OYs considered for the other depleted species. Relatively high scores are noted using all the evaluation criteria.

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.

The relative level of stock depletion is 23 percent and ranks high compared to the other depleted species.

Rebuilding probabilities range from 50 percent to 100 percent across the range of analyzed POP OYs and are especially high (>95 percent) for the Preferred Low and High OY Alternatives. The final Council-preferred OY of 150 mt also has a high 92.9 percent P_{MAX}. This compares to a 73 percent P_{MAX} under the status quo OY of 447 mt, which is almost 3 times higher than the final Council-preferred OY Alternative.

The shortest possible time to rebuild the West Coast POP stock under a zero-harvest strategy is 2015. The Preferred Low OY Alternative extends rebuilding by less than half a year longer and the Preferred High OY Alternative extends rebuilding by approximately one year. The final Council-preferred OY alternative extends rebuilding by about 2 years relative to $T_{F=0}$. This compares to about 8 years of extended rebuilding under the status quo OY and over 30 years under the harvest rate used to determine the highest OY considered (OY Alternative 5).

The GMT recommended a similar consideration for setting the POP OY as they did for darkblotched rockfish. Noting that the POP stock, as well as the darkblotched and widow rockfish stocks, are considerably more productive than the other depleted species and rebuilding is progressing faster than anticipated with the validation of strong recent recruitment, the GMT recommended a higher OY than the preferred High OY. The GMT's June 2006 POP OY recommendation and rationale was as follows:

> "The commercial trawl preseason catch projections for Pacific ocean perch (POP) have been off by as much as 100 percent as compared to post-season catch estimates in recent years; however, the GMT has significantly increased the precision in its catch

estimation methodology over the past year, especially for trawl. Like darkblotched, POP is rarely caught by fixed gear and recreational fisheries. However, POP is also nearing its rebuilt level, so there would likely be increased encounter rates for POP in 2007 and 2008. Therefore, the Council may wish to consider including a relatively high amount of OY to cover the rebuilding paradox and this uncertainty. Similar to darkblotched, unless there is sufficient OY available to address these items, POP will likely constrain commercial slope fisheries. However, unlike darkblotched and other depleted stocks, there is expected to be hardly any residual for POP (i.e., no residual for Action Alternatives 1 and 3, and a residual of 1.5 mt in Action Alternative 2). This is because the OYs analyzed for the Action Alternatives for POP for 2007 and 2008 (which are 44 mt and 100 mt) are significantly reduced from the 2006 OY level of 447 mt. These reduced OYs were not the result of the recent stock assessment or rebuilding plan, but were proposed from recent catch levels in the commercial slope fisheries, which are more significantly constrained by darkblotched rebuilding levels."

Additionally, the GMT recommended the specification of darkblotched and POP OYs reflect the ratio of total mortality observed for the two stocks in recent years given their strong co-occurrence on the northern West Coast slope and their similar selectivities to bottom trawl gear. The Council heeded this advice and adopted a 150 mt POP OY for 2007–2008. This OY reasonably reflects a proportional fishing-related mortality to the final Council-preferred darkblotched OY of 290 mt in 2007. And given that POP rebuilding is estimated to take only 2 years longer than the shortest possible time to rebuild ($T_{F=0}$) under this harvest rate, the Council believes the 150 mt OY is not risky and provides a reasonable balance between the conservation objective to rebuild quickly and the socioeconomic objective to avoid short-term disastrous impacts to dependent West Coast fishing communities.

Table 4-12. Evaluation of alternative 2007–2008 Pacific ocean perch OYs relative to the criteria described in Section 4.2.

Evaluation Criterion	OY (mt)								
	No Action OY Alt. (2006 OY)	**OY Alt. 1**	**Pref. Low OY Alt.**	**OY Alt. 2**	**Pref. High OY Alt.**	**Final Council-Pref. Alt.**	**OY Alt. 3**	**OY Alt. 4**	**OY Alt. 5**
	447	0	44	87	100	**150**	405	514	749
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	23%								
Rebuilding Probability (P_{MAX})	73%	100%	99.5%	96.7%	94.5%	92.9%	80%	70%	50%
Rebuilding Duration Beyond $T_{F=0}$ (yrs.)	8	0	<1	<1	1	2	6	10	33

Evaluation of Action Alternatives

In recent years, the effective harvest rate of POP in trawl slope fisheries has been much less than that specified in the POP rebuilding plan because darkblotched OYs were more constraining. The Preferred Low and High OY alternatives, as well as the Council-Preferred OY alternative, are much lower than the No Action OY and, depending on the harvest rate decided for the darkblotched rockfish rebuilding plan, could become the constraining stock in future trawl slope fisheries in waters off Oregon and Washington.

Only Action Alternative 1 constrains fisheries enough to stay within the Preferred Low OY Alternative for POP, while Action Alternatives 2 and 3 stay within the Preferred High OY.

Widow Rockfish

Specific Widow Rockfish Rebuilding Strategies

The Council chose to eliminate the non-tribal midwater trawl fishery targeting yellowtail and widow rockfish in 2003 to reduce widow rockfish exploitation (PFMC 2003c). 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 4-6). 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.

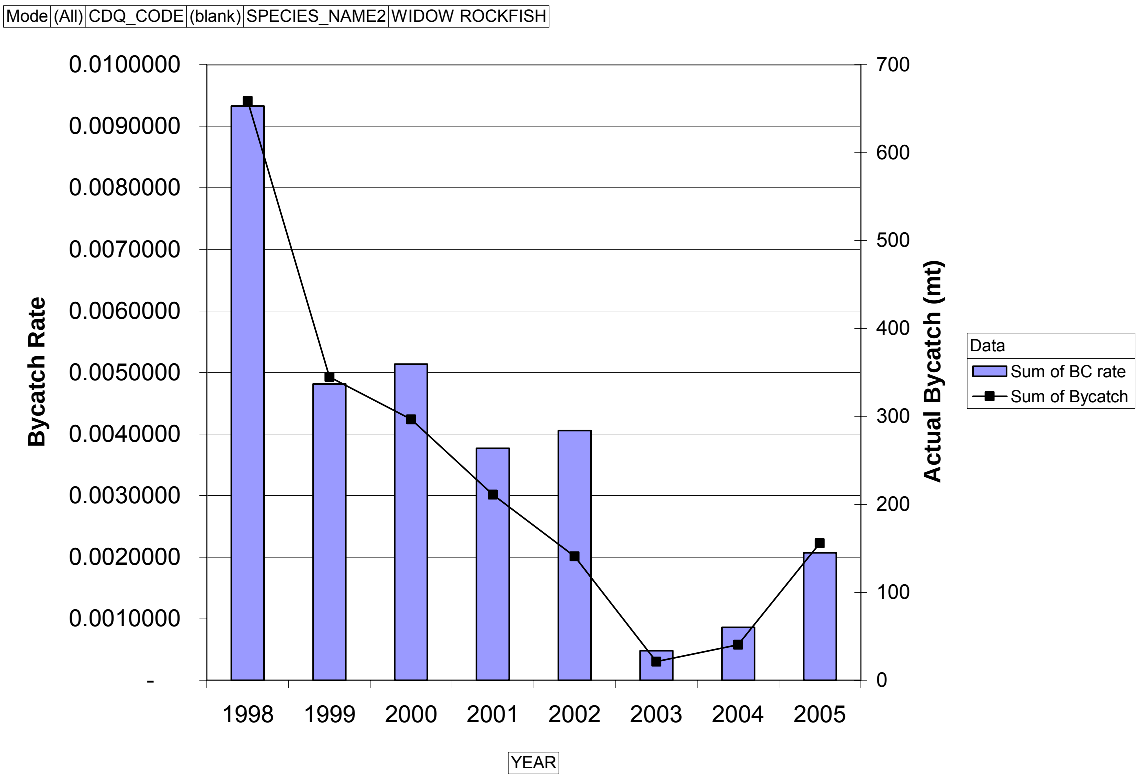


Figure 4-6. Annual widow rockfish bycatch rate and bycatch in the non-tribal sectors of whiting-directed midwater trawl fisheries.

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, as Figure 4-6 indicates, 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 operates under an EFP 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 echosounder 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.

Evaluation of Optimum Yield Alternatives

Table 4-13 shows the results of the evaluation of alternative widow rockfish OYs analyzed for 2007–08 using the criteria described in Section 4.2.

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.)

Most of the widow rockfish OY alternatives analyzed in this EIS have high rebuilding probabilities (P_{MAX} at or above 80 percent). Only OY Alternative 5 (1,369 mt) has a P_{MAX} less than the SSC "target" of ≥80 percent. The Preferred Low and High OY alternatives have very high rebuilding probabilities of 98 percent and 95 percent, respectively. In terms of the P_{MAX} criterion, 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 short rebuilding times predicted across a large range of OYs (Table 2-3 and Figure 2-2). The shortest possible time to rebuild the stock under a zero-harvest strategy is 2013. The Preferred Low OY harvest rate is predicted to extend rebuilding about a year longer than this and the Preferred High OY harvest rate extends rebuilding by yet another year. This compares to slightly less than two years of extended rebuilding under the status quo OY, which is intermediate to the Preferred Low and High OY Alternatives.

The Council chose the preferred High OY of 368 mt for its final Council-preferred alternative. The rationale for this decision is the extended duration of rebuilding is only two years relative to the shortest possible time to rebuild and the fishery impacts, especially to the valuable whiting-directed trawl fishery, would be extreme with a lower OY. The 2006 whiting fishery has had to significantly alter their behavior by frequently moving the fleet to avoid widow rockfish and lessen the chance of early closure from attaining the total catch limit. This is evidence of the widow "rebuilding paradox", where, as the stock successfully rebuilds and while the rebuilding OYs are low, encounters with these fish increase and they are increasingly harder to avoid. This dynamic led the GMT and the GAP to recommend a higher widow rockfish OY for 2007–08.

Table 4-13. Evaluation of alternative 2007–2008 widow rockfish OYs relative to the criteria described in Section 4.2.

Evaluation Criterion	OY (mt)							
	No Action OY Alt. (2006 OY)	**OY Alt. 1**	**Pref. Low OY Alt.**	**OY Alt. 2**	**Final Council-Pref. Alt. (Pref. High OY Alt.)**	**OY Alt. 3**	**OY Alt. 4**	**OY Alt. 5**
	289	0	120	329	**368**	456	917	1,369
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	31%							
Rebuilding Probability (P_{MAX})	96.2%	100%	98.4%	95.7%	95.2%	94%	80%	60%
Rebuilding Duration Beyond $T_{F=0}$ (yrs.)	2	0	1	2	2	3	7	14

Evaluation of Action Alternatives

All the action alternatives assume the same basic strategy of reducing widow rockfish mortalities by specifying caps in non-tribal fisheries targeting whiting. While other sectors may be able to reduce their impacts with widow avoidance strategies, the impacts in directed midwater trawl fisheries for whiting promise to most substantially reduce widow mortalities. The large recruitments of widow rockfish predicted in the new stock assessment may be a significant management challenge for the whiting fishery, depending on the widow harvest rate and OY selected for the widow rockfish rebuilding plan and the bycatch caps specified in future whiting fisheries.

Only Action Alternative 1 is conservative enough to stay within the Preferred Low OY Alternative for widow, while all the action alternatives stay within the Council's Preferred High OY Alternative. Managing for a 120 mt OY (Preferred Low OY) will most certainly constrain future whiting fisheries significantly given the OY is less than the status quo bycatch caps specified for 2005 and 2006 whiting fisheries. It will prove difficult, if not impossible for the whiting sectors to fully attain future whiting allocations if the cap is as low as it would have to be under the Preferred Low OY Alternative.

Yelloweye Rockfish

Specific Yelloweye Rockfish Rebuilding Strategies

Of all the new groundfish stock assessments conducted in 2005–2006, the yelloweye rockfish assessment shows the most pessimistic change from status quo. A significant adjustment of status quo management is needed to rebuild this stock given the much lower OYs projected from the new rebuilding analysis. While status quo management of yelloweye has relied on a similar avoidance strategy as is used to minimize cowcod mortalities (i.e., no retention regulations and specific area closures), there are still some fisheries, such as recreational and commercial fisheries in the north targeting Pacific halibut, that will need to be further constrained to stay within the lower OYs analyzed in this EIS. A more comprehensive area management strategy, where more of the critical habitats where yelloweye reside are closed to fishing efforts known to take yelloweye, may be most effective at further reducing mortalities and should be seriously considered. Other mechanisms, such as season and depth restrictions, should also be considered to reduce yelloweye mortality.

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, like the existing one off the north Washington coast (Figure 2-4), are likely to be most effective at reducing incidental mortality in hook and line fisheries. Figure 4-7 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.

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. The Canadian TAC (total allowable catch; analogous to an OY) for yelloweye in 2006 is 284 mt. This compares to the 12.6 mt coastwide OY under the Preferred Low OY Alternative analyzed in this EIS (which has the same harvest rate targeted within four year’s under the ramp-down strategy recommended by the Council). Without any genetic evidence indicating the Canadians are fishing on a different stock, the close proximity 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. For point of reference, the Canadian TACs for canary and POP this year are 1,193 mt and 6,148 mt, respectively.

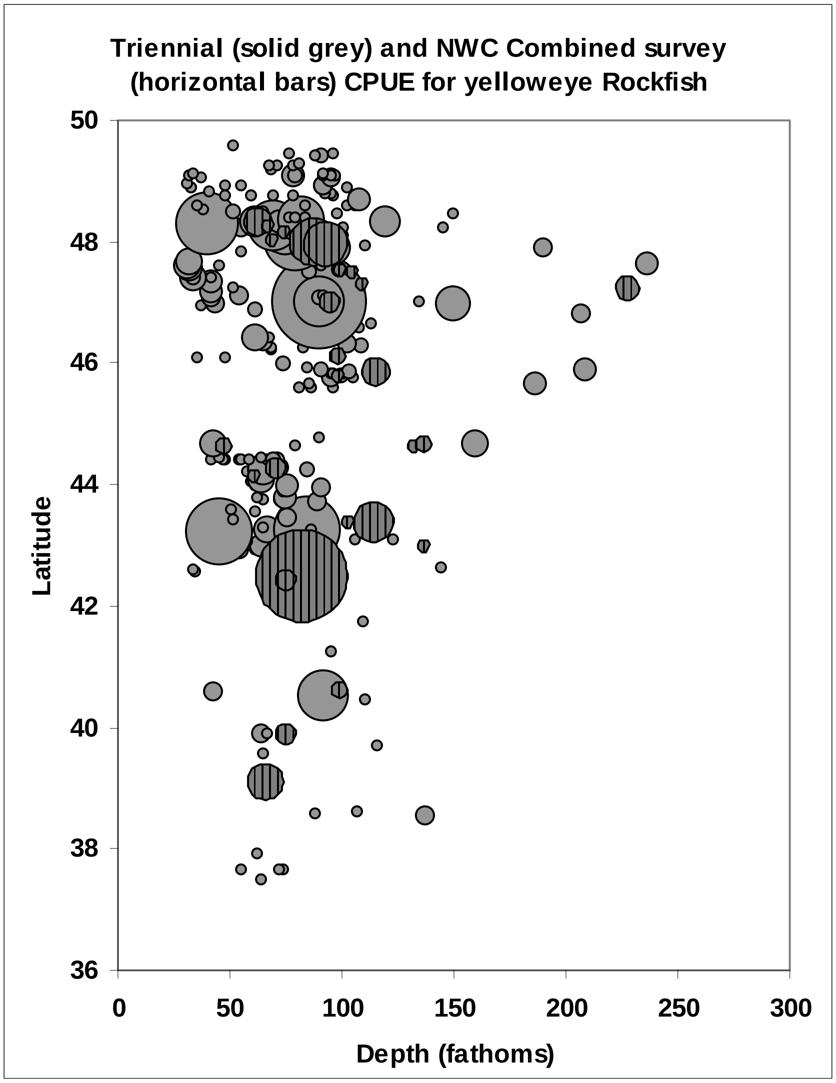


Figure 4-7. Index of West Coast distribution of yelloweye rockfish by latitude and depth as determined by catch per tow in NMFS trawl surveys. Size of circle is proportional to yelloweye rockfish density at that location. Data from NWFSC's West Coast Groundfish Survey Database and the AFSC Triennial Shelf and Slope Survey Database.

Evaluation of Optimum Yield Alternatives

Table 4-14 shows the results of the evaluation of alternative yelloweye rockfish OYs analyzed for 2007–08 using the criteria described in Section 4.2.

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 survey bottom trawls 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 high for the yelloweye OY alternatives considered for 2007–08, ranging from 100 percent under the zero-harvest alternative to 80 percent for the Preferred Low OY and High OY alternatives. These preferred OYs are within the “target” range of 80 percent recommended by the SSC. This compares to about a 46 percent P_{MAX} under the status quo OY, which is under the lower legal limit of 50 percent. Of the two preferred OYs adopted for detailed analysis by the Council in April 2006, the Preferred High OY “ramp-down” strategy is slightly more risky in that it assumes a four-year transition from the current management regime before adopting a constant harvest rate strategy equal to that under the Preferred Low OY Alternative. Assuming the 2007–10 OYs are not exceeded under the ramp-down strategy, there is no effective difference in P_{MAX} between the Preferred Low and High OY alternatives.

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 would be 2048 (Table 2-3). The harvest rate used to determine the 12 mt alternative (OY Alternative 2) is estimated to extend rebuilding an additional 30 years beyond that, while the Preferred Low OY and High OY alternatives are estimated to extend rebuilding an additional 35 and 35.5 years, respectively. This compares to over 71 additional years of rebuilding under the status quo harvest rate currently specified for rebuilding the yelloweye stock. The effect of a four-year transition from the status quo harvest rate to the low harvest rate under the Preferred Low OY Alternative is about a half a year of additional rebuilding under the ramp-down strategy.

The Council chose the ramp-down strategy as its final 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 better explore available spatial data to determine a potentially more comprehensive and effective area management strategy for reducing yelloweye mortalities.

Table 4-14. Evaluation of alternative 2007–2008 yelloweye rockfish OYs relative to the criteria described in Section 4.2.

Evaluation Criterion	OY (mt)				
	No Action OY Alt. (2006 OY)	OY Alt. 1	OY Alt. 2	Pref. Low OY Alt.	Final Council-Pref. Alt. (Pref. High OY Alt.)
	27	0	12	12.6	Ramp down [a/]
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	17%				
Rebuilding Probability (P_{MAX})	45.7%	100%	81%	80%	80% [b/]
Rebuilding Duration Beyond $T_{F=0}$ (yrs.)	71.5	0	30	35	35.5
a/ 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.					
b/ P_{MAX} (and the harvest rate beginning in 2011) are the same as for the Preferred Low OY Alternative.					

Evaluation of Action Alternatives

The very conservative management measures described under Action Alternative 1 in Chapter 2 are the only suite of management measures that are predicted to stay within the Council's Preferred Low OY Alternative. Management measures under Action Alternatives 2 and 3 stay within the OYs under the Council's Preferred High OY alternative, or the ramp-down strategy. Every action alternative specifies the implementation of a number of new Yelloweye RCAs to reduce mortality, but there is no quantifiable impact savings determined in this EIS from those proposed area closures. While it is unknown how overall total yelloweye mortality may be reduced by these YRCAs, some reduced mortality is anticipated and should be realized in 2007–08 if these area closures are implemented. Reduced mortality should first be evidenced in decreased encounters in recreational fisheries in Washington and Oregon and reduced bycatch observed in the WCGOP, particularly in the limited entry and open access fixed gear sectors.

An important aspect of the YRCAs proposed for 2007–08 is that comprehensive fishery and survey data are unavailable for understanding the distribution of critical yelloweye habitats. To determine which proposed alternative YRCAs would be recommended for managing 2007–08 fisheries, the WDFW and ODFW reviewed available yelloweye rockfish encounter data. They plotted the coordinates of the closed areas with Geographic Information Systems (GIS) software with overlays of state observer data from recreational, salmon troll, and exempted fisheries for trawl and longline, groundfish trawl logbook data, and data from the annual IPHC halibut survey, the NMFS triennial trawl survey, and the WDFW submersible survey for yelloweye rockfish. Based on this review, and information communicated from recreational and commercial fishers, the Council believes that closing those areas recommended for YRCAs in 2007–08 under the final Council-preferred alternative to the specified fisheries will help conserve yelloweye rockfish. While there is no quantitative analysis of impacts associated with closing these areas to recreational and commercial fishing, there is also no impact "savings" credit or estimate of reduced yelloweye rockfish mortality associated with closing these areas. Many of these proposed

YRCAs are within the habitats of greatest yelloweye density as inferred from trawl survey CPUEs (Figure 4-7). A larger, less fragmented area management strategy may ultimately be more effective for rebuilding the yelloweye stock since it would likely reduce mortalities by protecting the most critical habitats in which yelloweye reside and will be easier to enforce. Over the next 18 months, the state agencies will hold a series of meetings with recreational and commercial fishers to complete a more comprehensive review of the data and information about fishing locations to further refine these YRCAs and potentially define new sites. However, the YRCAs currently proposed are a good first start in transitioning to a significantly lower harvest rate. If closing only these proposed areas is deemed insufficient for ramping down the harvest rate, then conservative inseason depth and season restrictions will be needed to stay within these rebuilding limits. All the action alternatives contemplate stringent yelloweye harvest guidelines, which would force conservative inseason adjustments to those sectors experiencing difficulty avoiding yelloweye impacts. While all this analysis focused on yelloweye rockfish distribution, it is expected these YRCAs will also reduce mortality on co-occurring canary rockfish as well.

4.3.1.2 Impacts of Rebuilding Alternatives

As explained in 2.1.1, rebuilding alternatives (Table 2-2b) were developed by arranging the depleted species' OYs in various combinations in order to understand how the rebuilding plans for different species interact to cumulatively constrain fishing opportunities. The description of each rebuilding alternative's impacts, below, is predominantly qualitative, as these suites of OYs were not crafted so that the Council would choose its depleted species OYs wholly from one of the alternatives. Rather, the function of the discussion below is to highlight, through its panoramic view across all depleted species, how each species might differentially constrain fishing opportunities by sector (or gear type) and region along the West Coast. Another point made in this section is that one depleted species (such as canary rockfish, which has a coastwide distribution and affects nearly all fishing sectors) can constrain opportunity in many sectors even if high OYs are selected for other co-occurring depleted species.

Rebuilding Alternative 1

Under Rebuilding Alternative 1, canary rockfish is a constraining species limiting both the commercial and recreational sectors. For limited entry bottom trawl, the canary rockfish OY limits the catch of target species, such as petrale and Dover sole in the summer months, as well as English sole, arrowtooth flounder, and Other Flatfish on the continental shelf. Applying depth restrictions is the primary management tool to reduce the impact of limited entry fixed gear and open access fisheries on depleted species. The canary rockfish OY, as well as the yelloweye rockfish OY, could cause these fisheries to be restricted to depths greater than 100 fm north of 40°10' N latitude (rather than 100 fm under status quo).

Although the canary rockfish OY is the primary constraint on the recreational sector, yelloweye rockfish is also a constraining species for the sector, especially for recreational fisheries in Washington and Oregon. For California recreational fisheries, the bocaccio OY also substantially constrains opportunity. Affected recreational fisheries include those targeting black rockfish, blue rockfish, cabezon, lingcod, Pacific halibut, and greenling. In general, management measures that would be needed under this alternative, in order to restrict encounters with canary rockfish, would be similar to those under Action Alternative 1 (see Section 4.3.1.1). However, a greater impact to yelloweye rockfish would be possible under this alternative than is expected under Action Alternative 1. This could allow for less restrictive management measures in some sectors, particularly Washington and Oregon recreational fisheries.

Canary rockfish also constrains the whiting fishery. Given recent bycatch rates, canary rockfish could constrain the whiting fishery to a catch at a level approximately two thirds of the 2006 Pacific whiting OY. However, the whiting fleets have avoided many of the impacts to depleted or protected species through innovative bycatch reduction techniques, such as near real-time reporting of bycatch and voluntary fleet mobilization when bycatch in a particular area is high. In the past two years, setting bycatch caps for the non-tribal whiting sectors has effectively minimized the bycatch of depleted groundfish species.

The bottom trawl fisheries on the continental slope become more liberalized under this alternative. As a result, the available OYs for two of the main deepwater target species, petrale sole and sablefish, are able to be nearly or fully achieved. Given this more liberal scenario, it is the precautionary species, petrale sole and sablefish, which become constraining to fishing opportunities for other target species in limited entry bottom trawl, such as Dover sole and thornyheads. Nevertheless, the catch of Dover sole and thornyheads can still occur at levels equal to or higher than status quo levels. Species that have a high degree of co-occurrence with darkblotched rockfish (particularly those within the slope rockfish complex) are caught at levels that are substantially less than the available OY for those species. As has been the case in recent years, the POP OY is greater than that which can be accessed by these fisheries, given the constraints of other co-occurring species.

This alternative contains a widow rockfish OY that is higher than status quo; the OY is also greater than the estimated impact from the whiting fishery, the primary sector to catch widow incidentally. However, a midwater yellowtail rockfish and widow rockfish fishery cannot be re-introduced because the fishery's anticipated bycatch of canary rockfish could not be accommodated under this alternative's canary rockfish OY.

Rebuilding Alternative 2

Under Rebuilding Alternative 2, the northern fisheries that operate along the continental shelf and in nearshore areas are particularly constrained. The canary rockfish OY is set at a status quo level within this alternative, and therefore the impacts to fisheries would be expected to be similar to that seen under the current management. The yelloweye rockfish OY in this alternative, however, is set to a level lower than status quo (and also lower than under Rebuilding Alternative 1). Since yelloweye rockfish is caught almost exclusively by line gear, this alternative is particularly constraining to northern fixed gear and recreational fisheries. In order to lower the incidental catch of yelloweye within the recreational sector, the groundfish and, in northern waters, the Pacific halibut fishery would have to be restricted to shallower depths (potentially ≤20 fm) and/or new yelloweye RCAs would need to be established in areas of high yelloweye density where recreational bottom fishing would be prohibited. One possibility to reduce the limited entry and open access fixed gear impact on yelloweye rockfish would be to extend the non-trawl RCA seaward north of 40°10' N latitude, although establishing yelloweye RCAs could also help reduce impacts. The management measures to restrict impacts to canary rockfish and yelloweye rockfish under this alternative would be similar to those under Action Alternative 3.

Pacific ocean perch and darkblotched rockfish constrain bottom trawl fisheries along the northern slope areas to the same extent as under status quo management. Management measures under this alternative would also be similar to those described in Action Alternative 3. Similar to the case in Rebuilding Alternative 1, petrale sole and sablefish somewhat constrain the catch of other target species in the deepwater bottom trawl fisheries, such as Dover sole and thornyheads. However, the catch of these species is equal to or higher than the amount of catch occurring under status quo management. The whiting fishery operates as it would under status quo because its constraining bycatch species (canary rockfish, widow rockfish, and darkblotched rockfish) do not change under this alternative.

This alternative liberalizes the southern fisheries by increasing the bocaccio and cowcod OYs relative to status quo, although nearshore and shelf fisheries would still be constrained by canary rockfish, given the species coastwide distribution. Recreational fishermen in California, for example, might be able to fish at deeper depths or have a slightly longer season under this alternative. However, given the bocaccio OY is only slightly higher than the status quo impacts of about 150 mt of bocaccio in all fisheries combined, these increased opportunities might be slight. This is especially true if a strong year class of bocaccio is caught at a higher rate in nearshore fisheries, creating a temporary increase in bocaccio mortality until the fish mature and move to deeper depths.

Rebuilding Alternative 3

Rebuilding Alternative 3 is the most liberal of all of the rebuilding alternatives. Only the yelloweye rockfish OY specified within this alternative is less than that under status quo (although not much different than the realized status quo total mortality); some of the other OYs are substantially greater than those under status quo. This alternative provides for greater opportunities than those found in any of the Action Alternatives or in status quo management measures.

This alternative has the highest attainment of target species for most of the commercial sectors compared to other rebuilding alternatives, although current constraints on fisheries posed by low yelloweye OYs would not be lifted. Nevertheless, multiple target species OYs are not fully attained because the catch of precautionary zone target species caught in the commercial fishery (i.e., petrale sole and sablefish) limits the catch of healthy target species such as Dover sole and thornyheads. Commercial fixed gear fisheries, on the other hand, would continue to be constrained by the yelloweye rockfish OY.

Additional target opportunities could be accommodated under this alternative. For example, a midwater trawl fishery for yellowtail rockfish is possible, given that the widow rockfish OY is large enough to allow targeting and the canary rockfish OY is high enough to account for impacts that would be expected due to the co-occurrence of the three species. Only under this alternative would catch of widow rockfish approach the level of the OY; under the other alternatives (as well as under status quo) the widow rockfish OY is too low to allow this yellowtail rockfish target opportunity. The highest widow rockfish OY that could be considered in the new rebuilding analysis (1,369 mt) cannot be considered since canary rockfish would constrain midwater trawl opportunities, even under the higher amount under this rebuilding alternative (68 mt) before that amount of widow rockfish would be incidentally caught. The whiting fishery, which currently takes the greatest amount of widow rockfish, would be much less constrained by widow rockfish or canary rockfish under this alternative.

Northern recreational fisheries are still constrained by the yelloweye rockfish OY under this alternative. However, the effect on the fisheries may be mitigated by the higher canary rockfish OY in that management measures could direct fisheries away from areas with high yelloweye bycatch even if this increased the bycatch of canary rockfish. Depending on the management measures used to constrain the fisheries, fisheries directed toward black rockfish, Pacific halibut, lingcod, and greenling, amongst others, could be affected. Since yelloweye is rarely caught south of Cape Mendocino (40°10' N latitude), southern recreational fisheries are more liberalized under this alternative than under any of the other alternatives.

Rebuilding Alternative 4

Rebuilding Alternative 4 constrains the catch of target species for northern fisheries. Like in Rebuilding Alternative 1, the canary rockfish OY is almost one-half of status quo; however, the yelloweye OY is less than half of status quo, a more significant reduction than that analyzed under Rebuilding Alternative 1.

The OY for darkblotched rockfish is about double that of status quo and the OY for POP is nearly five times status quo. Given this scenario, the trawl fishery would need to shift away from the nearshore and shelf, where bycatch of canary rockfish is high, and into deeper waters where darkblotched encounters are greater (but are accommodated under this alternative). The result of this shift is to limit the catch of many commercially caught shelf and nearshore target species such as petrale and Dover sole in the summer months, English sole, arrowtooth flounder, and Other Flatfish. The midwater trawl fishery for Pacific whiting is similarly constrained under this alternative as it would be under Rebuilding Alternative 1. With a low canary rockfish bycatch cap, it is possible for the non-tribal sectors of the fishery to be closed before reaching their whiting allocations. However, the fishery's demonstrated ability to reduce its bycatch of depleted species in recent years suggests that such a situation may be averted.

Commercial fixed gear and open access fisheries coastwide are constrained significantly by this alternative, due to their encounters with canary and yelloweye rockfish. Management measures would likely be similar to those described under Action Alternative 1, in which the seaward boundary of the non-trawl RCA is extended from 100 to 150 fm north of 40°10' N latitude.

Recreationally fisheries are restricted substantially or eliminated completely under this alternative due to the low canary rockfish and yelloweye rockfish OYs. This affects both bottomfish fisheries (such as black rockfish, blue rockfish, cabezon, and lingcod) as well as other recreational fisheries that catch canary rockfish and yelloweye rockfish incidentally (such as Pacific halibut). In all instances, the OYs for these target species remain largely uncaught. Although yelloweye rockfish is generally only encountered north of Cape Mendocino, canary rockfish is caught nearly coastwide (it is rarely encountered south of Point Conception). Only for these most southern fisheries, can a more liberal season be considered given the higher bocaccio and cowcod OYs.

Unlike the southern commercial fixed gear fisheries, bottom trawl fisheries in the south are relatively unconstrained under this alternative, as the bocaccio OY is approximately twice that of status quo. As a result, the attainment of target species by the southern trawl fishery is largely limited by the attainment of precautionary zone target species OYs (petrale sole and sablefish).

Rebuilding Alternative 5

The OYs under Rebuilding Alternative 5 constrain all sectors of the groundfish fishery coastwide. Yelloweye rockfish, Pacific ocean perch, canary rockfish, darkblotched rockfish, and bocaccio all constrain the catch of more abundant species as well as the remaining two rebuilding species, widow rockfish and cowcod. No target species are constraints under this alternative, and none of the target species' OYs are attained.

The complexity of managing the fisheries increases substantially under this alternative. For example, it is difficult for managers to shift a fishery from an area where the catch of a depleted species has been exceeded into another other area where less constraining depleted species are found because nearly all of the depleted species are equally constraining. This type of situation would likely bring about the early closure of some fisheries in order to avoid exceeding the rebuilding OYs.

4.3.2 Precautionary Zone Groundfish Species

4.3.2.1 Cabezon (in Waters off California)

Cabezon (in waters off California) is classified as a precautionary zone species, given that its 2005 depletion level is estimated at 40.1 percent (Northern California substock) and 28.3 percent (Southern California substock) (Cope and Punt 2006). Though this designation triggers the 40-10 policy under the Groundfish FMP, the one OY alternative (69 mt, equal to status quo) identified for analysis was determined following CDFG's 60-20 harvest policy, given that it is an even more conservative policy (see the discussion of cabezon in Section 2.1.3 for greater detail). This alternative was selected as the final Council-preferred OY alternative.

The one cabezon ABC alternative, also selected as final Council-preferred OY alternative, was set using the harvest rate of $F_{45\%}$ (i.e., the harvest rate predicted to build the stock's biomass to B_{MSY}). It is noted that the SSC recommended an $F_{45\%}$ harvest rate as an F_{MSY} proxy for setting the ABC for groundfish species such as cabezon as a risk-neutral policy (PFMC 2000b). This proxy harvest rate is intermediate to the $F_{50\%}$ rate prescribed for species with lower potential productivity, such as rockfish, and the $F_{40\%}$ rate for more resilient species, such as flatfishes.

The very precautionary nature of the 60-20 adjustment suggests that this OY provides ample protection for this species against risk of additional fishing-related depletion. Preliminary estimates of total 2005 catch indicate that the OY (but not the ABC) for cabezon off California was exceeded by 10 mt. Given that the management measures for commercial nearshore and recreational fisheries in California under the Council-preferred Action Alternative are slightly more liberalized than under status quo, there is risk that 69 mt may be reached early in the season or even exceeded. If a non-retention regulation were implemented inseason to avoid exceeding the OY, it is expected that this would not affect recreational or commercial access to co-occurring nearshore species. Cabezon do not have swim bladders and so a very high survivability of live discarded catch could be assumed.

4.3.2.2 Pacific Whiting

Pacific whiting harvest specifications for 2007 and 2008 fisheries will be decided in March of 2007 and March of 2008, respectively. None of the action alternatives have an adverse impact on Pacific whiting.

4.3.2.3 Petrale Sole

The petrale sole OY alternatives the Council chose for analysis vary by the assumptions regarding the spawning stock biomass (base case vs. a low spawning biomass model) and whether to select a further precautionary reduction in the southern OY (i.e., that portion of the coastwide OY attributed to the stock south of 40°10' N latitude) beyond the Council's default 40-10 reduction to account for assessment uncertainty. No OY alternatives were analyzed using the high spawning biomass model in the 2005 assessment (Lai, *et al.* 2006) because the Council thought that model was overly optimistic.

The Council's choice of the 2,499 mt coastwide OY for 2007–08 used the base model from the assessment, which was considered the most plausible model by the assessment team, STAR Panel, and the SSC. This alternative was also developed with the 40-10 adjustment to the portions of the coastwide

ABC attributed to the biomass north and south of 40°10' N latitude since the stock is considered below the MSY threshold of $B_{40\%}$ ($B_{34\%}$ in the north and $B_{29\%}$ in the south). An additional 25% reduction is factored into the southern portion of the OY since the input data for the southern substock was considered sparse. These OY reductions are consistent with the Groundfish FMP framework for stocks in the precautionary zone and for assessments that are considered data-poor.

The decision table in the assessment projects the spawning biomass depletion level at various harvest rates assuming either the base model, low spawning biomass model, or high spawning biomass model represents the true state of nature. If the harvest rate under the high OY alternative (2,883 mt in 2007–08) is attained in the next four years and if the more pessimistic low spawning biomass model represents the true state of nature, the stock is projected to decline to the depleted threshold level of $B_{25\%}$ by 2010. This risk compelled the Council to reject this alternative. However, at a lesser harvest rate under the more pessimistic state of nature (low spawning biomass model), the spawning biomass is projected to increase slightly. The Council's choice of the 2,499 mt OY is therefore likely to result in increased petrale sole spawning biomass, even under the most pessimistic state of nature analyzed in the assessment. This compares to the No Action alternative OY of 2,762 mt. If this harvest rate was maintained, it might result in an increased risk of spawning biomass depletion since it is only slightly less than that under the high OY alternative.

4.3.2.4 Sablefish

Sablefish OY alternatives analyzed in this EIS vary largely on model-estimated levels of steepness (h) in the assessment, which are relatively low for a productive stock like sablefish. The two OY alternatives assume a spawner-recruit steepness of 0.26 and 0.34, respectively. The lower OY alternative (OY alternative 1 = coastwide OY of 4,574 mt) is based on the low stock/production model, which was not the base model in the assessment, but an alternative model used to explore assessment uncertainty. The Council-preferred OY alternative (OY alternative 2 = coastwide OY of 5,934 mt) assumes the higher steepness value of 0.34 and is based on the most plausible base model in the assessment as recommended by the stock assessment team, the sablefish STAR Panel, and the SSC. Estimates of low steepness in the assessment are a consequence of adding in the environmental covariates of sea level height and sea surface temperature, which was done to account for recruitment deviations from the stock-recruitment function. This relationship also drives down current estimates of depletion since historical biomass is estimated to be much higher when steepness is low and, under the Groundfish FMP framework, depletion levels are relative to historical, unfished biomass. That is, if the stock is as unproductive as indicated by the low steepness values in the assessment, historical spawning biomasses had to have been high to account for higher historical recruitment. Without the environmental covariates in the assessment, current depletion levels and projected sustainable harvests would likely be higher since the unfished biomass (B_0) denominator in the depletion function would be lower.

The other significant parameter distinguishing the two OY alternatives is the catchability coefficient (q) for the historic shelf and slope trawl surveys (the AFSC and NWFSC surveys). A number of major uncertainties on the best way to model survey data center on the annual depth distribution of age-1 sablefish. The selectivity of young fish (<4 years of age) in the two slope surveys, the overall catchability coefficient (q) of the two slope surveys, and the lack of reconciliation of the 2001 shelf survey length compositions and biomass estimates all contribute to significant uncertainty in the current biomass estimate. The assumed q values under the low stock/production and base models attempt to capture this uncertainty in the decision table, which projects spawning stock biomass and depletion under a range of harvest rates assuming either model represents the true state of nature. While a high stock/production model with a higher assumed steepness value and a lower q value was also provided in the decision table, the Council did not select an OY alternative using this more optimistic model due to the risk of depleting the stock by specifying potentially unsustainable harvest limits.

All the model projections in the decision table predict stock declines as the strong 1999 and 2000 year classes wane in the population and average recruitment is assumed thereafter. It is important to note that all forecasts and decision table results are based on the model where the steepness parameter (h) is estimated to be 0.20. If the stock is truly this unproductive (unlikely given that most rockfish stocks have a higher estimated spawner-recruit steepness; Table 4-3), it could not support a long-term fishery in the absence of favorable environmental conditions. It is unlikely that a steepness of 0.20 is an accurate estimate given the longevity of the fishery. However, using this decision table despite the above qualification, either OY alternative considered in this EIS does not predict a stock decline below the MSST of $B_{25\%}$ in the next two management cycles, even if the more pessimistic low stock/production model is the true state of nature. In fact, there is relatively little difference in projected spawning stock biomass or depletion under the harvest rates predicted from either model. The Council's choice of OY alternative 2 using the base model is considered a risk-neutral level of harvest and balances the potential risk to the stock of low future recruitments and the loss of fishing opportunity to the groundfish fishery represented by a significant decline in the OY relative to the No Action alternative (a coastwide OY of 7,634 mt in 2006 vs. 5,934 mt in 2007–08). A new full sablefish assessment is planned for 2007 (to be used for decision-making in the 2009–10 management cycle). The significant uncertainties underscored in the current assessment may be more fully explored and hopefully resolved in the next assessment.

The Council also continues to recommend the specification of total catch OYs north and south of 36º N latitude. These 2007–08 OYs are 5,723 mt and 210 mt for north and south, respectively. The northern OY of 5,723 mt is used for sector allocations according to the FMP allocation framework for sablefish.

4.3.3 Healthy Groundfish Species

4.3.3.1 Arrowtooth Flounder

As arrowtooth flounder is a healthy stock, the Council identified the status quo ABC/OY alternative, 5,800 mt, to be analyzed (Table 2-1) and then selected this as the final Council-preferred ABC and OY alternative. This is the only harvest alternative analyzed in this EIS since the stock has not been assessed since the original catch curve analysis in 1993 (Rickey 1993); and therefore, there is no basis for identifying an alternative other than status quo.

Though total catch of arrowtooth flounder has been significantly lower than the ABC/OY in the past (Table 4-5), this has not been the case for 2004 and 2005, in which estimated total catch was approximately 88 and 90 percent of the ABC/OY, respectively. More than one half of the total catch is attributed to discards in 2004 and 2005; it is unclear whether this is due to regulatory constraints on trip limits or due to a lack of market demand for the species.

Arrowtooth flounder is a shelf species caught by bottom trawl gear. Under the final Council-preferred Action Alternative, trip limits are increased relative to the No Action Alternative only for selective flatfish trawl north of 40°10' N latitude from 80,000 lbs/ 2 months to 90,000 lbs/ 2 months. This trip limit change is intended to reduce regulatory-based discards, while maintaining total catch below the ABC/OY.

4.3.3.2 Bank Rockfish

Bank rockfish are managed under the northern and southern minor slope rockfish complexes, as the stock's distribution ranges from northern Oregon to southern California. As the species is more commonly encountered south of Fort Bragg, only under the Minor Slope Rockfish South complex is the individual contribution of bank rockfish depicted (see Table 4-1) and alternatives considered.

The Council considered only one alternative, the status quo, for the bank rockfish contribution to the ABC and OY of the Minor Slope Rockfish South complex. This decision was based on two factors. First, bank rockfish are considered to be an underutilized stock; their small mouth makes them less susceptible to hook and line gear and the trawl RCA closes the area of their highest density (115 fm to 140 fm) to the bottom trawl fishery. Second, an assessment was not conducted on the stock during the last stock assessment cycle, thus no new scientific information is available to consider alternative harvest levels. The final Council-preferred alternative for the Minor Slope Rockfish South OY includes the status quo contribution of bank rockfish. Likewise, the Minor Slope Rockfish North OY is equal to status quo. Under the suite of management measures considered under the final Council-preferred alternative, it is expected that the catch of bank rockfish will be maintained at status quo levels.

4.3.3.3 Black Rockfish

The coastwide stock of black rockfish is managed under northern (Washington) and southern (Oregon and California) management specifications; both are considered to be at healthy levels with biomass greater than 40 percent of virgin levels. Black rockfish is a nearshore species found north of 34° N latitude and with highest density shoreward of 30 fm. Though a new stock assessment was not conducted since the last biennial specifications process and so no new stock status information is provided for decision-making under the current action, a coastwide assessment of black rockfish is scheduled for 2007, which will inform the 2009–10 management specifications process.

Only the recreational fishery is responsible for catch of black rockfish north of 46°16' N latitude since Washington state prohibits nearshore commercial fishing. When last assessed in 1999, the Washington (and Oregon) substock was estimated at a depletion level of 0.45. Since then, restrictions on the recreational fishery to protect yelloweye and canary rockfish have led to low recreational fishing pressure on black rockfish. Nevertheless, black rockfish is a valued component to the Washington recreational fishery. Total catch in 2005 is estimated at 271 mt, half of the 540 mt ABC/OY. Given that there is no new scientific assessment and catches have been maintained below the OY, the Council considered the status quo ABC and OY, both 540 mt, for use in the 2007–08 management cycle. These values were selected as the final Council-preferred ABC and OY alternatives.

The southern substock OY is shared by Oregon and Washington recreational and nearshore commercial fisheries following a catch sharing formula adopted by the Council under the biennial specifications process (see Section 2.2.1.1). The most recent assessment of this substock was completed in 2003 (Ralston and Dick 2003). In the assessment, the stock's spawning output was estimated at 49 percent of its unexploited level, indicating that the substock was well above the management target level of $B_{40\%}$. In 2003, total catch of black rockfish coastwide exceeded the combined ABC/OY for the northern and southern portions by 3 percent (35 mt). In 2005, however, total catch (687 mt) was maintained at a level lower than the 753 mt ABC/OY (Table 4-7). ABC and OY alternatives for the 2007–08 management cycle were derived from the 2003 assessment. The assessment projected an ABC of 725 mt in 2007 and an ABC of 719 mt in 2008; the OYs for both years are set equal to the average of the 2007 and 2008 ABC since the stock is above B40%, resulting in an OY of 722 mt.

4.3.3.4 California Scorpionfish

California scorpionfish was assessed for the first time in 2005. Beginning in 2007, it will be managed under a separate OY, rather than as a component species in the Minor Nearshore Rockfish South species OY. The two alternatives that were adopted for analysis by the Council in November are each based on a different recreational catch database system. While the stock assessment is based on MRFSS CPFV data, the state of California now manages its fishery based on CRFS data. This inconsistency is corrected in the first alternative, in response to the SSC's caveat when approving the stock assessment that the ABC/OY derived from the assessment could only be related to recreational catch calculated in the same manner as the catch stream. Given that California scorpionfish is primarily caught by recreational anglers (approximately 90 percent of mortality attributed to the recreational sector since 2000), effective and accurate management of recreational impacts is of primary importance for this species. Both alternatives are higher than the OY would be under a status quo calculation (setting the harvest level equal to 50 percent of recent landings).

Alternative 1 (137 mt) was derived using a catch scenario based on CRFS estimates (see Section 2.1.3 for more information). This alternative, because it is calculated using the CRFS estimates, allows for inseason monitoring, as such monitoring is also conducted using the CRFS data. By incorporating this ability to make adjustments to the fishery inseason, this alternative reduces the risk of either not achieving or exceeding the OY. However, OY Alternative 1, which is more constraining to California nearshore fisheries, could result in inseason regulation changes.

Alternative 2 (219 mt) is based on an average of the 2007 and 2008 ABC/OYs projected from the base model in the stock assessment, without the modification of CPFV data to convert it from MRFSS to CRFS estimates. While this alternative simplifies the regulation process, it does not allow for inseason monitoring of this species. As a result the catches would only be evaluated on an annual basis and so this alternative brings about an increased risk of either not achieving or exceeding the OY.

Figure 4-8 portrays the combined recreational and commercial take in metric ton, with recreational take calculated either with the CPFV proportion from MRFSS (corresponding to the data used to calculate Alternative 1) and from CRFS (corresponding to the data used to calculate Alternative 1). The two OY alternatives, as well as the status quo (calculated as 50 percent of recent landings) are also provided.

The Council selected an intermediate value, 175 mt, as the final Council-preferred OY alternative for 2007–08. This value is intermediate Alternatives 1 and 2 and is approximately equal to the maximum historical catches based on CRFS data (Figure 4-8). The Council considered the very healthy status of the stock (estimated in the 2005 assessment to be at 80 percent of its unfished level) in recommending this final OY alternative.

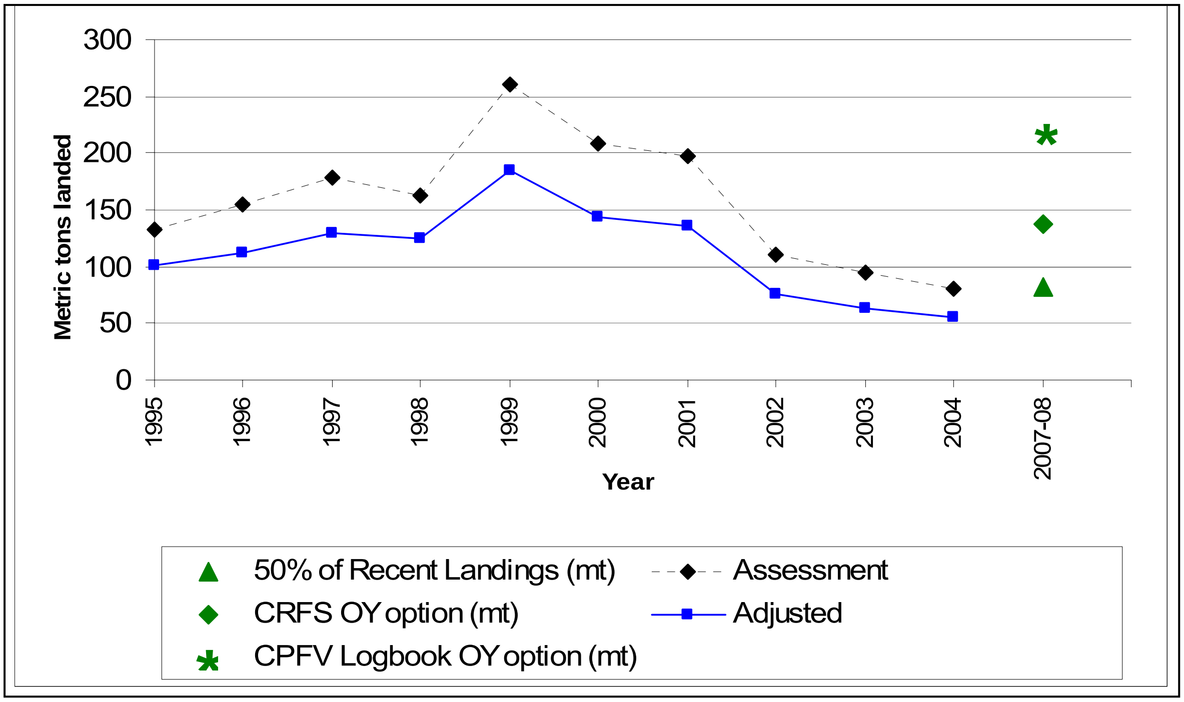


Figure 4-8. Combined recreational and commercial California scorpionfish estimated landings based on CPFV proportions taken from MRFSS (assessment) and CRFS (adjusted).

4.3.3.5 Chilipepper Rockfish

Chilipepper rockfish were last assessed in 1998 (Ralston, *et al.* 1998), at which time the stock was estimated to be at 46 percent to 61 percent of unfished biomass. Due to constraints of co-occurring depleted species, particularly bocaccio in the south, the catch of chilipepper rockfish has reduced to incidental levels. In 2005, for example, total mortality is estimated at 40 mt compared to a 2,000 mt OY. Given the low harvest rates since the last assessment, the chilipepper rockfish stock is considered to still be above the B_{MSY} proxy. Chilipepper rockfish is scheduled for a full assessment in the 2008-2009 stock assessment cycle.

The first OY alternative, 2,000 mt, is the status quo alternative that was first adopted as a precautionary measure to reduce encounters with co-occurring bocaccio. This was adopted before depth-based management (RCAs) was introduced to control the catch of depleted species. Therefore, the higher OY alternative, 2,700 mt, is based on the rationale that the RCAs may provide an adequate bocaccio bycatch control mechanism and so the OY can be set equal to the ABC.

The three Exempted Fishing Permit applications received by the Council by June 2006 all seek to test the ability of hook and line gear to target chilipepper rockfish without increasing fishing mortality on depleted stocks. The applications will be considered by the Council in November 2007. A healthy stock such as chilipepper rockfish could safely sustain increased harvest levels; if it can be determined through an EFP that the resumption of a chilipepper rockfish fishery could be conducted cleanly, the California commercial fishing fleet could have alternative fishing opportunities that would provide some economic relief to the industry.

2,000 mt was selected as the Council-preferred OY alternative, despite the possibility that this precautionary reduction from the ABC may no longer be necessary. The Council's decision reflects an understanding that the current RCAs have effectively closed access to chilipepper rockfish and therefore the total catch is projected far below either of the OY alternatives.

4.3.3.6 Dover Sole

Dover sole is a target species for the bottom trawl fishery and is most commonly caught as part of the DTS (Dover sole, shortspine thornyhead, longspine thornyhead, and sablefish) complex. Total catch levels in 2003-05 have been near the OY of approximately 7,400 mt (Tables 4-6, 4-6, 4-7). The 2005 assessment (Sampson 2006) indicated that the Dover sole stock was above target levels and had an increasing abundance trend. The stock's depletion level is projected at 63.2 percent of virgin spawning biomass in 2005 and 70.7 percent in 2007, substantially above the B_{MSY} proxy of 49 percent of virgin biomass. The projections from the 2005 assessment greatly differ from the previous assessment (Sampson and Wood 2001), in which the stock was estimated to be at approximately 29 percent of its virgin level, prompting a precautionary zone designation in the 2005–06 harvest specifications EIS. The estimated increases in biomass since the mid-1990s are due primarily to strong year classes in 1990 and 1991, and exceptionally strong year classes in 1997 and 2000; the incorporation of the 1997 and 2000 year classes into the 2005 stock assessment contributes to is in part responsible for the much more optimistic outlook than that in the prior assessment.

The change from the 2001 assessment to the 2005 assessment is clear in comparison of the ABC alternative (28,522 mt for 2007 and 28,442 mt for 2008) with that of the status quo (approximately 8,500 mt for 2005–06). Likewise, the OY alternatives for 2007–08 are higher than the status quo. The first OY alternative, 16,500 mt, is equal to the equilibrium MSY from the 2005 stock assessment. The second alternative, 28,482 mt is equal to the average of the 2007 and 2008 ABCs.

Though the OY can be set to the ABC for a healthy stock, as is done in Alternative 2, the Council selected 8,500 mt as its final preferred alternative. It is anticipated that co-occurring depleted species, as well as target species with more limited OYs such as sablefish and shortspine thornyhead, will constrain the catch of Dover sole below either OY alternative.

4.3.3.7 English Sole

English sole are a shelf species caught nearly exclusively by bottom trawl gear. Landings have generally declined since the mid 1960s and have been at nearly historical lows in recent years, due to the trawl RCA closures that substantially limit access to the resource. Catch data from 2003-05 indicate that harvest has been well below its allowable limit (Tables 4-5, 4-6, 4-7). Though the most recent stock assessment (Stewart 2006) highlights substantial uncertainties related to biomass, recruitment, and relative depletion, the conclusion that current spawning biomass exceeds the target level ($B_{40\%}$) was robust in sensitivity analyses to all three of these sources of uncertainty. Spawning biomass is estimated at 92 percent of virgin levels.

The Council identified an ABC alternative of 6,773 mt for 2007 and 5,701 mt for 2008, as projected by the 2005 stock assessment. These year-specific ABCs were averaged and the resultant average ABC of 6,237 mt was specified for each year as part of the final Council-preferred alternative (Table 2-1). The single OY alternative identified, later selected as the final Council-preferred Alternative, was set to the ABC given the very high biomass estimated in the assessment. It is anticipated, however, that the English sole stock will be underutilized during this management cycle and that catch levels will continue to be substantially below the OY.

4.3.3.8 Lingcod

The lingcod OY alternatives all contemplate a continued specification of total catch OYs north and south of 42° N latitude. While the stock is considered successfully rebuilt and healthy on a coastwide basis with a spawning stock biomass of $B_{60\%}$ at the beginning of 2005, there is still a concern with localized depletion of the stock in waters off California given the assessment result that the southern substock spawning biomass is estimated to be at $B_{24\%}$. Therefore, continuing the No Action strategy of specifying separate OYs north and south of 42° N latitude is a sensible reaction to the assessment result.

The final Council-preferred OY alternative for north of 42° N latitude is 5,558 mt and 612 mt for the area south of 42° N latitude. The final Council-preferred OY alternative for south of 42° N latitude is based on a proposal from CDFG to maintain the current status quo OY of 612 mt, which is an intermediate value between OY Alternatives 1 and 2. There is little chance of the OYs in the north or the south being attained in 2007–08 with the precautionary measures in place to reduce depleted species' impacts. South of 42° N latitude, where the lingcod resource concern is greater, the sector with the largest lingcod impact is the California recreational sector. The estimated lingcod impact in the 2007–08 California recreational fishery is 282 mt (Table 4-55) or less than half the southern OY. Commercial fisheries proposed for 2007–08 in waters off California are not likely to approach half that impact. Jagielo and Wallace (2006) estimated 2003 and 2004 total commercial catches of lingcod (the most recent years modeled in the new assessment) of 100 mt and 107 mt, respectively for fisheries in the Conception, Monterey, and Eureka areas. 2007–08 commercial impacts to the southern lingcod substock will likely be less than this amount since proposed management measures under the final Council-preferred alternative are not dramatically different from that period and only about half the Eureka area catches will count against the southern OY.

Reducing the minimum size limit from the status quo 24 inches to the proposed 22 inches for most sectors in 2007–08 may also benefit spawning stock biomass increases in the south since more spawners will likely survive. This would not necessarily be the case if there was a concomitant increase in bag or trip limits. But with no proposed increase in the California recreational lingcod bag limit and only some minor increases in fixed gear trip limits in the south, a rapid increase in the southern substock spawning biomass is likely. Under an assumption of average recruitment, higher harvest rates in the south than that proposed under the final Council-preferred alternative are projected to rebuild the southern substock to a healthy level of abundance by 2015 (Jagielo and Wallace 2006).

4.3.3.9 Longspine Thornyhead

The delineation of harvest specifications used to manage longspine thornyhead has evolved over recent years, since the stock was first managed separately from shortspine thornyhead in 1992. From 1995 through 1997, ABCs were specified coast-wide north of Point Conception (34°27' N latitude), then from 1998 through 2004, ABCs excluded the Conception area. The 2005–06 management cycle introduced a separate ABC for the northern area of Conception (34°27' N latitude – 36° N latitude) and specified corresponding OYs. Under the proposed management cycle, a single coastwide ABC will be adopted, however separate OYs will be specified for the area north of 34°27' N latitude and the area between 34°27' N latitude and the U.S.-Mexico border. This will be the first time that this southern portion of the Conception INPFC area will be covered under an ABC or OY, though risk to the stock prior to this is considered to be minimal given that there are no trawl ports in the area south of Point Conception.

The most recent assessment of longspine thornyhead (Fay 2006) assumes one coastwide stock and estimates coastwide biomass in 2005 at 71 percent of its unfished level. The Council-preferred coastwide ABC, 3,907 mt for 2007 and 2008, results from this assessment and is an increase from the status quo of 2,851 mt (which did not include the area south of Point Conception).

Stratifying the longspine thornyhead stock at the Point Conception management line is intended to distribute harvest opportunities proportional to the relative abundance of the resource and so protect against the potential of localized depletion which could occur if the increased OY allowed for higher exploitation rates north of Pt. Conception. Based on the most recent slope survey data, the GMT estimated that approximately 25 percent of the coastwide stock occurs south of Point Conception. Alternative 2 sets the OY equal to the ABC and applies this stratification, resulting in OYs of 3,930 mt north of Point Conception and 941 mt south of Point Conception. Alternative 1 reduces each of these OYs by 25 percent as a precautionary measure to account for higher assessment uncertainty, resulting in OYs of 2,220 mt and 476 mt, respectively. For the 2005–06 management cycle, a 50 percent reduction from the ABC was applied to the northern Conception area OY to account for stock assessment uncertainty while the OY for the northern portion of the stock was set equal to the ABC.

The Council adopted the more precautionary alternative (Alternative 1) as the Council-preferred OY alternative, given concerns about assessment uncertainty. Nevertheless, it is expected that catch will not near even this more precautionary level. Total catch of longspine thornyhead has been substantially below the OY for the past two years (Tables 4-6 and 4-7), due to the challenge involved in fully exploiting this resource without exceeding the OYs for shortspine thornyhead. In addition, the implementation of Essential Fish Habitat closures in 2006 further restricts access to the deepwater species by prohibiting bottom trawling in all areas within the EEZ seaward of a line that approximates 700 fm north of Point Conception and 300 fm south of Point Conception.

4.3.3.10 Shortbelly Rockfish

Shortbelly rockfish, a dwarf rockfish species, is unexploited due to its small size, except as infrequent incidental catch. The 13,900 mt ABC/OY, the one alternative identified for analysis and the adopted final Council-preferred alternative, is a continuation of a conservative Council policy for this species based on a catch curve analysis in 1989 (Pearson 1989). Since that “assessment”, the peak one-year shortbelly landings have been <100 mt. An informal assessment by John Field of the SWFSC in 2005 confirmed the stock’s high abundance. Field also discusses the usefulness of monitoring the abundance of shortbelly rockfish as an indicator of how non-fishing (i.e. environmental) related mortality of rockfish change over time.

4.3.3.11 Shortspine Thornyhead

Shortspine thornyhead are a major component of the deepwater fishery on the continental slope, especially the trawl fishery for Dover sole, thornyheads, and sablefish (referred to as the DTS complex). South of Point Conception the species is a target of fixed gear vessels.

Under the 2005–06 harvest specifications, a shortspine thornyhead ABC and OY were adopted for the area north of Point Conception (34°27' N latitude) and neither an ABC nor an OY was adopted for the southern Conception area (between 34°27' N latitude and the U.S.-Mexico border). The 2007–08 harvest specifications expand the ABC coastwide and propose separate alternative OYs for the area north and south of Point Conception. This change reflects an the 2005 assessment’s expansion of the geographic range, so as to include the area south of 34°27' N latitude, compared to that which had been used in the prior assessment. By stratifying the OY at Point Conception, the harvest specifications distribute harvest opportunities proportional to the relative abundance of the resource so that the increase in the ABC from the status quo does not bring about a higher exploitation rate in the north than that which can be sustained by the stock. Though this stratification is also proposed for longspine thornyhead under this EIS, the management change is of greater importance for shortspine thornyhead given its higher exploitation rate. Unlike longspine thornyhead, shortspine thornyhead catches in recent years have neared the OY (Tables 4-6 and 4-7), and in 2003 exceeded the ABC (Table 4-5).

The stratification of OYs is based on the model result indicating 66 percent of the current coastwide biomass occurs north of Pt. Conception and 34 percent south of Pt. Conception. Applying these proportions to the coastwide OY results in the OYs in Alternative 2, 841 mt for south of Pt. Conception and 1,634 mt for north of Pt. Conception. The most recent assessment of the stock (Hamel 2006c) estimated the 2005 spawning biomass at 63 percent of unfished levels, justifying setting the OY equal to the ABC under this alternative. This estimate of abundance is greater than that cited in the previous harvest specifications EIS (PFMC 2004b), in which shortspine thornyhead was identified as a precautionary zone species. Much of this change can be attributed to the inclusion of biomass from the entire Conception area, which is estimated to account for 22 percent of coastwide virgin biomass but 34 percent of current coastwide biomass. In other words, estimating current depletion levels separately for the areas north and south of Pt. Conception (but still assuming complete mixing for recruitment purposes) results in values of 53.3 percent north of Pt. Conception and 96.6 percent south of Pt. Conception.

Alternative 1 applies a precautionary reduction to the OYs proposed under Alternative 2, in order to take into account the conclusion of the SSC that the 2005 assessment is marginally sufficient to estimate resource status. For the area north of Pt. Conception, a 25 percent reduction is made, resulting in an OY alternative of 1,240 mt. For the area south of Pt. Conception, for which the SSC noted particular concern due to the compounding uncertainty associated with the short duration and density of survey data, a 50 percent reduction is made, resulting in an OY alternative of 421 mt. These precautionary OYs are not constraining relative to recent catches. The Council selected the values in Alternative 1 as their final preferred OY alternative.

4.3.3.12 Splitnose Rockfish

Only the portion of the splitnose rockfish stock south of 40°10' N latitude is managed under a separate ABC and OY; the portion north of 40°10' N latitude is managed within the Minor Slope Rockfish North complex.

Splitnose rockfish are primarily caught by bottom trawl gear. Since the trawl RCA was implemented, trawl vessels have been restricted from access to much of the area with the highest density of splitnose rockfish (55 fm to 250 fm). Though Action Alternative 1 would increase the RCA to cover the greatest area of splitnose distribution, the final Council-preferred Action Alternative also covers a substantial portion. Furthermore, bottom trawl trip limits for splitnose rockfish are set equal to that of the slope rockfish complex; both are constrained by the need to minimize the bycatch of darkblotched rockfish and Pacific ocean perch. Due to these management measures to protect depleted species, the catch of splitnose rockfish in the south has been far below the OY; in 2005, for example, total fishing mortality is estimated to be 87 mt compared to the OY of 461 mt (Table 4-7). Similarly, in the north, the total catch of species in the Minor Slope Rockfish, including splitnose rockfish, is estimated to be 285 mt out of an OY of 1,160 mt (Table 4-7).

Given these considerations and the lack of a new assessment of splitnose rockfish to inform this management decision, the Council adopted the one OY alternative, which is equal to the status quo, as the final Council-preferred alternative. This OY alternative, 461 mt, reflects a 25 percent reduction from the ABC, a precautionary adjustment taken for species for which there is less rigorous stock assessment information.

4.3.3.13 Starry Flounder

The first stock assessment of starry flounder was completed in 2005 (Ralston 2006) and the SSC approved its use in decision-making for the 2007–08 management cycle. Previously, the stock had been managed as a component stock of the Other Flatfish complex. The coastwide stock assessment is considered to be data poor; for example, unlike most other groundfish stock assessments, no age- or length-composition data are directly used in the assessment. Both the northern and southern populations are estimated to be above the target level of 40 percent of virgin spawning biomass (in 2005, $B_{44\%}$ in the Washington-Oregon area model and $B_{62\%}$ in the California area model).

The ABC and OY alternatives (Table 2-1) were calculated by combining the northern and southern base models using the preferred high catch scenario. OY Alternative 1 (1,186 mt) was calculated in accordance with the 40-10 adjustment since this stock is near $B_{40\%}$. Given the uncertainty resulting from the lack of data in the assessment, an additional 25 percent reduction to the base OY (Alternative 1) is made to Alternative 2 (890 mt). The Council selected the more precautionary alternative, 890 mt, as the final Council-preferred OY alternative.

Under either of the OY alternatives, it is likely that total catch of starry flounder would be substantially lower than that harvest limit. Nearshore trawl closures adopted by the States of Washington and California many years ago have almost certainly led to substantial reductions in fishing impacts on starry flounder populations, as the species is most commonly encountered shoreward of 80 fm. In 2004, for example, coastwide recreational and commercial (trawl) landings of starry flounder were approximately 115 mt (although this does not include discards).

4.3.3.14 Yellowtail Rockfish

Yellowtail rockfish is a midwater shelf species with a distribution that overlaps that of depleted species, particularly widow and canary rockfish. Due to this co-occurrence, the catch of yellowtail rockfish has been substantially constrained in recent years through management measures to protect the depleted species. Much of the shelf has been closed to the trawl fishery through the implementation of RCAs. The directed yellowtail fishery was banned in 2003 to all but tribal fisheries due to its high incidence of widow rockfish. For example, total catch north of 40°30' N latitude in 2005 is estimated at 892 mt compared to coastwide landings of 5,702 mt in 1996.

The most recent assessment of the northern stock of yellowtail rockfish (Wallace and Lai 2006) estimated a 2005 depletion level of 0.55 and an increasing abundance trend assuming status quo total catch levels. Given this healthy biomass level, as well as the lack of access to the resource, the Council considered only one OY alternative (for the northern stock only) for the 2007–08 management cycle. This alternative, 4,548 mt, is equal to the ABC alternative (averaged over 2007 and 2008), given the Council policy to set OYs equal to the ABC for healthy stocks. This OY alternative is an increase from the status quo of 3,681 mt, given the increasing abundance demonstrated in the stock assessment. Since management measures under the Council-preferred action alternative neither open a directed yellowtail rockfish fishery nor liberalize trawl RCA boundaries in the north, it is expected that total catch of yellowtail rockfish will be maintained at a level substantially lower than the preferred OY.

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

4.3.4.1 Minor Rockfish South

4.3.4.1.1 Southern Nearshore Species

Changes to the Minor Nearshore Rockfish South OY that are considered in this EIS relate to changes to the gopher rockfish contribution to the complex. The different contributions are associated with different levels of risk to other species within the complex, as discussed below.

Gopher rockfish are managed under the Minor Nearshore Rockfish South OY, though will have a point of concern set at a level determined appropriate to the adopted OY and taking into account the 2005 stock assessment. Gopher rockfish co-occur with both shallow and deeper nearshore species and cannot be cleanly targeted. As a result, raising the gopher rockfish portion of the Minor Nearshore Rockfish South OY to the level derived from the stock assessment could result in additional harvest of other data-poor stocks within the complex rather than just the harvest of gopher rockfish. While the stock assessment determined the stock to be healthy, the four gopher rockfish portion of the OY alternatives provide for the uncertainty around the assessment by including options that take proportional reductions from the base portion of 302 mt.

Gopher rockfish occur throughout California, with highest concentrations in central California. The gopher rockfish stock assessment covered only the central portion of the stock (from the California/Oregon border to Point Conception). Most gopher rockfish are taken in the Central Coast region (contributing greater than 95 percent of both the recreational and commercial landings). Each sector in the North region (California-Oregon border to Cape Mendocino) has contributed a negligible amount of landings, and the Southern region (Point Conception to the U.S. Mexico border) also has contributed a minimal amount of landings to the total.

Gopher rockfish are caught in depths that cover the range of other shallow nearshore species, as well as depths where deeper nearshore species are caught. As a result, there is a concern that raising the gopher rockfish portion of the minor nearshore south OY too high may result in additional harvests of data poor stocks, rather than harvests of gopher rockfish. Figure 4-9 demonstrates how much the additional gopher catch would impact the overall take of the deeper and shallow (without gopher) nearshore rockfish groups within the Minor Nearshore Rockfish South OY (this pertains to the area between Cape Mendocino and the California/Mexico border). As the portion of the circle representing the gopher rockfish contribution grows larger (for example in Alternative 4), the risk of other unassessed nearshore species being caught instead of gopher rockfish also increases.

The status quo contribution of gopher rockfish to the Southern Nearshore Species OY, 49 mt per year, would pose the least risk to the gopher rockfish stock by continuing to manage this species at 50 percent of recent landings. Furthermore, this alternative results in no additional risk of increased catches for the other unassessed species in the Southern Nearshore Species complex. Since this alternative does not incorporate the results of the gopher rockfish stock assessment into management, no additional fishing opportunities are provided.

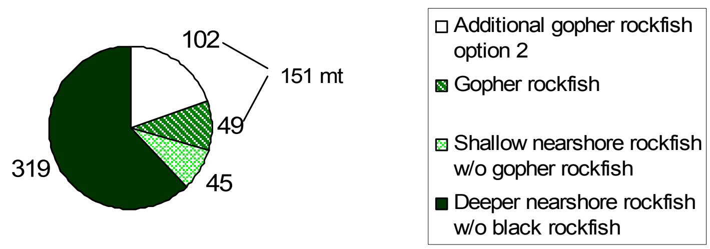
The second alternative contribution, 151 mt per year, is equal to one-half of the ABC calculated in the stock assessment. This contribution of gopher rockfish to the Minor Nearshore Rockfish South complex is lower than the 212 mt landings observed in 1992, but slightly higher than the historical average (Figure 4-10). It allows for some increased fishing opportunities for anglers and commercial fishermen targeting shallow nearshore rockfish in waters off central CA, while resulting in the least risk of increased catches for other unassessed species in this group compared to the other two non-status quo alternatives. Still, there remains a risk that increased fishing opportunities may result in increased take of other unassessed species, rather than gopher rockfish. Finally, this alternative brings about an increased risk to the gopher rockfish stock compared to the no action alternative, particularly if recruitment continues to be sporadic (as the assessment was heavily based on a single major recruitment event in 2000).

The third alternative contribution, 227 mt per year, is equal to three-quarters of the ABC. This alternative includes a contribution of gopher rockfish to the Minor Nearshore Rockfish South that is slightly higher than the highest observed landings (Figure 4-10). By affording additional fishing opportunities for anglers and commercial fishermen, this alternative also poses greater risk to the gopher rockfish stock, as well as to the other unassessed species in this group.

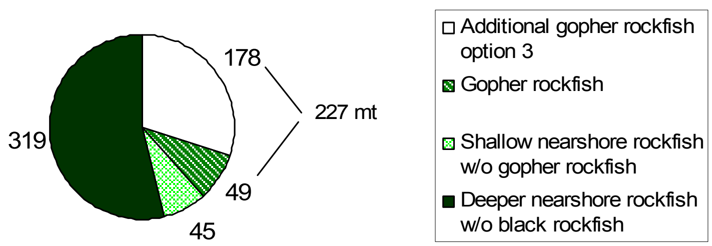
The fourth alternative contribution, 302 mt per year, is equal to the gopher rockfish ABC projected in the assessment. This alternative provides the greatest amount of additional fishing opportunities for anglers and commercial fishermen. This allowable take is well above the historic landings (Figure 4-10) and poses the greatest risk among the alternative to the gopher rockfish stock and to the increase of catches for the other unassessed species in this group.

The final Council-preferred alternative contribution, 200 mt, is intermediate between Alternatives 2 and 3 and is approximately equal to the highest observed landings (Figure 4-10). A point of concern of 200 mt will be set for gopher rockfish for 2007–08 and will be used to monitor the need to adjust catch levels inseason. This alternative allows for increased fishing opportunities for anglers and commercial fishermen targeting shallow nearshore rockfish in waters off central CA, while resulting in the an intermediate level of risk of increased catches for other unassessed species in this group compared to the other non-status quo alternatives. Like the other action alternatives, this alternative brings about an increased risk to the gopher rockfish stock compared to the no action alternative, particularly if recruitment continues to be sporadic.

<u>Combined commercial and recreational</u> estimated landings for 2007-2008, in metric tons, of minor nearshore rockfish south group (Cape Mendocino, California to the California/Mexico border) for OY option 2



<u>Combined commercial and recreational</u> landings estimate for 2007-2008, in metric tons, of minor nearshore rockfish south group for OY option 3



<u>Combined commercial and recreational</u> estimated landings for 2007-2008, in metric tons, of minor nearshore rockfish south group for OY option 4

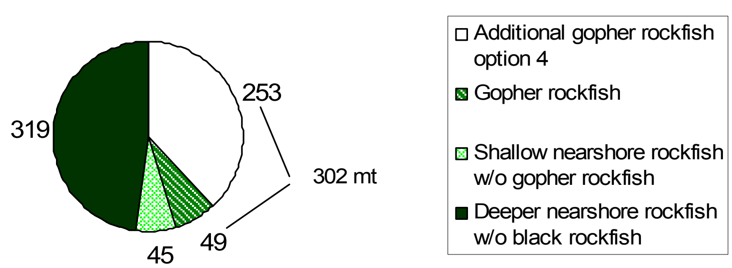


Figure 4-9. Impact of adding increased gopher rockfish catch to the Minor Nearshore Rockfish South (south of 40°30' N latitude) OY. (Note: Gopher rockfish comprises 12 percent of the OY under the Status quo option.)

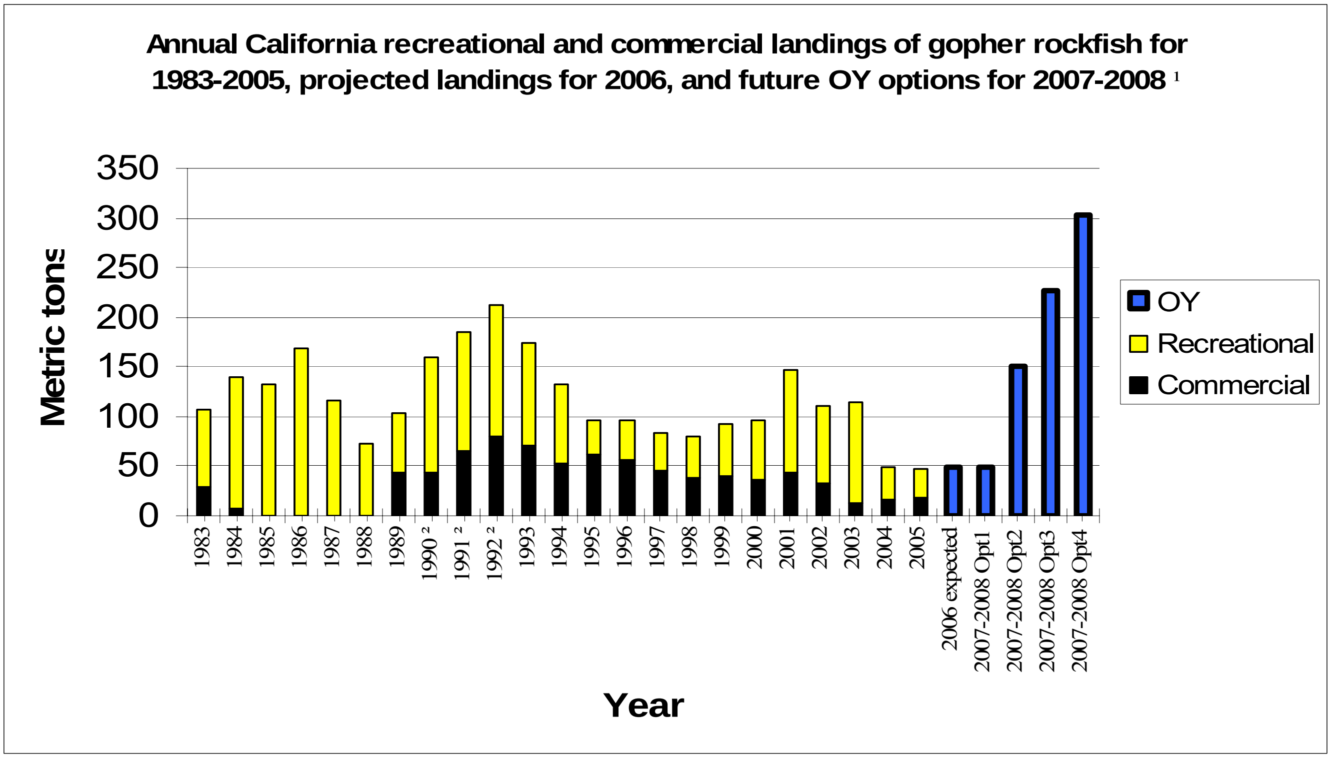


Figure 4-10. Combined landings of gopher rockfish and future OY options.

[1] 2007–08 OY options are for the area from Cape Mendocino (40°10') to the CA-Mexico border and will be part of the "Minor Nearshore Rockfish South OY"; gopher rockfish landings from the Oregon border to Cape Mendocino (Humboldt County) have historically comprised less than 1 percent of the statewide total.

Statewide recreational data from 1983–1989 and 1993–2003 from Marine Recreational Fisheries Statistical Survey (MRFSS); 1990-1992 recreational data from gopher stock assessment 2005 (no MRFSS sampling); 2004-05 recreational data from California Recreational Fisheries Survey (CRFS); commercial data from 1983–2005 from CalCOM.

4.3.4.1.2 Southern Shelf 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 Minor Shelf Rockfish South 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 2007–08 management cycle and selected this as the final Council-preferred alternative.

4.3.4.1.3 Southern Slope Species

Changes to the Minor Slope Rockfish South OY that are considered in this EIS relate to changes to the blackgill rockfish contribution to the complex, as discussed below.

Blackgill rockfish are managed within the Minor Slope Rockfish complex south of 40°10' N latitude, though a harvest level based on the 2005 stock assessment will be identified in order to monitor the fishery impacts to the stock following the points of concern framework (see 6.2.2 in the Groundfish

FMP (PFMC 2006a)). Helser (2006) explained in the most recent stock assessment that while the overall level of discard of blackgill rockfish is unknown, landings have been generally less (ranging from 64 to 286 mt between 1997 and 2004) than the harvest guideline (305 mt) during the last decade. Depletion is estimated at 52 percent of unfished spawning biomass in 2005.

The final Council-preferred OY alternative of 626 mt for this complex compares to the status quo 2005–06 OY 639 mt. This reduction by 13 mt that is considered under the alternative is the result of adjusting the contribution of blackgill rockfish to 292 mt, a more conservative value that reflects the information from the new assessment. The previous contribution, 305 mt, was based on an inference from the 1998 assessment of the blackgill rockfish stock (as the proxy ABC was not explicitly estimated in that assessment). The 2005 assessment, on the other hand, did explicitly project the ABC for 2007 and 2008.

The most risk to blackgill rockfish associated with the actions considered under this EIS is not related to the changes to the OY but rather to the liberalization of the CCA boundaries that are included in some form within each of the actions alternatives, including the final Council-preferred alternative. In 2001, the CCA was established outside of 20 fm, excluding directed groundfish fishing within an expansive area in the Conception area. This regulation may have had the greatest effect on blackgill rockfish, since the main fishery for the stock takes place between 200 fm and 260 fm in the Conception area. The proposed changes to the CCA boundaries under this action would open areas deeper than 175 fm to directed groundfish fishing, in order to provide greater access to slope species such as blackgill rockfish for commercial fixed gear participants. In 2004, total catch of blackgill rockfish is estimated at 162 mt, just over one half of the proxy ABC of 305 mt. Though this suggests that the stock is underutilized, there has not been analysis to project the increase in mortality that would result from liberalization of the CCA boundaries and therefore the risk to blackgill rockfish is unknown.

4.3.4.2 Minor Rockfish North

4.3.4.2.1 Northern Nearshore Species

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

The Council chose an OY of 142 mt for the Minor Rockfish North complex under the final Council-preferred OY alternative for 2007–08.

4.3.4.2.2 Northern Shelf 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 2007–08 management cycle and selected this as the final Council-preferred alternative.

4.3.4.2.3 Northern Slope Species

Impacts of species comprising the Minor Slope Rockfish North 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 2007–08 (Table 2-1).

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 harvest specifications and trip limits are recommended for the 2007–08 management period, which should maintain total catches well below the Council-preferred OY.

4.3.4.4 Other Fish

The Council has used historical landings to specify the ABC of 14,600 mt and an OY of 7,300 mt for the Other Fish complex, which is consistent with the Council's precautionary 50 percent OY adjustment for unassessed species (Table 2-1). Kelp greenling (in waters off Oregon) was assessed for the first time in 2005. However, as discussed below, management of the species is maintained within the Other Fish complex due to uncertainty in the stock assessment, and no changes to the kelp greenling contribution to the complex were proposed. Thus, with no new information informing the Council on alternative OYs for this complex, no change from status quo is identified by the Council for analysis. Therefore, the ABC and OY of 14,600 mt and 7,300 mt, respectively are recommended under the final Council-preferred alternative.

The adopted kelp greenling assessment (Cope and MacCall 2006) is geographically confined to Oregon. Due to the considerable uncertainty within the kelp greenling assessment, the Council elected not to set an independent ABC/OY for the species based on the assessment but rather keep kelp greenling within the Other Fish complex. Kelp greenling is a nearshore species with the highest density between depths of zero and 10 fm and is therefore found only in state waters. The state of Oregon manages kelp greenling using state harvest caps, catch limits, and length restrictions for both the recreational and commercial fisheries. Current Oregon catch levels fall below the OY suggested by the assessment, and the state does not anticipate considering any expansion beyond current catch levels. The two alternatives adopted by the Council at its November 2005 meeting are either to (1) not adopt a federal harvest guideline, with the state retaining management authority of the species, or (2) adopt a federal harvest guideline that is equal to the state harvest cap. The stock assessment indicates that the state of Oregon is managing at a level lower than that which could be harvested sustainably, given that the substock biomass is above $B_{40\%}$ (and so the harvest level could be set equal to the ABC). Given this precautionary management maintained by the state, the Council recommends under the final Council-preferred alternative, not to adopt a federal harvest guideline for kelp greenling for the 2007–08 management cycle and further recommends the stock continue to be managed under the more conservative Oregon harvest guideline.

4.3.4.5 Other Flatfish

Under the final Council-preferred alternative, starry flounder is removed from the Other Flatfish complex and managed with its own ABC/OY (see Section 4.3.3.13). With this recommendation, the Other Flatfish complex would then include butter sole, curlfin sole, flathead sole, Pacific sandddab, rex sole, rock sole, and sand sole. The combined 2007 and 2008 ABCs under the final Council-preferred alternative, based on historical landings for these species, results in an Other Flatfish ABC of 6,731 mt. The combined 2007 and 2008 OYs for the complex sum to 4,884 mt. To derive OYs, the ABCs for sanddabs and rex sole are reduced by a 25 percent precautionary adjustment for less rigorously assessed stocks, and the ABCs for the remaining species are reduced by a 50 percent precautionary adjustment for unassessed stocks consistent with the recommendations of Restrepo *et al.* (1998).

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.

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 2007–08.

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.

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 VMS Implementation

In order to enforce compliance with depth-based and area-based restrictions, a common tool in management under the Groundfish FMP, a VMS program has been implemented over the past few years. In 2004, NMFS initiated a pilot program requiring all limited entry trawl and fixed gear vessels operating under the Groundfish FMP to carry and use VMS units. Beginning in 2007, this program will be expanded to include 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. Because the vessels must utilize VMS, compliance by limited entry vessels is assumed in the analysis of impacts of depth-based restrictions on affected species; therefore, the effects of the limited entry sectors' used of VMS are already considered under the current action.

The expansion of VMS into the directed open access sector in 2007, however, is considered to be a future action that may affect West Coast groundfish species. VMS deters mixed fishing strategies where vessels alter gear to catch groundfish within the RCAs. As a result, under VMS the risk of the actual catch exceeding the OYs for depleted species due to illegal fishing in the RCAs is reduced. Nevertheless, the behavior of the open access fleet under VMS can only be speculated; for example, the requirement may encourage additional targeting of groundfish by certain vessels in order to compensate for the cost of the VMS equipment. A potential indirect impact of VMS expansion is that fishing effort and location data from the vessels may improve the understanding of groundfish mortality. Data can be combined with observer, survey, and fish ticket data to better estimate total fishing mortality, impacts on juveniles and other fishery resources related to changes in fishing locations and intensity, fishing intensity (amount of time vessels are in an area), and changes in fishing location and intensity over time.

4.4.1.2 Bycatch (Amendment 18)

The Council has undertaken a number of actions in response to the 1996 amendment to the MSA requiring measures to reduce bycatch in U.S. fisheries, as well as to a related court case, *Pacific Marine Conservation Council v. Evans*. Amendment 18 will establish catch caps and increased monitoring policies in the Groundfish FMP in order to minimize bycatch in West Coast groundfish fisheries to the extent practicable, minimize the mortality of unavoidable bycatch, and ensure that bycatch is reported and monitored as required by law. Amendment 18 was approved by NMFS in 2006. By reducing bycatch and bycatch mortality and by increasing the accuracy of total fishing mortality estimates, these new policies complement ongoing actions to rebuild depleted species. As fishing mortality is decreased through more stringent harvest restrictions, the cumulative adverse effects of fishing and its associated bycatch diminish for both depleted and healthy groundfish stocks. Therefore, it is for the less conservative harvest specification alternatives that these bycatch minimization efforts will be particularly important in providing mitigation against adverse effects.

Bycatch minimization efforts should indirectly affect West Coast groundfish stocks by improving the data used in stock assessments. Assessment models will be tuned to more precise estimates of total catch levels, which will then benefit the management specification process that uses these findings. Given that Amendment 18 will not be implemented in time to influence the 2005–06 stock assessment cycle, the concern that unreported bycatch may adversely impact the affected species is not fully addressed within this action.

4.4.1.3 Changes to the Management Regime: Open Access Sector License Limitation and Trawl Individual Quota System

The Council is currently considering alternatives that would establish at TIQ program, with an expected implementation date of 2010. 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.

4.4.1.3 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 (EFH) will bring 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 10 fm would reduce the area available (inside 60 fm) by 84 percent, and 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 presented in Table 4-2. 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 (for further background on the relationship between El Nino events and the Pacific Decadal Oscillation and ocean conditions, see Section 3.1.3. 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 2003a). 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 (Swartman 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 and Colbert (Schirripa and Colbert 2006) 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. (2004) 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, *et al.* 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. Alternative 3, therefore, poses the greatest risk of adverse spatial effects to depleted species, while Alternative 1 poses the least risk. 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; see Section 3.1.3 for more information). 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 Modeling Limited Entry Trawl Impacts

Fleet-wide discard estimates associated with groundfish trawling are derived from WCGOP observer data and logbook and fish ticket data obtained from the PacFIN. Observer data are stratified by area, depth, and season. The management line at 40°10' N latitude is used to partition northern and southern areas. Bi-monthly cumulative limit periods are combined to form two seasons, representing winter (January-April and November-December) and summer (May-October). The northern area includes five depth strata, however, only four are used in the south, due to the paucity of observed trips in depths shallower than 100 fm. The number of observed tows and retained catch of target species within each stratum are reported in Table 4-15 for the 2004 fishery. For this analysis, target species include all flatfish, sablefish, and thornyheads, and also slope rockfish in the area south of 40°10' N latitude. Since regulations severely limit or eliminate the retention of rebuilding species, estimating fleet discard for those species by applying a ratio of discarded-to-landed catch to landings is not reliable. Consequently for rebuilding or bycatch species, retained target-species catch is used as a measure of effort for expanding discard from observed trips. Table 4-16 shows aggregate discard ratios for several species in each stratum. For bycatch species (upper panel), the discard ratios represent the discarded poundage for each species divided by the retained target species poundage. For target species (lower panel), the ratio of discarded-to-retained pounds is presented for each species.

Logbook data are then stratified in the same manner as observer data, and the retained amounts of individual target species are aggregated for each stratum (Table 4-17). For each target species, an initial estimate of discard is calculated by multiplying the retained poundage by the appropriate discard ratio reported in Table 4-15. For bycatch species, estimated discard is calculated by multiplying aggregate target species poundage in each stratum by the corresponding discard ratio. Logbook data do not include records for all trawl trips, and for purposes of this analysis, records without recorded depth or latitude-longitude coordinates are not included. To adjust for these factors, the discard amounts are expanded to reflect the difference in landed catch reported in fish tickets and logbooks. For target species, the expansion ratio is equal to fish ticket pounds for each species divided by the logbook pounds for each state and 2-month period. For bycatch species, the ratio of fish ticket-to-logbook poundage for combined target species is used.

Table 4-15. Number of limited entry trawl tows and retained target species poundage observed by the West Coast Groundfish Observer Program in 2004, by depth interval, area and season.

Area	Depth intervals (fm)	Winter [a/] Number of observed tows	target species [b/] retained (lbs)	Summer [a/] Number of observed tows	target species [b/] retained (lbs)
North of 40°10'					
	0-50	143	169,783	483	533,043
	51-75	164	158,449	496	646,807
	151-200	177	724,372	161	653,321
	201-300	508	2,330,542	288	1,007,533
	>300	198	709,423	170	503,181
South of 40°10'					
	0-100	47	21,858	118	153,556
	151-200	55	95,158	47	138,165
	201-300	101	398,342	119	492,927
	>300	178	676,715	104	338,339

a/ Winter season includes bi-monthly periods 1, 2, 6; the Summer season includes periods 3, 4, 5.

b/ Target species are defined as all flatfish, sablefish and thornyheads in both areas and also slope rockfish in the southern area.

Table 4-16. Discard ratios for major West Coast bycatch and target species for 2004, by area and depth interval in trawl tows observed during 2004, by the West Coast Groundfish Observer Program.

	North of 40°10'						South of 40°10'				
	Depth intervals (fm)						Depth intervals (fm)				
	0-50	51-75	151-200	201-300	>300	All depths	0-100	151-200	201-300	>300	All depths
Rebuilding species											
(Ratio of species pounds discarded to total target species pounds retained)											
Lingcod	0.03356	0.04852	0.01048	0.00070	0	0.00971	0.04622	0.04403	0.00044	0	0.00807
Canary	0.00379	0.00459	0.00024	0	0	0.00078	0.00419	0	0	0	0.00031
Widow	0.00033	0.00186	0.00107	0	0	0.00040	0.00007	0.00124	0	0	0.00013
Yelloweye	0.00030	0.00006	0.00003	0	0	0.00003	0.00009	0.00000	0	0	0.00001
Bocaccio							0.01146	0.00305	0.00001	0	0.00117
Cowcod							0.00133	0.00001	0	0	0.00010
POP	0.00001	0.00027	0.03374	0.00662	0.00097	0.00983					
Darkblotched	0.00536	0.00251	0.04163	0.01414	0.00534	0.01576	0.00000	0.02385	0.00051	0.00001	0.00261
Target Species											
(Ratio of each species' discarded-to-retained pounds)											
Sablefish	0.134	0.154	0.485	0.379	0.196	0.310	0.412	0.691	0.239	0.187	0.241
Shortspine	0	0.006	0.770	0.302	0.250	0.331	0	0.786	0.350	0.319	0.328
Longspine	0	0	0.679	0.644	0.154	0.212	0	0.078	0.290	0.143	0.153
Dover	0.229	0.069	0.044	0.015	0.085	0.037	2.093	0.315	0.050	0.136	0.099
Petrale sole	0.087	0.095	0.003	0.003	0.346	0.031	0.063	0.015	0.001	0.010	0.037
English sole	0.254	0.184	0.020	0.007	0.019	0.160	0.784	0.590	0.167	0	0.669
Arrowtooth	1.271	2.868	0.073	0.078	0.084	0.247	1.983	15.936	4.879	18.246	6.043
Other Flatfish	0.174	0.386	0.120	0.068	0.566	0.181	0.070	0.825	0.155	2.948	0.160
Slope Rock.	0.002	0.191	0.314	0.228	0.059	0.259	34.632	0.287	0.080	0.026	0.189
Yellowtail	0.535	0.130	312.866	12.890	0	0.314					
Chilipepper							24.191	0.883	0.017	0.000	3.549

Table 4-17. Number of limited entry trawl tows and retained target species poundage reported in West Coast groundfish trawl logbooks for 2004.

Area	Depth intervals (fm)	Winter [a/] Number of tows	Winter [a/] target species [b/] retained (mt)	Summer [a/] Number of tows	Summer [a/] target species [b/] retained (mt)
North of 40°10'					
	0-50	446	120	2,854	1,134
	51-75	383	122	2,852	2,511
	151-200	744	1,083	840	1,181
	201-300	1,540	2,899	977	1,414
	>300	568	921	498	683
South of 40°10'					
	0-100	1,821	90	2,056	146
	151-200	166	120	255	220
	201-300	303	410	436	697
	>300	412	616	398	672

a/ Winter season includes bi-monthly periods 1, 2, 6; the Summer season includes periods 3, 4, 5.

b/ Target species are defined as all flatfish, sablefish and thornyheads in both areas and also slope rockfish in the southern area.

4.5.1.2 Modeling Limited Entry Fixed Gear Impacts

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.

Fleet-wide 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 2001 and has focused on those participating in the limited-entry primary fishery. Due to the limited numbers of trips observed south of 40°10' N latitude, discard ratios are calculated through pooling all observations for 2004 within each gear group (longline and pot). Few vessels (limited entry or open access) were observed while fishing for sablefish under the "daily-trip-limit" provisions. However, 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. Because there are no logbook data indicating the depth of fishing, it is not possible to apply the same depth-stratified approach used for the trawl fleet. Consequently, the coast-wide observer data are summarized, by gear, across the two depth zones where the fishery was permitted to take place in 2004: greater than 100 fm, north of 40°10' N latitude, and greater than 150 fm, south of 40°10' N latitude. As presented in Table 4-18, discarded amounts of sablefish are calculated for each gear and area, using fish ticket landings and the corresponding discard ratios. 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 percent of the discarded poundage 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 4-18. Estimated discard of rebuilding species and sablefish associated with all fixed-gear sablefish landings north of 36° N latitude during 2004.

	South of 40°10' (seaward boundary of the RCA at 150 fm)			North of 40°10' (seaward boundary of the RCA at 100 fm)			Summary for area north of 36° N. Lat.
	Gear rates and discard		Combined discard	Gear rates and discard		Combined discard	
	Longline	Pot		Longline	Pot		
Sablefish							
Sets observed in each area and depth range							
number of sets	20	43		248	90		
observed sablefish catch	24,125	129,344		254,304	128,900		
Observed sets used for discard ratios in each depth range							
number of sets	146	127		268	133		
observed sablefish catch	146,045	257,357		278,430	258,243		
Total landings (mt)	**294**	**159**		**1,140**	**521**		**2,113**
Area percent, by gear	65%	35%		69%	31%		
Coast-wide percent, by gear/area	14%	8%		54%	25%		
Observed sablefish discard ratio	9.8%	42.2%		11.5%	42.1%		21.1%
Total estimated discard	29	67		131	219		446
Estimated discard mortality[a/] (mt)	6	13		26	44		89
Estimated total mortality	**300**	**172**		**1,166**	**564**		**2,203**
Rebuilding species discard ratios [b/]							
Lingcod	0.018%	0.273%		0.144%	0.284%		
Canary rockfish	0.016%	0%		0.101%	0%		
Widow rockfish	0%	0%		0%	0%		
Yelloweye rockfish	0.023%	0%		0.089%	0%		
Bocaccio rockfish [c/]	0%	0%		0%	0%		
Cowcod rockfish [c/]	0%	0%		0%	0%		
Pacific ocean perch	0%	0%		0.002%	0.002%		
Darkblotched rockfish	0.042%	0.009%		0.029%	0.009%		
Estimated rebuilding species discard (mt)							
Lingcod	0.1	0.4	**0.5**	1.6	1.5	3.1	**3.6**
Canary rockfish	0.0	0.0	**0.0**	1.1	0.0	1.1	**1.2**
Widow rockfish	0.0	0.0	**0.0**	0.0	0.0	0.0	**0.0**
Yelloweye rockfish	0.1	0.0	**0.1**	1.0	0.0	1.0	**1.1**
Bocaccio rockfish [c/]	0.0	0.0	**0.0**	0.0	0.0	0.0	**0.0**
Cowcod rockfish [c/]	0.0	0.0	**0.0**	0.0	0.0	0.0	**0.0**
Pacific ocean perch	0.0	0.0	**0.0**	0.0	0.0	0.0	**0.0**
Darkblotched rockfish	0.1	0.0	**0.1**	0.3	0.0	0.4	**0.5**

a/ As assumed by the Groundfish Management Team, the rate of mortality for discarded sablefish in the fixed gear fishery is assumed to be 20%.

b/ Discard ratios are calculated by dividing the total discarded weight of each species by the retained catch weight of sablefish, and are derived from data collected by the West Coast Groundfish Observer Program during the 2004 limited entry fixed gear primary fishery.

c/ Please note that the observer data include few observations from south of Ft. Bragg, CA, so these rates may underestimate the true bycatch of these species.

4.5.1.3 Modeling Open Access Impacts

Open access impacts are modeled using the limited entry fixed gear sablefish impact methodology described in the previous section for the directed open access strategies targeting sablefish (i.e., the daily-trip-limit fishery). Modeling impacts for that portion of the open access fishery targeting nearshore groundfish species is described in the following section.

4.5.1.4 Modeling Nearshore Commercial Impacts

Fleet-wide discard estimates associated with near-shore groundfish fishing are derived from observer data, fish ticket data obtained from PacFIN, and other parameters developed by the GMT. WCGOP began pilot coverage of vessels targeting near-shore rockfish and associated species, such as cabezon and kelp greenling, in 2003. Data collected from these vessels from January 2003 through August 2004 were summarized in a report published on the NWFSC web site in May of 2005 (http://www.nwfsc.noaa.gov/research/divisions/fram/observer/datareport/nearshore/datareport_nearshore_may2005.cfm). Data from the remainder of 2004 have not yet been released. It should be noted that the coverage of observed trips and tonnage reported in Table 4-19 reflect lower levels of coverage than for other fleets, and in turn greater uncertainty in estimating discard relationships. Table 4-20 summarizes bycatch ratios for rebuilding species and the number of observed gear sets used to calculate them. Table 4-21 summarizes the observed catch weight of target and rebuilding species, and the percentage of each species or species-group's catch that was discarded.

Table 4-19. Number of observed open access, fixed gear trips occurring at less than 50 fm and associated landed tonnage, by port group and gear from January 1, 2003 to August 31, 2004.

Port Group	Hook and Line [a/]		Pot [a/]	
	Number of trips	Landed catch (mt)	Number of trips	Landed catch (mt)
Astoria	16	1.2	b/	
S Oregon	71	7.3		
Crescent City	114	14.6		
Fort Bragg	12	0.3	10	0.3
Monterey	24	1.2		
Morro Bay	77	3.9	12	2.5
Santa Barbara	15	0.6	15	1.8
Los Angeles	31	0.7	32	3.2
ALL PORTS	360	29.7	b/	

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 not reported because of confidentiality issues.

Table 4-20. Ratios of bycatch, for eight[a/] rebuilding species, per 100 pounds of retained nearshore target species, by area and depth, from open access fixed gear sets observed between January 1, 2003 and August 31, 2004 by the West Coast Groundfish Observer Program.

	0 - 10 fm	11 - 20 fm	21 - 50 fm
North of 40°10'			
Number of applicable observed sets	152	173	19
Species catch per 100 lb of retained nearshore species			
Canary Rockfish	0.413	1.646	5.344
Lingcod	27.593	36.700	73.092
Widow Rockfish	0.024	0.021	0.173
Yelloweye Rockfish	0.142	1.109	9.404
South of 40°10'			
Number of applicable observed sets	254	68	
Species catch per 100 lb of retained nearshore species			
Canary Rockfish	0.012	1.756	Insufficient data
Lingcod	23.936	33.773	
Widow Rockfish	0	0	
Yelloweye Rockfish	0	0	

a/ No bycatch of bocaccio, cowcod, darkblotched rockfish or Pacific ocean perch were observed in these sets.

Table 4-21. Discard percentages for target and rebuilding species, by area and depth, from open access fixed gear sets observed between January 1, 2003 and August 31, 2004 by the West Coast Groundfish Observer Program.

	0 - 10 fm		11 - 20 fm		21 - 50fm		All Depths	
Area / Species	Total lbs	Discard % [a/]	Total lbs	Discard % [a/]	Total lbs	Discard % [a/]	Total lbs	Discard % [a/]
North of 40°10'								
Target species								
Black Rockfish	15,193	2%	16,189	1%	744	0%	32,125	1%
Blue Rockfish	912	16%	2,431	12%	182	14%	3,525	14%
Other minor nearshore rockfish	601	6%	1,530	5%	1,043	2%	3,175	4%
Cabezon	1,471	21%	2,467	21%	184	20%	4,122	21%
Kelp Greenling	988	23%	1,570	18%	83	14%	2,641	20%
Rebuilding species								
Canary Rockfish	66	100%	308	99%	85	100%	458	100%
Widow Rockfish	4		4		3		11	
Yelloweye Rockfish	23	100%	207	100%	150	100%	379	100%
Lingcod [b/]	4,408	43%	6,860	40%	1,164	15%	12,431	39%
South of 40°10'								
Target species								
Shallow nearshore species	4,347	24%	943	52%	54	40%	5,344	29%
Deeper nearshore species	1,920	18%	2,234	13%	27	100%	4,181	16%
Kelp Greenling	1,588	62%	19	87%	10	100%	1,617	62%
Cabezon	10,864	29%	263	72%	33	100%	11,160	30%
California Sheephead	13,199	36%	2,702	35%	239	15%	16,141	35%
Rebuilding species								
Bocaccio Rockfish					27	8%	27	8%
Canary Rockfish	2	100%	63	100%	6	100%	72	100%
Lingcod [b/]	4,422	42%	1,258	56%	24	56%	5,704	45%

a/ The percentage discarded is calculated as the discard poundage divided by the total catch weight for each species.

b/ Lingcod was declared rebuilt in 2005.

In May 2005, the values presented in Tables 4-20 and 4-21 were used by the GMT, in conjunction with other information provided by Team members, in constructing the framework for evaluating discard in the nearshore fisheries presented in Tables 4-22 and 4-23. For the purposes of estimating 2004 discard in nearshore groundfish fisheries, the framework and parameters developed by the GMT have not been updated, except for the target species landed catch amounts. However, an overview of the process embodied in these two tables is presented below for purposes of clarity. Table 4-22 summarizes the calculation of discard for target species. Landed weights for each species/group are expanded to total catch estimates, using all-depth retention rates. Using observer and state-agency information, total catch is then distributed among 3 depth intervals: 0-10 fm, 11-20 fm, and 21-50 fm. Within each of those strata, depth-specific gross discard and mortality estimates are calculated using observed discard ratios and assumed rates of discard survival. The estimated retained catch of all target species within each area/depth stratum is used with observer-derived discard ratios to estimate the discard mortality of rebuilding species in these fisheries (Table 4-23).

Table 4-22. Estimated nearshore target species discard mortality, derived using the Groundfish Management Team nearshore model with 2004 landed catches.[a]

Area	All depths			0 - 10 fm							11 - 20 fm						
				% of total catch	stratum catch	gross discard		discard mortality		stratum mortality	% of total catch	stratum catch	gross discard		discard mortality		stratum mortality
Species	landed catch (mt)	retention rate	total catch (mt)		mt	%	mt	%	mt	mt		mt	%	mt	%	mt	mt
South of 40°10'																	
Shallow nearshore species	**42**	71%	59	81%	48	24%	12	15%	1.7	38	18%	10	52%	5	45%	2.4	7
Deeper nearshore species	**46**	84%	55	43%	24	17%	4	10%	0.4	20	53%	29	13%	4	40%	1.5	27
Cabezon	**47**	70%	67	97%	65	29%	19	7%	1.3	48	2%	2	72%	1	7%	0.1	1
Kelp Greenling	**2**	38%	5	98%	5	62%	3	7%	0.2	2	1%	0	87%	0	7%	0.0	0
All nearshore groundfish	**137**	74%	184	77%	142	26%	37	10%	3.7	108	23%	41	25%	10	39%	4.0	35
North of 40°10'																	
Black Rockfish	**180**	99%	183	47%	87	2%	2	10%	0.2	85	50%	92	1%	1	40%	0.4	92
Blue Rockfish	**12**	86%	13	26%	3	16%	1	10%	0.1	3	69%	9	12%	1	40%	0.4	9
Other minor nearshore rockfish	**39**	96%	41	55%	22	6%	1	20%	0.3	21	35%	14	5%	1	50%	0.4	14
Cabezon	**30**	79%	38	36%	14	21%	3	7%	0.2	11	60%	23	21%	5	7%	0.3	19
Kelp Greenling	**24**	80%	29	37%	11	23%	3	7%	0.2	9	59%	17	18%	3	7%	0.2	15
All nearshore groundfish	**285**	94%	303	45%	137	7%	9	10%	0.9	129	52%	156	7%	11	16%	1.7	147

Table 4-22. Estimated nearshore target species discard mortality, derived using the Groundfish Management Team nearshore model with 2004 landed catches (continued).[a/]

Area / Species	21 - 50 fm							0 - 50 fm			
	% of total catch	stratum catch	gross discard		discard mortality		stratum mortality	mortality from:			discard as a percentage of mortality
		mt	%	mt	%	mt	mt	landings (mt)	discard (mt)	total (mt)	
South of 40°10'											
Shallow nearshore species	1%	1	60%	0.4	100%	0.4	1	42	4.5	46.3	9.8%
Deeper nearshore species	4%	2	60%	1.3	100%	1.3	2	46	3.2	49.5	6.5%
Cabezon	0%	0	75%	0.1	7%	0.0	0	47	1.4	48.3	2.9%
Kelp Greenling	1%	0	90%	0.0	7%	0.0	0	2	0.2	2.0	10.4%
All nearshore groundfish	2%	3	61%	1.9	91%	1.7	3	137	9.4	146.1	6.4%
North of 40°10'											
Black Rockfish	2%	4	0%	0.0	100%	0.0	4	180	0.5	180.9	0.3%
Blue Rockfish	5%	1	14%	0.1	100%	0.1	1	12	0.6	12.2	4.9%
Other minor nearshore rockfish	10%	4	2%	0.1	100%	0.1	4	39	0.7	39.7	1.8%
Cabezon	4%	2	20%	0.3	7%	0.0	1	30	0.6	31.0	1.8%
Kelp Greenling	3%	1	14%	0.1	7%	0.0	1	24	0.4	23.9	1.7%
All nearshore groundfish	4%	12	6%	0.7	33%	0.2	11	285	2.8	287.7	1.0%

a/ The model uses discard and retention percentages reported by the West Coast Groundfish Observer Program from data collected between January 1, 2003 and August 31, 2004.

Table 4-23. Groundfish Management Team nearshore model for estimating target species' discard mortality, with 2004 landed catches.

	0 - 10 fm	11 - 20 fm	21 - 50 fm	Estimated bycatch (mt)			
				0 - 10 fm	11 - 20 fm	21 - 50 fm	0 - 50 fm
South of 40°10'							
Retained nearshore mt	104	31	1.2				
Rebuilding species		*Bycatch rates*					
Canary	0.01%	1.76%	1.76%	0.01	0.55	0.02	0.58
disc. mort. (%:mt)	10%	55%	100%	0.00	0.30	0.02	**0.32**
Lingcod							
catch (%:mt)	23.40%	33.77%	33.77%	24.44	10.49	0.40	35.33
landed (%:mt)	58%	44%	55%	14.18	4.62	0.22	19.01
discard (%:mt)	42%	56%	45%	10.27	5.88	0.18	16.32
disc. mort. (%:mt)	7%	7%	7%	0.72	0.41	0.01	1.14
total mortality				14.89	5.03	0.23	**20.15**
North of 40°10'							
Retained nearshore mt	128	145	11				
Rebuilding species		*Bycatch rates*					
Canary	0.41%	1.65%	5.34%	0.53	2.39	0.59	3.51
disc. mort. (%:mt)	10%	55%	100%	0.05	1.32	0.59	**1.96**
Widow	0.02%	0.02%	0.17%	0.03	0.03	0.02	**0.08**
Yelloweye	0.14%	1.11%	9.40%	0.18	1.61	1.03	2.83
disc. mort. (%:mt)	50%	90%	100%	0.09	1.45	1.03	**2.58**
Lingcod							
catch (%:mt)	27.59%	36.70%	73.09%	35.34	53.40	8.03	96.76
landed (%:mt)	57%	60%	85%	20.14	32.04	6.83	59.00
discard (%:mt)	43%	40%	15%	15.19	21.36	1.20	37.76
disc. mort. (%:mt)	7%	7%	7%	1.06	1.50	0.08	2.64
total mortality				21.21	33.53	6.91	**61.65**
Estimated coast-wide discard mortality associated with near-shore groundfish targets							
					Canary		**2.28**
					Widow		**0.08**
					Yelloweye		**2.58**
					Lingcod		**3.79**

4.5.1.5 Modeling Tribal Fishery Impacts

Background

From 1991 to 2002, Makah fishermen have employed trawl gear on a limited, exploratory basis. Recently, trawl fisheries have been developed to diversify harvest strategies and maximize fisheries production (vessels must choose between trawling and longlining and cannot engage in both). The trawl fleet had eight vessels in 2003 and expanded to the current fleet limit of 10 vessels in 2004. They pursue two basic strategies – bottom (small footrope) and midwater (pelagic) trawl. The majority of the fleet participates in both strategies though some specialize in one or the other. The bottom trawl fishery targets flatfish (primarily Dover, English, and petrale soles and arrowtooth flounder) and Pacific cod, while the midwater fishery targets yellowtail rockfish. In an agreement with the National Marine Fisheries Service and the Pacific Fishery Management Council, the Makah Tribe implemented an observer program in 2003 to monitor maximum retention compliance in the newly developed trawl fisheries. The observer program has a monthly (and overall annual) sampling rate target of 15 percent of all trips and is administered by a cooperative agreement between the Makah Tribe, Northwest Indian Fisheries Commission, and Washington Department of Fish and Wildlife.

Current Management

Makah Fisheries Management has developed trip limits for the trawl fleet for each of two strategies – bottom and midwater – that maximize production, while discouraging both interactions with depleted species and conflicts (i.e., preempting another fleet's opportunity) with their groundfish directed longline fleet (Tables 4-24 and 4-25). While trip limits are in place to discourage targeting on several species, especially depleted rockfishes (e.g., canary), maximum retention is required. Maximum retention in this case is defined as full retention of all marketable species, with particular emphasis on canary and widow rockfishes. Any trip limit overages are sold and the proceeds forfeited to the Tribe.

Table 4-24. Trip limits for the tribal midwater trawl fishery for both 2003 and 2004.

Species	Trip Limits
Yellowtail rockfish	≤ 30,000 lbs/trip
Widow rockfish	≤ 10% of yellowtail
Canary rockfish	300 lbs/trip
Minor shelf rockfish	300 lbs/trip
Minor slope rockfish	300 lbs/trip
Minor nearshore rockfish	300 lbs/trip
Thornyheads (long- and shortspine combined)	300 lbs/trip
Other species	Same as initial Limited Entry (LE) trawl N of 40° 10'

Table 4-25. Trip and/or cumulative limits for the tribal bottom trawl fishery for 2003 and 2004.

Species	2003 Limits	2004 Limits
Petrale sole	30,000 lbs/2 mo	30,000 lbs/2 mo
Arrowtooth flounder	60,000 lbs/2 mo	30,000 lbs/trip
All other flatfish	100,000 lbs/2 mo	100,000 lbs/2 mo
Lingcod	300 lbs/day (not to exceed 900 lbs/week)	450 lbs/day (not to exceed 1,350 lbs/wk)
Sablefish	6,000 lbs/yr dressed wt	6,000 lbs/yr dressed wt
Yellowtail rockfish	5,000 lbs/mo	3,000 lbs/trip
Widow rockfish	≤ 10% of yellowtail/trip	≤ 10% of yellowtail/trip
Canary rockfish	300 lbs/trip	300 lbs/trip
Minor shelf rockfish	300 lbs/trip	300 lbs/trip
Minor slope rockfish	300 lbs/trip	300 lbs/trip
Minor nearshore rockfish	300 lbs/trip	300 lbs/trip
Thornyheads (long- and shortspine combined)	300 lbs/trip	300 lbs/trip
Other species	Same as initial LE trawl N of 40° 10’	Same as initial LE trawl N of 40° 10’

Since canary rockfish is the primary constraint in both strategies, management centers on its avoidance. The two strategies may be open simultaneously (though most fishermen with midwater nets will prosecute that strategy when available) and are closed whenever bycatch rates appear elevated. The bottom trawl fishery has a small footrope requirement (≤ 8 inches) that reduces rockfish interactions by preventing access to reefs, rocky substrate, and other high-relief areas. The midwater fishery uses pelagic nets and is managed with a combination of time and area closures to minimize impacts on canary and widow rockfishes.

Midwater trawl areas are defined by latitudinal and longitudinal coordinates in regulations. An area is opened after two vessels with full observer coverage make exploratory trips to verify that bycatch rates are low enough to prosecute the fishery. An area is closed whenever bycatch rates appear elevated. The fishery is also closed June-August based on anecdotal evidence from fishermen that canary rockfish bycatch is highest in these months. Trip limits are usually 30,000 pounds/2 month period, but may be adjusted upwards to a maximum of 30,000 pounds/trip if bycatch appears minimal and few vessels are participating.

Methods

Observations are conducted by the port sampler operating out of Neah Bay, WA. Vessels must contact an observer hotline 24 hours prior to departure stating the date and time of departure and expected duration of the trip. Vessels are selected in a quasi-random manner based on availability of the observer in coordination with his other duties (i.e., dockside sampling and data entry). Data collected include gear type, tow duration, average depth, start and end location, and pounds discarded and retained. Priority is given, in decreasing order, to verifying maximum retention, quantifying discard of halibut and their disposition (not covered in this report), and quantifying all other discard species.

Bycatch rates were measured as total catch (retained + discard, if any) of bycatch species divided by landed catch of target species in pounds – similar to the method employed by the West Coast Groundfish Observer Program. While tow-by-tow data are collected by the observer, corresponding information is not available for unobserved trips making it difficult to attribute bycatch to a particular bottom trawl target strategy. Instead, bycatch rates for bottom trawl are reported for primary flatfish targets combined (petrale, English, and Dover soles and arrowtooth flounder), all flatfish combined, Pacific cod, and all targets combined (i.e., Pacific cod plus all flatfish). Target species are divided into these categories to help determine if bycatch of canary can more readily be attributed to flatfish fishing or Pacific cod fishing. The midwater trawl fishery targets only yellowtail rockfish. Bycatch of canary rockfish is measured for both bottom and midwater trawl fisheries. Bycatch of widow rockfish in midwater trawl is also examined.

Comparisons of observed versus unobserved landings by year were conducted for each strategy to test for differences in retention of select depleted species. Separate analyses were performed for vessels that carried an observer (paired *t* test) and all vessels combined (i.e. including those vessels that had no observer coverage during the year). For all vessels combined the assumption of equal variance was tested and the appropriate *t* test performed. Comparisons of canary rockfish associated with primary flatfish, Pacific cod, and all target species combined were conducted for bottom trawl. Comparisons based on all flatfish landings were not performed, since other flatfish (i.e., non-primary species) are not specifically targeted and change bycatch rates very little. Both widow and canary rockfish associated with yellowtail rockfish were examined for midwater trawl. Comparisons across years were not performed to avoid confusion of interannual variation in species availability or targeting strategy with fishing behavior associated with carrying an observer.

Results

Bottom Trawl

In 2003 there were 23 sampled trips out of 175 total trips (13.1 percent). Coincidentally, 23 of 221 total trips (10.4 percent) were also sampled in 2004. Discard in both years consisted primarily of Pacific whiting, spiny dogfish, unmarketable flatfish, and other unmarketable fishes (Table 4-26). Bycatch rates for all landings by target and year are provided in Table 4-27.

Table 4-26. Observed tribal bottom trawl discard in pounds by species or species group by year.

Species	2003	2004
Pacific whiting	11,000	5,097
Spiny dogfish	9,534	9,231
Arrowtooth flounder	1,982	6,250
Unspecified skates	1,485	4,723
Unspecified sole	1,219	1,484
Ratfish	1,180	3,361
Pollock	120	503
Minor shelf rockfish	30	104

Table 4-27. Total fleet bycatch rates (measured as pounds of canary rockfish in the tribal bottom trawl fishery divided by pounds of target category) by year.

Target	2003	2004
Primary flatfish	0.00138	0.00223
All flatfish	0.00131	0.00212
Pacific cod	0.00137	0.00249
All targets	0.00067	0.00115

Two-tailed paired *t* tests found no significant difference between observed and unobserved trips for vessels that carried an observer during the season for either year (Table 4-28). Canary catches per combined primary flatfish landings were not significantly different. Similarly, canary catches associated with Pacific cod and all targets combined were not significantly different.

Table 4-28. Yearly comparisons of canary rockfish bycatch rates (measured as pounds of canary rockfish divided by pounds of target category) for tribal 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	-0.60	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	0.30

Two-tailed *t* tests also found no significant difference between all observed and unobserved trips in either year (Table 4-29). Canary bycatch rates associated with primary flatfish were not significantly different. For Pacific cod, observed versus unobserved trips in 2004 had unequal variances (F (5, 9) = 23.62, $p < 0.01$) and were not significantly different in either year. Bycatch rates of canary for all targets combined also were not significantly different.

Table 4-29. Yearly comparisons of canary rockfish bycatch rates (measured as pounds of canary rockfish divided by pounds of target category) for all observed and unobserved tribal 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	0.50
2004	Primary flatfish	0.00772	0.00750	14	0.03	0.98
	Pacific cod	0.03807	0.00663	5	1.07	0.33
	All Targets	0.00619	0.00330	14	0.64	0.53

Midwater Trawl

The observer sampled 5 out of 34 trips (16.0 percent) in 2003, and 11 of 53 trips (20.8 percent) in 2004. Discard consisted of Pacific whiting, minor shelf rockfish, minor slope rockfish, and dogfish (Table 4-30). Bycatch rates of widow and canary in all landings are provided in Table 4-31.

Table 4-30. Observed tribal midwater trawl discard in pounds by species or species group by year.

Species	2003	2004
Pacific whiting	3270	0
Minor shelf rockfish	450	1175
Minor slope rockfish	63	575
Spiny dogfish	0	70

Table 4-31. Total fleet bycatch rates (measured as pounds of canary or widow rockfish divided by pounds of yellowtail rockfish) in the tribal midwater trawl fishery by year.

Species	2003	2004
Canary	0.00168	0.00350
Widow	0.04263	0.06767

Two-tailed paired *t* tests found no significant difference in bycatch between observed and unobserved trips on vessels that carried an observer at some point in the season (Table 4-32). In 2003 there was no significant difference for canary or widow. There was also no significant difference in 2004 for either canary or widow.

Table 4-32. Yearly comparisons of canary and widow rockfish bycatch rates (measured as pounds of bycatch divided by pounds of yellowtail) for tribal 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	0.60	0.61
2004	Canary	0.00651	0.00213	5	1.81	0.13
	Widow	0.07209	0.06719	2	0.30	0.78

In comparisons of all observed versus unobserved trips, two-tailed *t* tests detected no significant differences in bycatch (Table 4-33). Variances for canary bycatch were unequal in observed and unobserved trips for 2003 and 2004 $F\ (2, 7) = 9.57$, $p < 0.01$ and $F\ (5, 10) = 5.90$, $p < 0.01$ respectively. The difference in canary bycatch was not significantly different in either year, though in 2004 the difference is characterized as being of "borderline" significance. No significant differences were detected for widow bycatch in either year.

Table 4-33. Yearly comparisons of canary and widow rockfish bycatch rates (measured as pounds of bycatch divided by pounds of yellowtail) for all observed and unobserved tribal 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	0.70
2004	Canary	0.00651	0.00175	6	2.13	0.08*
	Widow	0.07209	0.05421	15	1.16	0.26

* Difference in canary bycatch rates in 2004 was of borderline significance.

Discard and Retention in Tribal Sablefish Fisheries

The tribal sablefish allocation is 10 percent of the OY for the area north of 36º N latitude. This amount is reduced by about 1.9 percent 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 five years (Table 4-34). This difference is then applied to the noncompetitive fishery allocation share (2/3) to get the rate of discards, and multiplied by 20 percent to get the estimated sablefish mortality rate due to discards.[6/] 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 and 84,292 pounds in 2005 (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. In 2002, these forfeitures accounted for 1,634 pounds in four landings (one per vessel). There were no forfeitures in 2003, when the tribal allocation of sablefish was not fully taken. Beginning in 2006 Makah bottom trawlers will target sablefish - up to a maximum of 150,000 pounds dressed weight - in association with Dover sole and thornyhead. The lack of discard in the tribal trawl fishery does not significantly affect the overall rate of 1.9 percent applied to tribal sablefish fisheries.

[23]/ Northwest Fisheries Science Center estimate of mortality as a share of total sablefish discards is 20%.

Table 4-34. Calculation of sablefish discard mortality in tribal longline fisheries.

Year	Fishery	Pounds of Sablefish by Market Size Category								
		<2lb	2-3lb	3-4lb	4-5lb	5-7lb	>7lb	Total	%>3lb	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%

Calculations:

Year	Discard rate a/	Mortality rate b/
2001	0.0673	0.0135
2002	0.0915	0.0183
2003	0.1819	0.0364
2004	0.0939	0.0188
2005	0.0458	0.0092
Avg.	0.0961	0.0192

a/ Difference between "%>3lb" 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).

Discussion

Bycatch rates for a particular species can vary considerably within a fleet and for a variety of reasons. Annual variations in distribution or abundance can affect encounters, as can effort and the times and areas fished. This is especially true for patchily distributed animals such as canary and widow rockfishes. In both bottom and midwater trawl fisheries the encounter rate of canary was considerably higher in 2004 than in 2003 (71.6% and 108.3 percent respectively). The bycatch rate of widow rockfish in the midwater fishery was 58.7 percent higher in 2004. These increases may also reflect expanding effort (though not capacity) within the trawl fleet as a whole. Some level of increasing impacts may be due to what has been termed the "rebuilding paradox." The paradox is that as depleted species rebuild, they are more likely to be encountered by fishermen trying to avoid them. Estimating the relative influence of these factors will require more data collection and further, detailed analyses.

One interesting effect of increased occurrences of canary rockfish in the 2004 midwater fishery was the prosecution of more observed, exploratory trips to determine if bycatch rates were low enough to conduct the fishery in a given area. Observed vessels engaged in exploratory trips can be expected to have higher bycatch rates than unobserved vessels operating in verified low bycatch areas. This is likely what led to the borderline significant low *p*-value for observed versus unobserved that year. Differentiating observed exploratory trips from other observed trips may lead to more comparable observed versus unobserved bycatch rates. Despite large interannual variation of bycatch rates for these two years, the values measured can still inform management. Examination of bycatch rates over many years could detect patterns, and averages across years weighted toward more recent years can mitigate some of the negative effects of the rebuilding paradox on the fishery as well as reflecting changes in fleet behavior (i.e., if more recent years are likely to be more similar to the upcoming season, preseason planning is improved). If preseason planning is based on accurate expectations of bycatch, inseason management (e.g., time and area restrictions) is likely to be more effective at staying within estimated impacts.

Combining maximum or full retention policies with an observer program to verify the accuracy of bycatch accounting can greatly benefit both the fleet and the resource. In other words, if observed bycatch rates are not significantly different than unobserved bycatch rates, managers can be reasonably certain that landings reflect total mortality for depleted species and fishermen can continue to access healthy stocks. This combination can also prove very cost effective where other programs might not be economically feasible (e.g., full observer coverage). With this method, estimates of total removals can be verified, bycatch rate estimates refined, and better preseason and inseason management can be achieved. In this case, the lack of significant differences between bycatch rates in observed versus unobserved trips shows that the maximum retention program is working and landings are a reasonable estimation of actual impacts.

4.5.1.6 Modeling Washington Recreational Impacts

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 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 only collects information on released catch and 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 throughout the sampling season primarily to observe hatchery salmon mark rates but also collect rockfish discard information for halibut charter 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

Sampling rates vary by port and boat type. Generally, at boat counts less than 30, the goal is 100 percent coverage. The sampling rate goal decreases as boat counts increase (e.g., at an exit count of 100, sample rate goal is 30 percent; over 300, sample rate goal is 20 percent). Overall sampling rates average approximately 50 percent coastwide through March-October season.

Sampling Schedules

Due to differences in effort patterns, weekdays/weekend days are stratified. 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, four 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:

$$\frac{\text{Exit Count}}{\text{Total boats sampled}} * P_s \text{ sampled} = P_t$$

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:

$$\text{Total Weekday Catch} = \frac{\Sigma(P_t) \text{ on sampled weekdays} * \text{no. of weekdays in stratum}}{\text{number weekdays sampled}}$$

Total Weekend Catch =$\underline{\Sigma(\ P_t)\text{ on sampled weekend days}}$* no. weekend days in stratum number weekend days sampled

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, and 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 OSP and incorporated in RecFIN. This is especially true if recreational regulations remain consistent.

However, 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 depth 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 sub-area and fishery. The Washington recreational management measures include prohibiting fishing deeper than 10, 20, or 30 fm (depending upon time and management sub-area); therefore, the depth analysis was re-structured to determine the catch and mortality of discarded fish relative to these depths, as follows:

Canary Rockfish

- Apply 100 percent mortality rate to canary rockfish caught on all recreational fishing trips targeting Pacific halibut, when there is no depth restriction in place
- Apply 66 percent mortality rate to canary rockfish on recreational fishing trips targeting species other than Pacific halibut, when there is no depth restriction in place
- When a 20-fm depth restriction is in place, apply a 50 percent mortality rate to canary rockfish caught on all recreational fishing trips (based on research by Albin and Karpov, 1995).
- When a 10-fm depth restriction is in place, apply a 10 percent mortality rate to canary rockfish caught on all recreational fishing trips.
- When a 10- or 20-fm depth restriction is in place, there may be a reduced encounter rate of canary rockfish, but this is not included in the model.

Yelloweye Rockfish

- Apply 100 percent 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 percent 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 percent (based on 2005 OSP catch-by-depth data) as yelloweye tend to inhabit deeper depths.
- When a 10-fm depth restriction is in place, apply a 10 percent mortality rate to yelloweye rockfish caught on all recreational fishing trips.
- When a 10-fm depth restriction is in place, the yelloweye encounter rate is likely reduced from the rate inside 20 fm, but this is not included in the model.

Inseason Catch Projections

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. This includes producing inseason reports of discard information for prohibited species such as yelloweye and canary. However, 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 other unforeseen factors.

4.5.1.7 Modeling Oregon Recreational Impacts

Data Source for Base Model

Modeling of estimated impacts in the 2007–08 Oregon recreational groundfish fishery was based on recent year estimates of landings and discards. For the ocean boat fishery, the data source was the ODFW Ocean Recreational Boat Survey (ORBS). For the shore and estuary fishery, the data source was the Marine Recreational Fishery Statistical Survey (MRFSS). Analyzed species include black, blue, brown, canary, china, copper, grass, quillback, vermilion, tiger, widow, and yelloweye rockfishes; as well as kelp and rock greenlings, cabezon and lingcod.

Landings and discards for the ocean boat fishery (in numbers of fish) were initially based on normalized 2004 and 2005 landings and discards because these data most closely reflect regulations expected in 2007–08 (i.e., bag limits, effort shifts to avoid depleted and harvest capped species, etc.). The 2004 season reflected very good salmon opportunity, while the 2005 season reflected reduced salmon opportunity. As work progressed on the model and the outlook for salmon opportunity in the near future appeared likely to be reduced from recent years it was decided to model estimated 2007–08 impacts based solely on the 2005 season (reduced salmon opportunity). Groundfish directed effort has been shown to be affected by salmon opportunity (i.e. groundfish directed effort increases when salmon opportunity is poor due to anglers pursuing other species). Concern was expressed that adopting an overly optimistic groundfish season would result in inseason action to slow catch rates, and anglers would rather have regulations relaxed inseason rather than opportunities curtailed. If salmon opportunity improves in 2007–08, the recreational groundfish opportunity could be expanded inseason.

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 as the MRFSS program is designed for trends and not annual accurate estimates of catch. Only annual weights for greenling and cabezon were adjusted to reflect changes in minimum length requirements.

Normalizing 2005 Catch and Angler Trip Data

To facilitate providing maximum flexibility in modeling 2007–08 management measure alternatives, landings in 2005 were normalized to a 10-fish marine bag limit and a year-round season with no offshore closures.

From 2000 through 2002, the rockfish bag limit had been 10 fish per angler per day. Starting in 2003 a 10-fish marine bag limit was implemented that included species other than lingcod, salmon, steelhead, Pacific halibut, sanddab, surfperch, sturgeon, striped bass, pelagic tuna and mackerel species, and bait fish such as herring, anchovy, sardine and smelt. In response to an early closure in 2004, the 2005 marine bag limit started at 8 fish on January 1 and was reduced to 5 fish on July 16.

Normalization of the marine bag limit was accomplished by comparing the average catch per angler trip (CPUE) observed in 2005 (8 and 5 fish marine bag limits in place) with comparable periods in 2003-2004 (10 fish marine bag limit). The average reduction in CPUE observed by adjusting the marine bag limit from 10 to 8 fish was 10.9 percent. A 38.2 percent reduction was observed when the marine bag limit was adjusted from 10 to 5 fish. The same methodology was applied to discards per angler trip, as the number discarded for many species for which retention was allowed increased as the marine bag limit was reduced. Canary and yelloweye rockfish impacts were not adjusted, as the data suggested little change to the duration of groundfish trips, resulting in little savings of those two species.

Landings and discards were normalized to reflect a fishery without depth restrictions. In both 2004 and 2005, during the period from June through September the groundfish fishery was closed shoreward of the 40-fathom line. The expected increase in encounter rates for species residing offshore was based on data from 2001 and 2003-05 at-sea observations on Oregon charter vessels (360 trips were observed). The observer study was not conducted in 2002. The following increased encounter rates were applied to appropriate months when normalizing to an all-depth fishery: canary rockfish = 1.32; yelloweye rockfish = 1.69; lingcod = 1.3; and widow rockfish = 3.57.

Landings and discards were normalized to a year-round season. 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. Estimated catch for October through December was calculated by applying the monthly temporal pattern observed in 2003 to the normalized January through September 2005 estimates.

The expected average weight of landed fish was based on those observed in the 2005 ocean boat fishery. The expected average weight of discarded fish in the ocean boat fishery was based on at-sea observations in 2003-05 with attention paid to matching samples with depth closure regulations. Observations indicate that yelloweye rockfish and canary rockfish caught shoreward of the 40 fm line were considerably smaller than the average size of those caught offshore, due to a higher abundance of juveniles nearshore. Due to small sample sizes observed at-sea, the average weight of fish landed in 2003 was used to represent the average weight of yelloweye rockfish caught during periods of no depth restrictions. For widow rockfish and nearshore rockfish other than black rockfish and blue rockfish, again due to small sample sizes (most are retained), a 25 percent reduction from average landed weight was assumed for discards of these species. This was thought to be conservative as the observed average size of discarded black rockfish and blue rockfish were on the order of a 50 percent reduction from average landed weight.

Annual groundfish directed angler effort for the ocean boat fishery is expected to be similar to levels observed in 2005. Effort data was also normalized using the 2003 temporal pattern to estimate groundfish effort during October through December when the nearshore fishery was closed in 2005. Angler effort in shore and estuary areas is 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. During closures seaward of 40-fm, ocean boat effort and catch were shifted from the offshore closure areas to open nearshore areas. The estimated effort increase in nearshore waters is 5 percent, which reflects the fact that approximately 5 percent of the total effort in 2001-03 was in offshore waters. This effort shift was addressed when normalizing the 2005 fishery.

Estimating Discard Mortality in the Oregon Recreational Groundfish Fishery

An approach similar to that used for the commercial open-access nearshore fishery to determine mortality of discarded groundfish was used to develop appropriate discard mortality rates to be applied to the recreational fishery. The approach incorporates at-sea observations of catch by species, stratified by depth, with angler reported discard, and stratum based mortality rates by species.

At-sea observations were conducted on recreational charter vessels off Oregon during 2001, 2003-05. A total of 360 vessels trips were conducted. Each year the observations were distributed across the state in an effort to represent the relative magnitude of catch by area. The annual goal was to conduct 100 observations, but that goal was not always achieved due to inseason closures. The number of rockfish observed by species or species group, discarded in the nearshore recreational fishery is reported in Table 4-35.

Table 4-35. Count of released fish observed by depth bin (fm) during 2001, and 2003-05. Canary and yelloweye data from open all depth periods only; black, blue, and other nearshore rockfish data from all periods. Other nearshore rockfish includes brown, copper, quillback and china rockfishes (no discards of other nearshore rockfish species were observed).

Species	≤10 fm	11-20 fm	21-25 fm	26-30 fm	31-40 fm	> 40 fm	Sample Size
Black rockfish	296	372	18	2	0	0	688
Blue rockfish	183	622	48	5	0	0	858
Other nearshore rockfish	1	8	2	5	0	0	16
Canary rockfish	13	107	29	2	5	52	208
Yelloweye rockfish	0	5	1	1	0	13	20

The species of rockfish caught inside of 20-fm, and for which mortality rates are derived, include black, blue, other nearshore rockfish, canary, and yelloweye. The distribution of discarded fish by species and depth bin (fm) based on at-sea observations are identified in Tables 4-36a-e. Observed distributions are presented for all-depth fisheries, and predicted distributions are presented for fisheries closed seaward of 40-fm, 30-fm, 20-fm, and 10-fm.

Table 4-36a. Distribution of released fish observed 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	Sample Size
Black rockfish	43%	54%	3%	0%	0%	0%	688
Blue rockfish	21%	72%	6%	1%	0%	0%	858
Other nearshore rockfish	9%	73%	18%	45%	0%	0%	16
Canary rockfish	6%	51%	14%	1%	2%	25%	208
Yelloweye rockfish	0%	25%	5%	5%	0%	65%	20

Table 4-36b. 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	Sample Size
Black rockfish	43%	54%	3%	0%	0%	688
Blue rockfish	21%	72%	6%	1%	0%	858
Other nearshore rockfish	6%	50%	13%	31%	0%	16
Canary rockfish	8%	69%	19%	1%	3%	156
Yelloweye rockfish	0%	71%	14%	14%	0%	7

Table 4-36c. Predicted distribution of released fish when closed outside 30 fm.

Species	≤10 fm	11-20 fm	21-25 fm	26-30 fm	Sample Size
Black rockfish	43%	54%	3%	0%	688
Blue rockfish	21%	72%	6%	1%	858
Other nearshore rockfish	6%	50%	13%	31%	16
Canary rockfish	9%	71%	19%	1%	151
Yelloweye rockfish	0%	71%	14%	14%	7

Table 4-36d. Predicted distribution of released fish when closed outside 27 fm.

Species	≤10 fm	11-20 fm	21-25 fm	Sample Size
Black rockfish	43%	54%	3%	686
Blue rockfish	21%	73%	6%	853
Other nearshore rockfish	9%	73%	18%	11
Canary rockfish	9%	72%	19%	149
Yelloweye rockfish	0%	83%	17%	6

Table 4-36e. Predicted distribution of released fish when closed outside 20 fm.

Species	≤10 fm	11-20 fm	Sample Size
Black rockfish	44%	56%	668
Blue rockfish	23%	77%	805
Other nearshore rockfish	11%	89%	9
Canary rockfish	11%	89%	120
Yelloweye rockfish	0%	100%	5

Mortality rates for fish discarded by depth strata are detailed in Table 4-37. A mortality rate of 100% would be applied to all rockfish caught and discarded in waters deeper than 20-fm. These mortality rates were applied to the species distributions (Tables 4-36a-e) to determine the comprehensive mortality rates detailed in Table 4-38. These comprehensive mortality rates are applied to estimated discard, calculating estimated discard mortality.

Table 4-37. Mortality rates developed by the GMT for use in the Oregon recreational fishery.

Mortality rate	≤10 fm	11-20 fm	21-25 fm	26-30 fm	31-40 fm	> 40 fm
Black rockfish	10%	40%	100%	100%	100%	100%
Blue rockfish	10%	40%	100%	100%	100%	100%
Other nearshore rockfish	10%	50%	100%	100%	100%	100%
Canary rockfish	10%	50%	100%	100%	100%	100%
Yelloweye rockfish	10%	50%	100%	100%	100%	100%

Table 4-38. Recommended mortality rates for all-depth fisheries and fisheries closed outside of 40 fm, 30 fm, 25 fm, 20 fm and 10 fm.

Species	<=10 fm	<= 20 fm	<= 25 fm	<= 30 fm	<= 40 fm	All depth
Black rockfish	10%	27%	29%	29%	29%	29%
Blue rockfish	10%	33%	37%	37%	37%	37%
Other nearshore rockfish	10%	46%	55%	69%	69%	69%
Canary rockfish	10%	46%	56%	57%	58%	69%
Yelloweye rockfish	10%	50%	58%	64%	64%	88%

A 7 percent mortality rate is applied in the Oregon recreational groundfish fishery for discarded lingcod, cabezon, and greenling species. In addition, a 7 percent mortality rate is used for the shore and estuary boat fisheries for all species discarded because, as barotrauma is not an issue, mortality is mostly related to hook location.

Model Inputs

Daily-bag-limits, offshore closures, minimum length changes, effort increases, and abundance trends are the basic input factors applied to the standardized 2005 model.

Bag limits were modeled to range from 5 to 10 marine fish and 2 to 3 lingcod. The expected reduction in CPUE from reducing the marine bag limit from 10 fish is based on the same comparison used to normalize the 8 and 5 fish marine bag limits observed in the 2005 fishery. A linear relationship was assumed using the observations in going from 10 to 8 and 10 to 5 fish. The following rates (in percent) of decline in CPUE were used when reducing the bag from 10 fish: 9 = 5.5; 8 = 10.9; 7 = 20.0; 6 = 29.1; 5 = 38.2. As assumed in normalizing the model no effect on CPUE was expected for yelloweye rockfish and canary rockfish (no retention allowed).

The effect of increasing the lingcod bag limit from 2 to 3 fish was also analyzed. In the ocean boat fishery, sample data from 2005 was used to determine the proportion of anglers that had achieved their 2 fish bag limit in 2005 (6.3 percent). An increase of 10.6 percent of the estimated landings resulted, assuming the same anglers would achieve a 3 fish bag limit. Applying the same approach to discard data results in a reduction of the estimated discard of 15.6 percent. Similar adjustments were made to the estimated landings in the shore and estuary fisheries to reflect an increase in the bag limit (8.5 percent increase in landings). No reductions were made to the estimated discards in the shore and estuary fisheries as most anglers quit fishing when they achieve their lingcod bag limit. 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.

The effect of lingcod minimum length reductions from 24-inches to 22 and 20-inches were analyzed for both the ocean boat and shore and estuary fisheries. The length profile of discards was developed from at-sea observations in the 2005 ocean boat fishery. These were applied to the estimated proportion of fish discarded in 2005 (42 percent of total fish caught based on ORBS estimates). It was assumed that all fish between 20 to 24-inches, and 22 to 24-inches would have been retained under the respective regulations. This resulted in an estimated increase in number of fish retained under minimum length regulations of 20 and 22-inches of 53.6 and 35.8 percent respectively. The estimated decrease in the amount of discarded fish under minimum length regulations of 20 and 22-inches was 72.3 and 58.3 percent respectively. The profile of discarded fish in the ocean boat fishery was used as a proxy for the shore and estuary fishery, as there exists no profile of the length of fish discarded in that fishery. This data was applied to the estimated proportion of fish discarded in the shore and estuary fishery (78 percent of total fish caught based on MRFSS estimates). As in the ocean boat fishery it was assumed that all fish now of legal size would have been retained as very few anglers attain the 2-fish bag limit. Because modeling of the shore and estuary fishery is based on past landings in metric tons, no estimate of additional landings in number of fish was calculated, only an expected increase in metric tons. The increase in landings estimated under the 20 and 22-inch minimum length requirements is 10 mt (equating to a discard reduction of 10 mt) and 7 mt (equating to a discard reduction of 7 mt) respectively.

Expected encounter rate reductions by species normally encountered in offshore waters (widow rockfish, canary rockfish, yelloweye rockfish and lingcod) were developed for offshore closures outside of 40, 30, 25, and 20 fm. For retention species (widow rockfish and lingcod) these include expected reduction rates for landed fish (Table 4-39) and discarded fish (Table 4-40). For non-retention species (yelloweye rockfish and canary rockfish) these include expected reduction rates for both discarded and the few illegally retained fish (Table 4-40). They were based on the same at-sea observations mentioned earlier in the report. Offshore effort (5 percent of total groundfish directed effort) was assumed to move to open areas nearshore during offshore closure periods.

Table 4-39. Percent reductions in landed widow rockfish and lingcod due to depth closures.

2001, 2003-05 count of landed fish by depth bin (fm), open all depths							
Species	<=10 fm	11-20 fm	21-25 fm	26-30 fm	31-40 fm	>40 fm	Total
Widow rockfish	0	1	9	3	54	174	241
Lingcod	115	320	77	16	6	161	695
2001, 2003-05 distribution of landed fish by depth bin (fm), open all depths							
Species	<=10 fm	11-20 fm	21-25 fm	26-30 fm	31-40 fm	>40 fm	Total
Widow rockfish	0%	0%	4%	1%	23%	72%	100%
Lingcod	17%	46%	11%	2%	1%	23%	100%
Percent reduction in landed fish from open all depth to depth closure							
Species	Closed >10 fm	Closed >20 fm	Closed >25 fm	Closed >30 fm	Closed >40 fm		
Widow rockfish	100%	100%	96%	95%	72%		
Lingcod	83%	37%	26%	24%	23%		

Because smaller lingcod would be legal to retain under the proposed regulations reducing the minimum length to 22 and 20-inches, the average weight of both landed and discarded fish in the ocean boat fishery was also adjusted. The estimated number of fish at 22 and 20-inches that now would be landed was factored by the appropriate average weight (kg) resulting in a revised total metric tons landed. This new weight was divided by the estimated number of fish landed (landings in 2005 plus additional fish, reflecting the appropriate minimum length regulation) to determine a revised average weight. This resulted in a 13.3 percent reduction in average size under the 22-inch regulation and a 19.6 percent under the 20-inch regulation. This same process was used for the discarded fish resulting in a 59.1 percent reduction under the 22-inch regulation and a 78.7 percent reduction under the 20-inch regulation. There was no adjustment in the shore and estuary fishery as the number of fish and average weight are not part of the calculation of metric tons landed.

Table 4-40. Percent reductions in released widow rockfish and lingcod due to depth closures.

2001, 2003-05 count of released fish by depth bin (fm), open all depths							
Species	<=10 fm	11-20 fm	21-25 fm	26-30 fm	31-40 fm	>40 fm	Total
Widow rockfish	0	2	0	0	3	0	5
Lingcod	269	633	110	36	13	46	1103
2001, 2003-05 distribution of released fish by depth bin (fm), open all depths							
Species	<=10 fm	11-20 fm	21-25 fm	26-30 fm	31-40 fm	>40 fm	Total
Widow rockfish	0%	40%	0%	0%	60%	0%	100%
Lingcod	24%	57%	10%	3%	1%	4%	100%
Percent reduction in released fish from open all depth to depth closure							
Species	Closed >10 fm	Closed >20 fm	Closed >25 fm	Closed >30 fm	Closed >40 fm		
Widow rockfish	100%	60%	60%	60%	0%		
Lingcod	76%	19%	9%	5%	4%		

Table 4-41. Percent total encounter reductions in yelloweye rockfish and canary rockfish due to depth closures.

2001, 2003-05 count of total encounters (released + landed) by depth bin (fm), open all depth							
Species	<=10 fm	11-20 fm	21-25 fm	26-30 fm	31-40 fm	>40 fm	Total
Canary rockfish	33	244	65	25	20	120	507
Yelloweye rockfish	1	19	11	6	4	29	70
2001, 2003-05 distribution of total encounters (released + landed) by depth bin (fm), open all depth							
Species	<=10 fm	11-20 fm	21-25 fm	26-30 fm	31-40 fm	>40 fm	Total
Canary rockfish	7%	48%	13%	5%	4%	24%	100%
Yelloweye rockfish	1%	27%	16%	9%	6%	41%	100%
Percent reduction in total encounters (released + landed) from open all depth to depth closure							
Species	Closed >10 fm	Closed >20 fm	Closed >25 fm	Closed >30 fm	Closed >40 fm		
Canary rockfish	93%	45%	33%	28%	24%		
Yelloweye rockfish	99%	71%	56%	47%	41%		

Abundance trends were only developed for lingcod. The average annual increase in impacts used was 1.17 percent and continues the same rate used for modeling the 2004-2006 fisheries. This increase was applied on a yearly basis. Thus for 2007 a 1.37 increase was used (2005 normalized catch x 1.17 x 1.17 representing increases from 2005 to 2006 and to 2007) and for 2008 a 1.6 increase was used (2005 normalized catch x 1.17 x 1.17 x 1.17).

Groundfish directed angler effort was assumed to remain equal to normalized 2005 under a 6 to 12 month season even during periods of offshore closures. For action alternative 1a, it was assumed that 33 percent of the angler effort from the closed period would shift to the open period resulting in 60 percent of annual effort (40 percent of annual effort normally occurs in the July through Labor Day period).

Angler effort in the directed Pacific halibut fishery was assumed to increase in 2007–08 so as to harvest the complete halibut allocation. The halibut allocation was assumed to be equal to the 2006 allocation, which is four percent higher than in 2005. For action alternative 1b, having the lowest estimated yelloweye rockfish impact (1.5 mt), it was assumed that halibut effort and catch would be reduced by 30 percent.

Model Description

The model was divided into landed and discarded fish sections. Each section had similar components although the discarded section also had components to apply both mortality rates and changes in average size due to offshore closures. Groundfish impacts on yelloweye rockfish and canary rockfish in the Pacific halibut fishery were modeled separately.

The normalized 2005 impact model (all ocean boat fishery sources, excluding the targeted Pacific halibut fishery), include the following components for each species by month: (1) standardized catch; (2) bag limit affects; (3) offshore fishery effects on encounter rates; (4) 5 percent effort shifts to the nearshore fishery due to offshore closures; (5) average size; and (6) minimum length changes for lingcod. For landed and discarded fish the methodology to address the affects of various marine bag limits and offshore closures on (a) encounter rates and (b) shifting effort nearshore, were discussed earlier in the Normalization section. For landed and discarded lingcod, the methodology to address the affects of bag limits and changes in minimum length were discussed earlier in the Model Input section. Average weight was based on 2005 landed weight and at-sea observations for discarded fish as discussed earlier also in 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.

Expected impacts on yelloweye rockfish and canary rockfish in the Pacific halibut fishery were addressed separately. The 2005 encounter rate per halibut pound landed, and the 2002-2003 average weight of fish caught shoreward of 30-fm, was applied to the 2006 Oregon central coast all-depth halibut sport allocation to address expected impacts on both species. This assumes similar Pacific halibut allocations in 2007–08.

Landings and discard impacts for shore and estuary caught species were modeled on a season total basis using the 1998-2002 average impacts (mt). This fishery will be managed for a year-round season as it does not impact yelloweye rockfish and canary rockfish. The impacts were adjusted to reflect length limits applied to cabezon and greenling since that period. Sublegal cabezon and greenling that were landed in the 1998-2002 period were now considered discards. A mortality rate of 7 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.

4.5.1.8 Modeling California Recreational Impacts

The CDFG revised their impact projection model that was reviewed by the GMT at their February 2006 meeting. The GMT recommends this updated model for use in projecting impacts of groundfish species in 2007–08 California recreational fisheries. This model is described below and is used in impact analyses in this EIS.

Introduction

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 provide fishing opportunities that keep total catch of depleted species within the reduced limits that are necessary to rebuild the stocks.

Prior to 2000, the recreational daily-bag-limit for rockfish was 15 fish per angler and there were 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 analysis of the effect of particular regulations difficult to determine. In addition, regulations have become more region-specific, adding to the difficulty of modeling projected catches.

Methodology Used to Project Recreational Catches for 2007–08

Background

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 2005–06, with new data from the California Recreational Fishery Survey (CRFS) program to serve as a baseline. Model output predicts expected catch under any combination of season and depth fishing restrictions by region.

Management Region Definitions:

North Region:	North of 40°10' N latitude to CA/OR border
North-Central Region:	South of 40°10' N latitude to 37°11' N latitude (Pigeon Pt.)
South-Central Monterey Region:	South of Pigeon Pt. to 36° N latitude (Lopez Pt.)
South-Central Morro Bay Region:	South of Lopez Pt. to 34°27' N latitude (Pt. Conception)
South Region:	South of Pt. Conception to CA/Mexico Border

CDFG/California Recreational Groundfish 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: 1) Canary, cowcod, and yelloweye are non-retention species which have high mortality rates when caught and released. Therefore, expected mortality estimates for these species also include B2 fish (fish reported to be released live) with hooking mortality rates as follows:
10.5 percent for the depth range 0-10 fm; 42 percent for 10-20 fm; and 100 percent for depths greater than 20 fm.
2) CA Scorpionfish hooking mortality rate is assumed to be 5 percent. This rate is applied to expected landings of CA Scorpionfish when fishing is allowed for species which associate with CA scorpionfish, but fishing for CA Scorpionfish is not allowed.

Inputs and Key Parameters for the Model

Weighting of Base Years: Base year catches from 2004 and 2005 are combined together in this version of the model using a 0.67 decay function (which translates into a weighting of 60 percent for 2005 and 40 percent for 2004). Model output predicts expected catch under any combination of season and depth fishing restrictions by region. *Reasons for weighting the 2005 estimates more heavily than the 2004 estimates include:* the recognition that constraints placed on salmon fishing in 2005 will likely persist over the next several years; and the acknowledgement that the expanded distribution and greater abundance of blue rockfish (as well as other groundfish species) due to cooler oceanographic conditions will also likely persist into 2007 and 2008. *Reasons for using 2004 data include:* the recognition that oceanographic conditions in 2005 were unusual while conditions in 2004 are more in line with what might be expected in 2007–08 under a colder water regime; and the expectation that the bulk of blue rockfish take (and potentially brown and olive rockfish take) will occur within deeper nearshore waters as was observed in 2004 rather than in the shallow nearshore waters as in 2005.

Base Year Catch: Initially, CRFS catch estimates in WEIGHT of fish were summed for caught and retained (CRFS “A” catch), filleted/caught and released dead (CRFS “B1” catch), and for species of concern, a proportion of CRFS “B2” catch (released alive) 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 add a catch estimate for what the catch would have been if all months and all depths had been open. This back calculation uses percent catch by month and depth derived from historical catch estimates.

Historical Catch By Month: Estimates of historical percent catch by two-month period were calculated for each region based on RecFIN Marine Recreational Fisheries Statistics Survey (MRFSS) data (weight of A+B1) from 1993-1999, 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.

Historical Catch By Depth: Estimates of percent catch by depth were calculated for each region based on RecFIN 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.

Methodology used to Calculate Annual Unrestricted Catch

1. Pull (A + B1) 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 percent's 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. If using B2 (reported catch released live) mortality, add calculated B2 mortality to these catch totals. 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 percent's 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 RecFIN 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.

Estimates of Total Mortality for Canary and Yelloweye Rockfish Using Two Different Methods for Estimating Discarded Catch

The California recreational catch projection model accounts for total mortality by combining A (sampler examined), B1 (discarded dead/filleted) and a portion of B2 (discarded alive) catch. To calculate the portion of B2 to include in the total mortality estimate, California staff apply mortality rates to the B2 catch component in the following manner: 10.5 percent for fish caught between 0-10 fm, 42 percent for fish caught between 10-20 fm, and 100 percent mortality for all other depths. Oregon and Washington account for total mortality by combining A (sampler examined) and a portion of a combined B catch (catch discarded dead or alive, or catch otherwise unavailable to be examined). Staff from these states apply a 50 percent mortality rate to the B catch component for fish caught between 0-20 fm and 100 percent mortality to the B fish caught at all other depths.

To determine which of these methods was more conservative in estimating total mortality, a comparison of the methods was made for canary and yelloweye rockfish taken by California anglers statewide using 2004 and 2005 CRFS A, B1, and B2 annual catch estimates. For this comparison, the type B and B1 fish included catch used as bait, given to other anglers, or otherwise not available for examination.

The total mortality estimates calculated by these two different methods are provided in Table 4-42.

Table 4-42. Total Mortality Estimates (mt) Calculated from Two Different Methods Using 2004 and 2005 California Recreational Fisheries Survey A, B1, and B2 Annual Catch Estimates.

Species	Year	Total Mortality (mt)	
		Combined B[a/] Method	B1 & B2[b/] Method
Canary	2004	NA	NA
	2005	6.8	7.1
Yelloweye	2004	2.7	3
	2005	5.1	5.6

a/ Mortality estimate includes A catch + mortality rates applied to discarded catch combined together (Combined B).

b/ Mortality estimate includes A catch + B1 catch + mortality rates applied to B2 catch (discarded catch (B1 &B2) treated separately).

The "Combined B" method consistently results in lower total mortality catch estimates; that is, it results in lower discard mortality than the "B1 & B2" method. Thus, the California recreational catch projection model uses a more conservative estimate for discard mortality, leading to a higher estimate of overall mortality. However, more analyses may be needed after the Council RecFIN Workshop in August, when further discussions will be held on what constitutes the discard catch (type "B") for Washington, Oregon, and California.

Estimation of Impacts

The CDFG is proposing the seasons described under Action Alternatives 1-3 in Chapter 2. The estimated impacts to select groundfish species in 2007 and 2008 California recreational fisheries by region are described in Section 4.5.4.

Action Alternative 3 includes an increase in the greenling bag limit from one to two fish. CDFG used the RECFIN methodology for Hypothetical Bag Limit Analyses available at http://www.psmfc.org/recfin/forms/bfreq.html to determine increased impacts on greenlings resulting from this change. The program uses 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 greenling that B1 includes filets and there were no fish thrown back dead as kelp greenling 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. The increased estimated impact on greenlings would be 15 percent based on this analysis. Even with the increase in catch, landings are expected to stay within the CDFG recreational allocation as greenling landings in 2005 were 37 percent of the allocation.

Action Alternative 1 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. Action Alternative 3 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 available at http://www.psmfc.org/recfin/forms/bfreq.html to determine increased impacts on bocaccio resulting from this change. The program uses the A+B1 fish from 2004 and 2005 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. There is no way to estimate the proportion of B2 fish that were undersized or the proportion thrown back alive. Therefore, B2 fish were not included as CDFG assumed most of the B2 fish were sublegal and there would be very few legal fish released alive. All bags over the hypothetical limit are then set to the hypothetical limit to calculate increased take. The increased estimated impact on bocaccio would be 27 percent based on this analysis. Landings are still expected to stay within the CDFG recreational allocation as bocaccio landings in 2005 were 64 percent of the allocation.

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.

Action Alternative 1 includes a reduction in the lingcod bag and size limit from the No Action Alternative of two fish at 24” to one fish at 22” to reduce fishing effort for lingcod, thereby reducing impacts on associated rebuilding species. The estimated increase in lingcod take as a result of reducing the size limit from 24” to 22” would be 26 percent using the formula:
Total Catch from 24" /(1 - 0.207) = Adjusted Catch

Reducing the bag limit from two to one fish at 22” would reduce this estimated increase by 27 percent based on the formula:
Adjusted Catch x (1 - 0.27) = Estimated Catch under a one fish bag limit.

Using the Total Catch estimate (300 mt) from 2005, the overall reduction in catch would be 24 mt or eight percent. Data from 1995 – 1997 were used to estimate size reduction increases and bag limit decreases when a 22” size limit was in effect.

Lingcod Bag and Minimum Size

CDFG is continuing to propose alternatives to fishery closure as an inseason management response to projected over harvest of lingcod if it occurs. If the CDFG determines that more restrictive management measures are necessary to slow the harvest of lingcod, an increase in the minimum size limit, or a reduction in the bag limit from two to one, may be implemented. Projected harvest for each upcoming month may be multiplied according to the coefficients for size and/or bag limit to identify the management response necessary to keep projected catch within the recreational harvest guideline.

Coefficients to modify projected catch of lingcod from a two-fish bag limit to a one-fish bag limit, or from 24” to a smaller or larger minimum size are shown in Table 4-43.

Table 4-43. Coefficients used to model lingcod bag and size limits in the California recreational groundfish fishery.

Size Limit (inches)	Size Coefficient	Bag Limit Coefficient
22	0.207	0.27
24 (status quo)	0	0.214
25	0.169	0.18
26	0.304	0.15
27	0.43	0.12
28	0.521	0.1
29	0.581	0.07
30	0.641	0.039
31	0.685	0.025
32	0.723	0.011

4.5.2 Allocating Depleted Species’ Impacts

The three action alternatives discussed in Sections 2.2.3.2 - 2.2.3.4 indicate ways in which the allowable impacts to depleted species may be divided between sectors. Under increasingly low OYs, such ad hoc allocations become even more critical, as the values selected may significantly constrain fisheries’ access to healthy stocks and target OYs. In order to explore hypothetical allocation scenarios under the high and low OYs, the Council requested in April 2006 that the GMT produce a number of tables (called “bycatch scorecards”) in which depleted species impacts are hypothetically attributed to sectors following different allocation strategies. The scorecards used either the final 2005 mortality estimates or the 2006 projected impacts in 2006 as the starting points from which to explore allocation options.

Under the Preferred High OY alternative, the sector impacts could be accommodated for most species under the 2005 and 2006 scenarios, however the Preferred Low OY alternative required greater reductions. Where reductions were necessary to constrain to an OY, the reductions were taken proportionately. In addition, the Council requested that scorecards also be constructed under the Preferred Low OY alternative in which all of the mortality impacts are associated with either the recreational sector or the commercial sector, under the Council's expectation that a viable coastwide fishery with all sectors might not be possible under the low alternative.

These scorecards were provided to the Council for their deliberations at the June meeting. However given that the scorecards were not used as the basis for decision-making, they have not been included in this EIS.

4.5.3 No Action Alternative

Species' impacts by fishery sector under the No Action Alternative are depicted in various tables in Section 4.5.4. The remainder of this section briefly describes those species' impacts that can and cannot be sustained under No Action management measures given the best available science. Additionally, a sense of the current effort distribution under No Action management measures is provided for the limited entry groundfish sectors.

4.5.3.1 Limited Entry Trawl Impacts

Depleted species' impacts under the No Action Alternative (see Section 2.2.3.1.1 for a description of No Action management measures) are shown in Table 4-44. Under the No Action suite of management measures for north of 40°10' N latitude, trip limits for most of the target species are equal to or less than those under the final Council-preferred alternative, but the size of the trawl RCA is less for most periods of the year with a shallower seaward line. South of 40°10' N latitude, trip limits for target species are smaller and the trawl RCA is larger in most periods relative to the final Council-preferred alternative. These changes are largely driven by more optimistic assessments for the target trawl species and industry desires regarding the trip limit- RCA configuration tradeoff.

Figures 4-11 – 4-14 depict representative trawl vessel area distributions in winter and spring months in 2006 both north and south of 40°10' N latitude relative to the trawl RCA as determined through composite VMS images[24]. From these images a few salient points regarding the trawl fishery emerge: 1) trawl effort appears to be patchily distributed coastwide, 2) there is more effort north of 40°10' N latitude than in the south, 3) there appears to be more effort seaward of the RCA in winter months than in the spring (petrale sole targeting in deeper water may be the main reason), and 4) effort appears to be concentrated adjacent to the RCA, especially for those vessels fishing in deeper water seaward of the RCA. However, conclusions regarding trawl effort distribution should be tempered by the lack of similar images for other times of the year. For instance, trawl logbook and WCGOP data indicate there is more effort shoreward of the RCA during the summer months when many target species, such as sablefish and petrale sole, make seasonal shoreward migrations. Seasonal effort is also affected by other non-groundfish fishing opportunities, such as the pink shrimp and Dungeness crab fisheries, which attract many trawlers, especially in the north.

The seaward boundary of the trawl RCA is close to the shelf-slope break, where many target species aggregate during the year. From past experience managing the trawl fishery with respect to depleted

[24] VMS positions in these figures that appear as line transects from coastal ports are typically transit lines and not fishing positions.

species' impacts, seasonal changes to the seaward trawl RCA line tend to have the most effect on slope species, such as darkblotched rockfish and Pacific ocean perch, and seasonal changes to the shoreward trawl RCA line tend to have a greater effect on bocaccio (in the south) and canary rockfish (especially in the north). Seasonal RCA adjustments will be as important in the next management cycle (2007–08) as they are in the current cycle and may have more of an effect on the mortality of species of concern than trip limit management (although both strategies are important when attempting to redirect effort from species of concern).

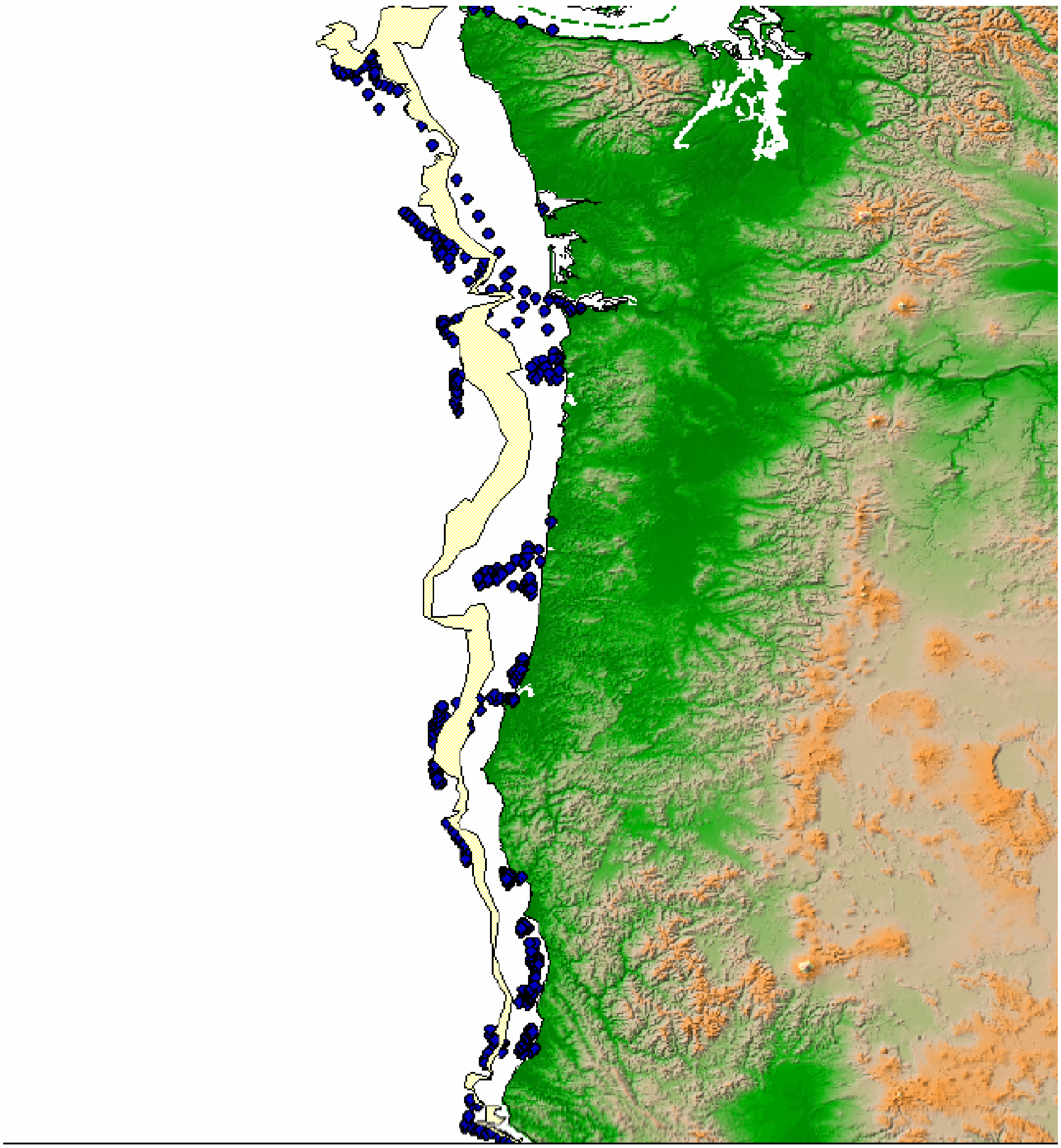


Figure 4-11. A composite VMS image of limited entry trawl vessel distribution north of 40°10' N latitude during winter months under 2006 management measures.

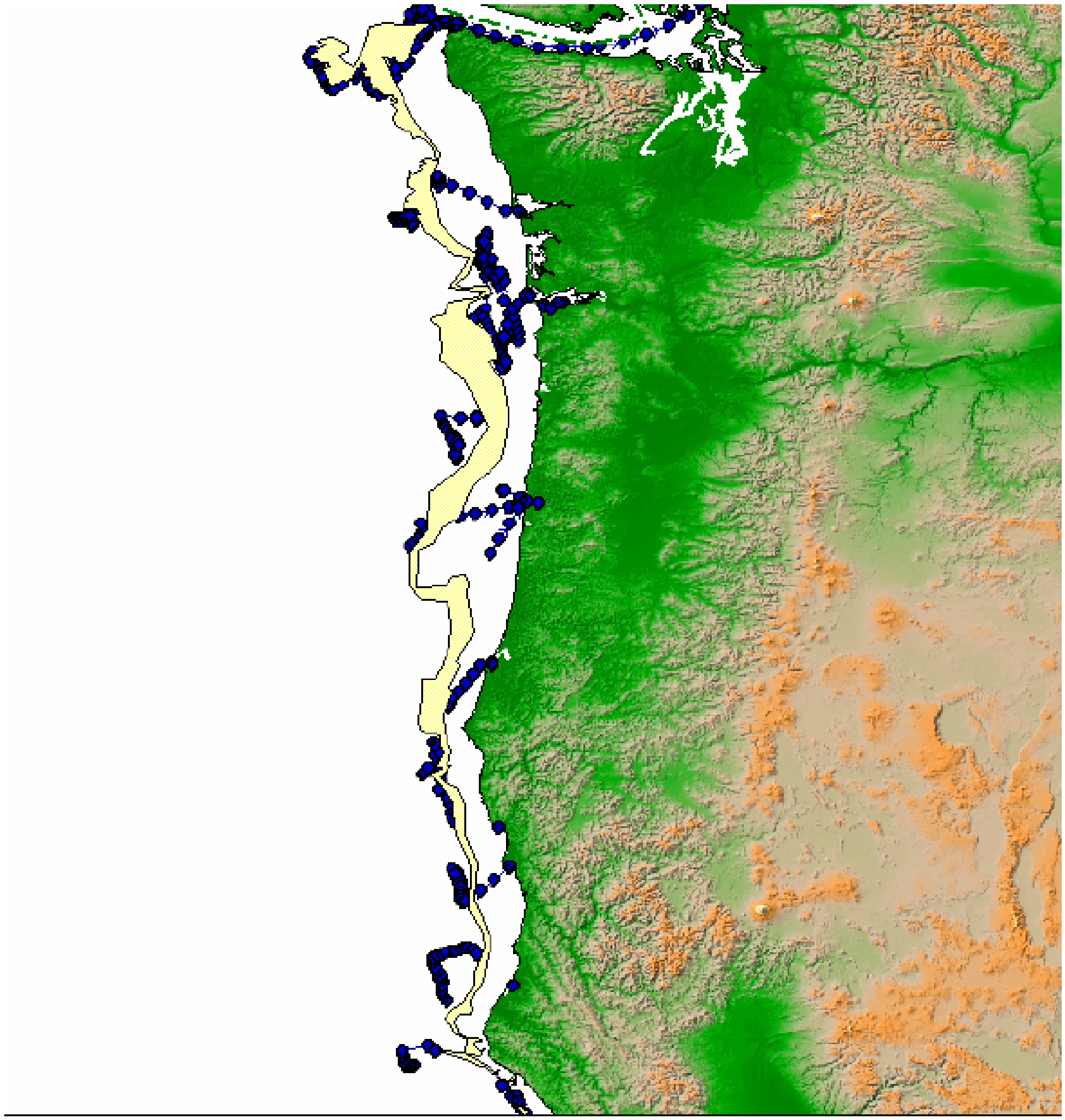


Figure 4-12. A composite VMS image of limited entry trawl vessel distribution north of 40°10' N latitude during spring months under 2006 management measures.

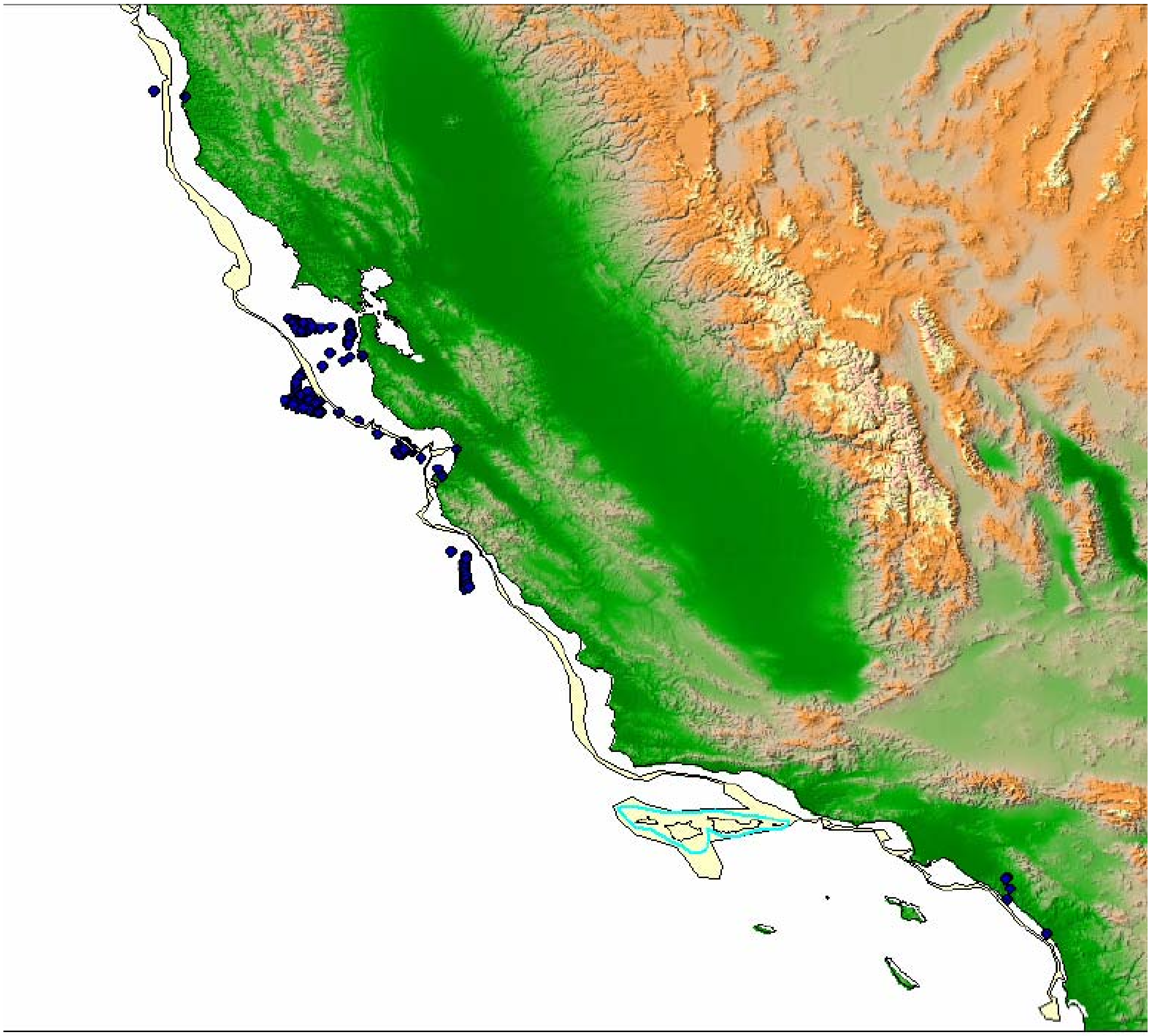


Figure 4-13. A composite VMS image of limited entry trawl vessel distribution south of 40°10' N latitude during winter months under 2006 management measures.

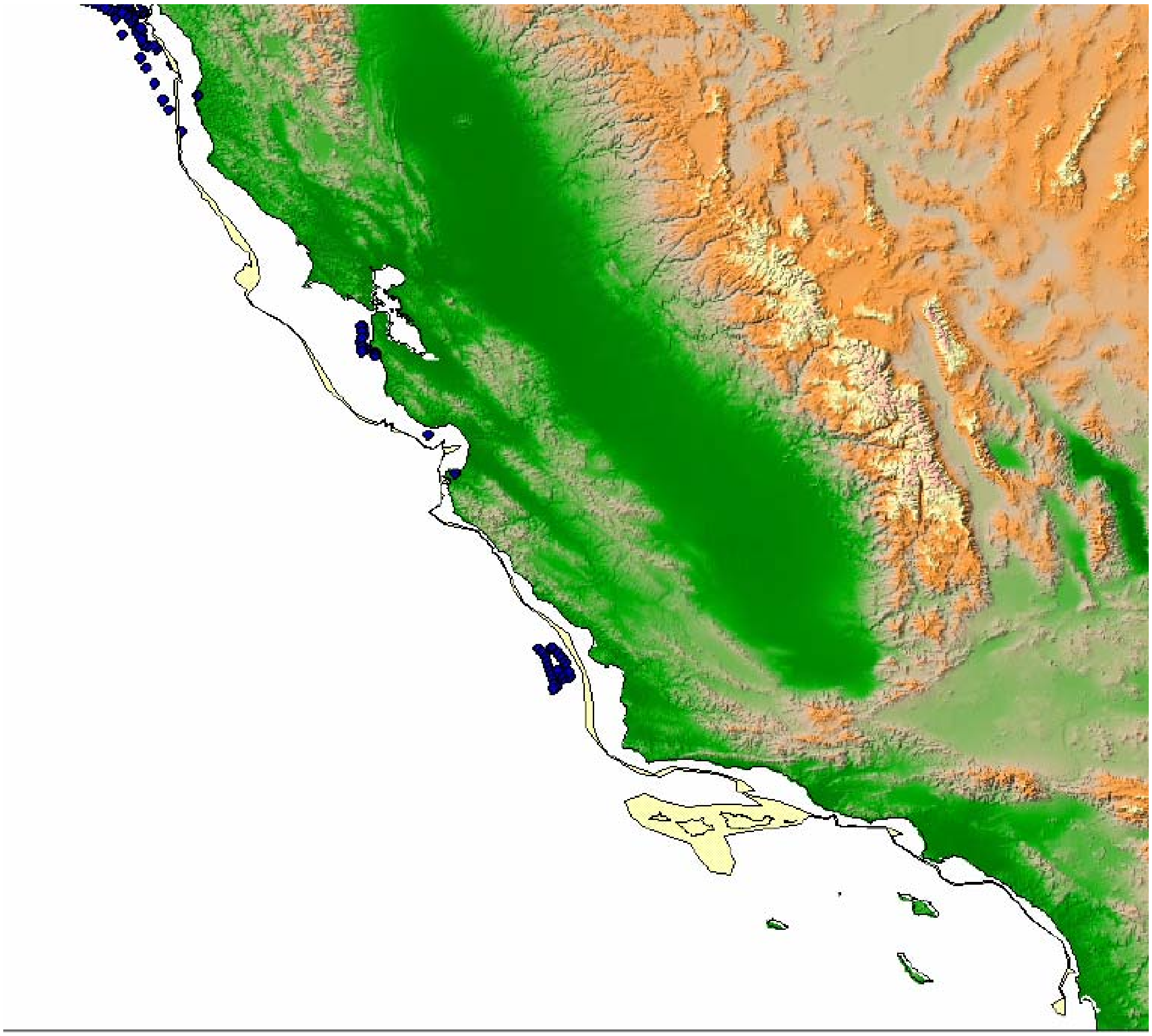


Figure 4-14. A composite VMS image of limited entry trawl vessel distribution south of 40°10' N latitude during spring months under 2006 management measures.

4.5.3.2 Limited Entry Fixed Gear Impacts

Depleted species' impacts under the No Action Alternative (see Section 2.2.3.1.2 for a description of No Action management measures) are shown in Tables 4-55 and 4-56. The No Action suite of management measures for the limited entry fixed gear sector are, for the most part, recommended for 2007–08 under the final Council-preferred alternative. An important exception is the higher sablefish tier limits in the primary fishery under the No Action Alternative given the higher sablefish OY. Lower sablefish tier limits are recommended under the Council-preferred alternative.

Figures 4-15 – 4-18 depict representative limited entry fixed gear vessel area distributions in winter and spring months in 2006 both north and south of 40°10' N latitude relative to the non-trawl RCA as determined through composite VMS images. From these images and those presented in Section 4.5.3.1, a few salient points regarding the limited entry fixed gear fishery emerge: 1) fixed gear effort appears to be patchily distributed coastwide, and 2) effort appears to be concentrated adjacent to the RCA, especially for those vessels fishing in deeper water seaward of the RCA north of 40°10' N latitude.

The apparent lack of effort[25] in the limited entry fixed gear fishery south of 40°10' N latitude may be an artifact of the seasonal timing of the composite VMS figures (Figures 4-17 and 4-18). The main target species for this sector in offshore waters continues to be sablefish and effort in the primary sablefish season, which runs from April through October, may not be adequately captured in Figures 4-17 and 4-18. Other reasons for this apparent lack of effort may be 1) the deeper seaward boundary of the non-trawl RCA south of 40°10' N latitude may preclude fishing opportunities for some important target species, and 2) the California regulation prohibiting longlining with more than 15 hooks per line within one mile of the shore in some areas north of 34°27' N latitude. This regulation was put in place to limit gear conflicts in nearshore waters; the limited amount of gear allowed will still work for the low-volume live-fish fishery. However, in the higher volume commercial fishery that does not seek to deliver live fish, this gear limit can effectively preclude nearshore fishing opportunities. In the summer months, when the shoreward boundary of the non-trawl RCA is at 20 fm, there may be few productive fishing areas in central California between 34°27' N latitude and 40°10' N latitude that are inside 20 fm and seaward of one mile of the coast.

The No Action suite of management measures for the limited entry fixed gear sector is, for the most part, recommended for 2007–08 under the final Council-preferred alternative. The exception to this is the suite of nearshore commercial management measures described in Section 4.5.3.4.

[25] The VMS composite figures in this EIS should probably not be used as an effort index.

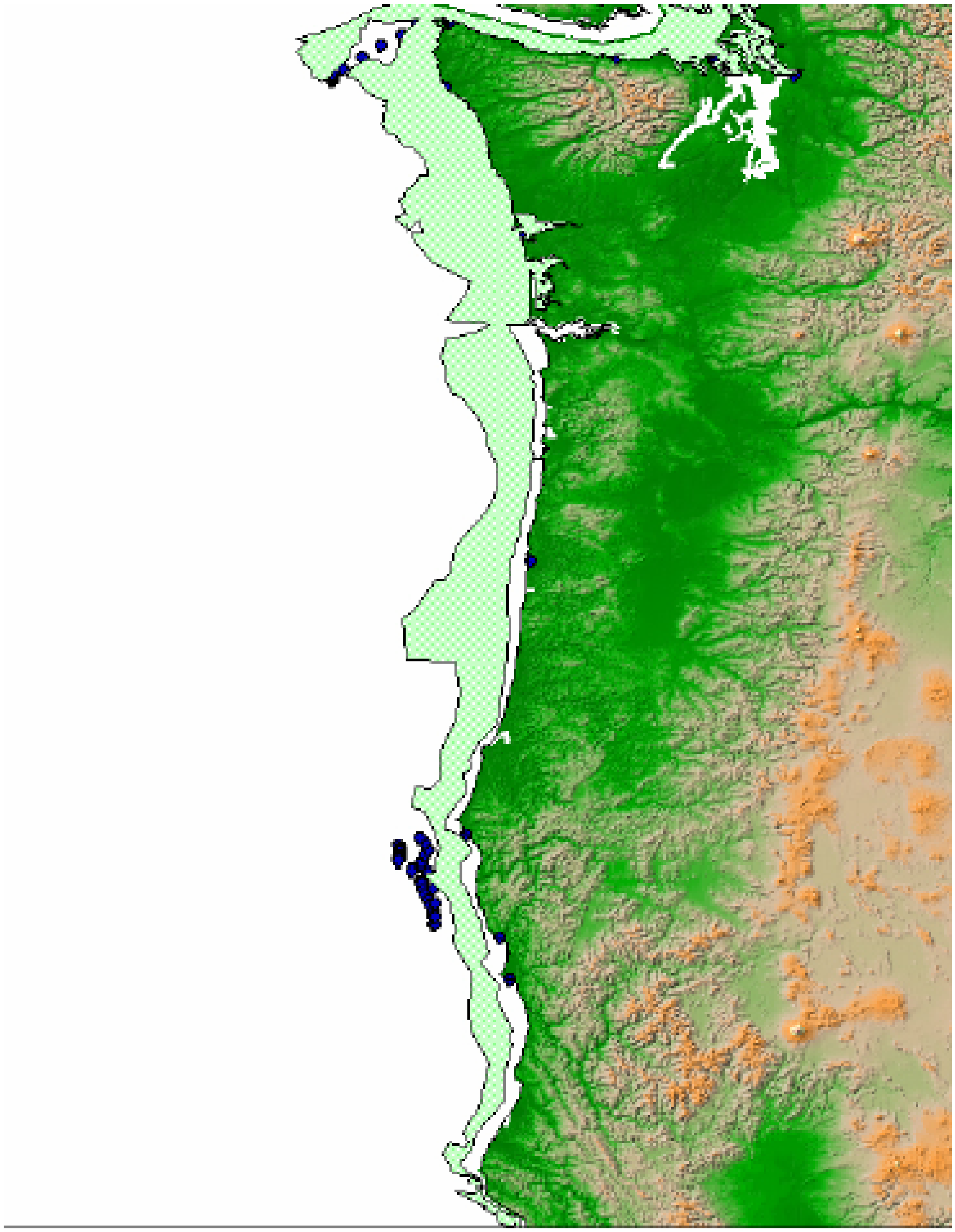


Figure 4-15. A composite VMS image of limited entry fixed gear vessel distribution north of 40°10' N latitude during winter months under 2006 management measures.

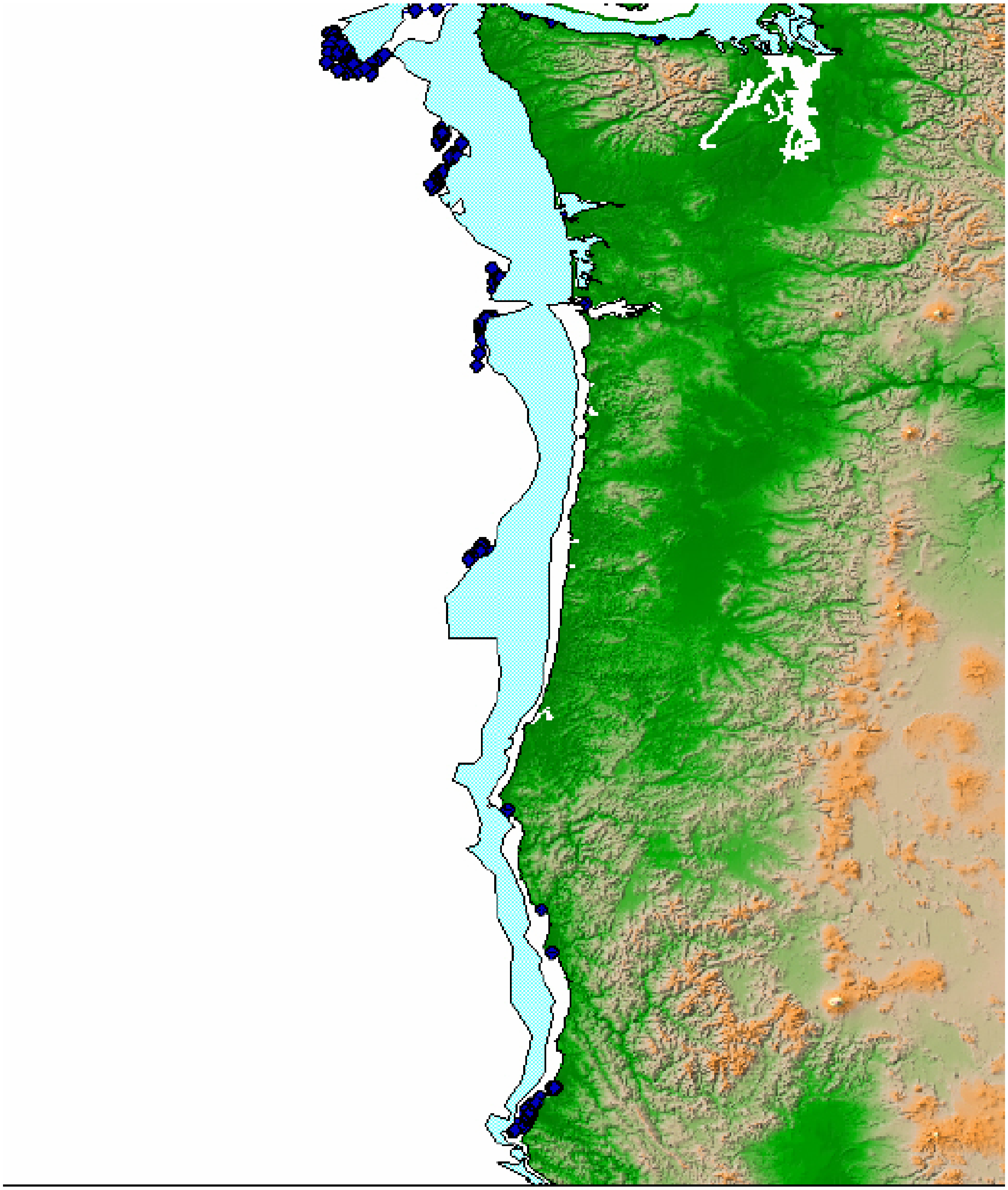


Figure 4-16. A composite VMS image of limited entry fixed gear vessel distribution north of 40°10' N latitude during spring months under 2006 management measures.

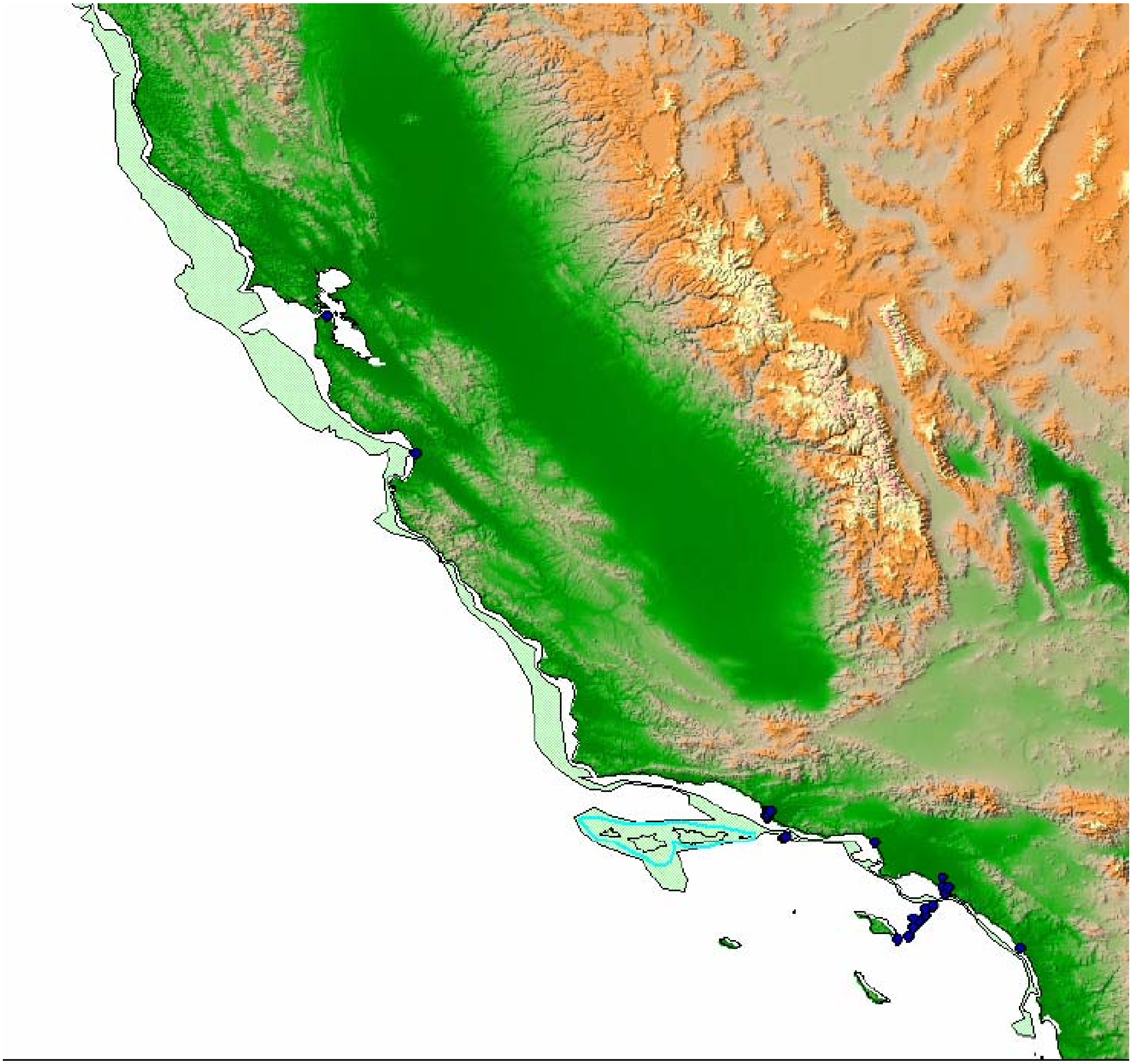


Figure 4-17. A composite VMS image of limited entry fixed gear vessel distribution south of 40°10' N latitude during winter months under 2006 management measures.

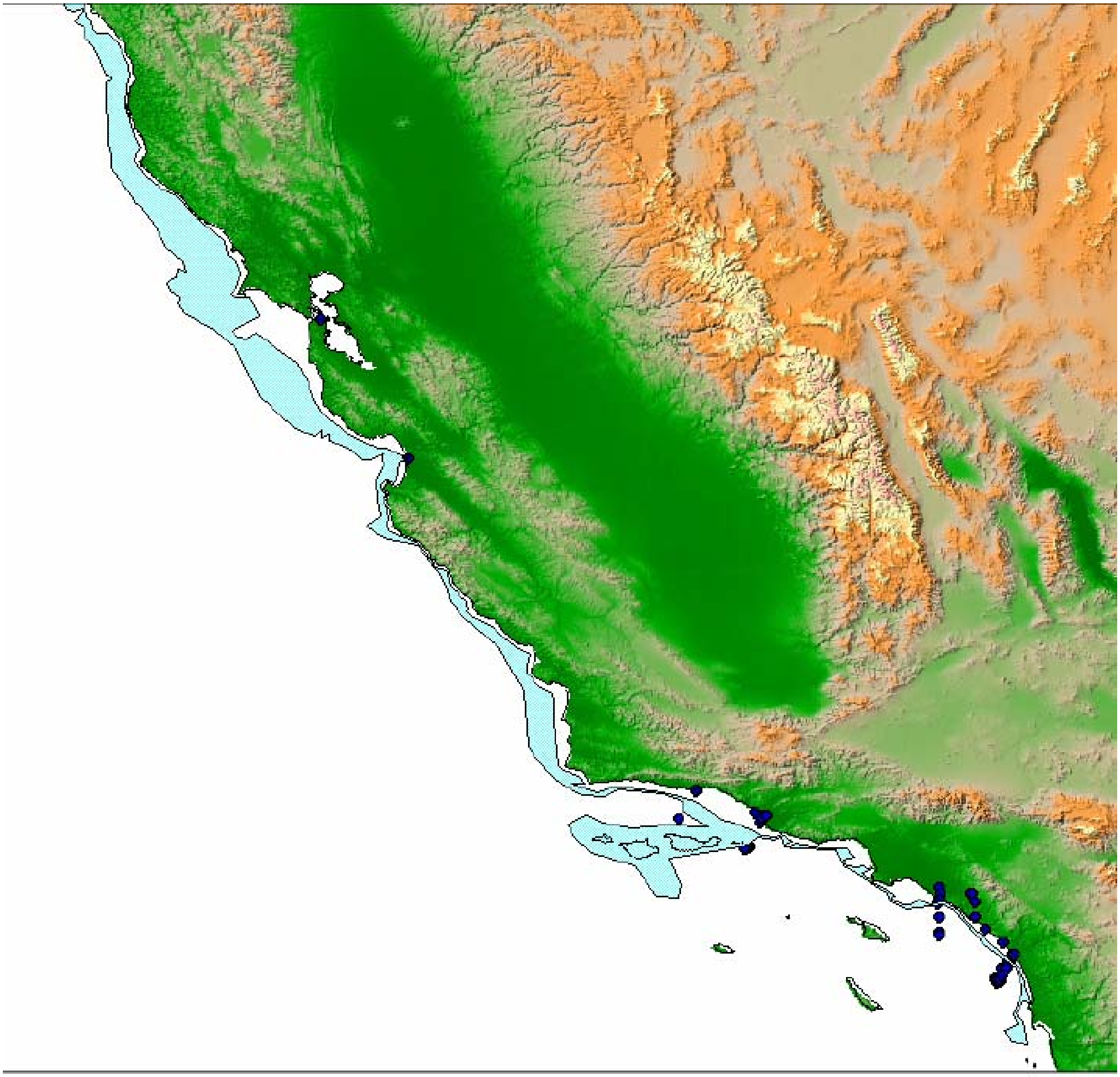


Figure 4-18. A composite VMS image of limited entry fixed gear vessel distribution south of 40°10' N latitude during spring months under 2006 management measures.

4.5.3.3 Open Access Impacts

Depleted species' impacts under the No Action Alternative (see Section 2.2.3.1.3 for a description of No Action management measures) are shown in Table 4-48. Table 4-48 impacts are only described for the sablefish-directed fisheries and are shown for the limited entry fixed gear and open access sectors combined. The reason for this is there is a paucity of available at-sea observation data for the open access sector, especially south of 40°10' N latitude. New WCGOP data will become available every fall, so sector-specific bycatch rates and impacts for depleted and target species should be increasingly certain with time.

The No Action suite of management measures for the open access sector is, for the most part, recommended for 2007–08 under the final Council-preferred alternative. The exception to this is the suite of nearshore commercial management measures described in the following Section.

4.5.3.4 Nearshore Commercial Impacts

Depleted species' impacts for nearshore commercial fisheries under the No Action Alternative (see Section 2.2.3.1.4 for a description of No Action management measures) for areas north and south of 40°10' N latitude are shown in Tables 4-50a and 4-50b, respectively. The Council anticipates the states of California and Oregon will continue to adopt conservative management measures that stay within the OYs, projected impacts, and harvest guidelines specific to the nearshore commercial fishery under the final Council-preferred alternative. In general, the No Action management measures are slightly more conservative than those under the final Council-preferred alternative. However, the harvest guidelines imposed under the final Council-preferred alternative, as well as those specified in state nearshore FMPs, are likely to stay within the recommended limits for this sector.

4.5.3.5 Tribal Fishery Impacts

Depleted species' impacts for tribal fisheries under the No Action Alternative (see Section 2.2.3.1.5 for a description of No Action management measures) are shown in Table 4-51. Most of the 2005–06 tribal management measures are recommended for 2007–08 under the final Council-preferred alternative.

4.5.3.6 Washington Recreational Impacts

Washington recreational fishery management measures are described in Section 2.2.3.1.6 and species' impacts are shown in Table 4-52. Washington recreational fishery management measures proposed under the final Council-preferred alternative are more conservative than those under the No Action alternative, largely due to the necessity to reduce yelloweye rockfish mortality. No Action management measures would probably be adequate for 2007–08, but early attainment of the canary or yelloweye rockfish harvest guideline is more likely, which could reduce fishing opportunities.

4.5.3.7 Oregon Recreational Impacts

Oregon recreational fishery management measures are described in Section 2.2.3.1.7 and species' impacts are shown in Table 4-53. Oregon recreational fishery management measures proposed under the final Council-preferred alternative are more conservative than those under the No Action alternative, largely due to the necessity to reduce yelloweye rockfish mortality. No Action management measures would probably be adequate for 2007–08, but early attainment of the canary or yelloweye rockfish harvest guideline is more likely, which could reduce fishing opportunities.

4.5.3.8 California Recreational Impacts

California recreational fishery management measures are described in Section 2.2.3.1.8 and species' impacts are shown in Tables 4-54 and 4-55. The No Action harvest guidelines for canary and yelloweye rockfish are higher than those recommended under the final Council-preferred alternative. If these same harvest guidelines were carried forward into the 2007–08 management cycle, there would have to be further constraints in other fishery sectors to prevent overfishing of these two species. California recreational impact modeling suggests the status quo harvest guidelines are not necessary to allow the Council-preferred recreational season to proceed.

4.5.4 The Action Alternatives

When evaluating the impacts associated with the action alternatives, there are several general points that may be important to bear in mind.

First, as a depleted species' spawning stock biomass nears a rebuilt level ($B_{40\%}$), the probability of fishing encounters with that species increases. When more of the stock is available to the fishery but the allowable catch remains at a low level, there is a greater chance that the OY could be reached early in the season or exceeded. This is particularly relevant with respect to darkblotched rockfish, Pacific ocean perch, and widow rockfish. Given that these species are primarily caught incidentally in trawl fisheries, concerns of increased encounters are most notable for those fleets. Furthermore, the proposed management measures under all action alternatives bring about impact estimates at or just below the proposed OY for Pacific ocean perch (Tables 2-14, 2-19 and 2-21). Without an excess of allowable impacts to buffer against the uncertainty associated with a biomass near a rebuilt level, there is a risk under each action alternative that the Pacific ocean perch OY could be exceeded. A similar situation may occur under Action Alternative 1 with respect to widow rockfish, as there is only a very small residual (3 percent of OY or 3.8 mt). In the scorecards that explore the different allocation scenarios (Tables 4-43 through 4-50), the residual is maintained for these three depleted species under the high OY scenario. Under the low OY scenarios, there is no residual for any of these depleted species.

Second, as the discard estimates from WCGOP improve, it is likely that discard rates used to manage those fisheries with a lesser amount of at-sea observations (i.e., southern limited entry and open access fixed gear fisheries) will change dramatically. This is a particular concern if new discard rates prove to be much higher than currently assumed based on limited at-sea observations. As this information is used to better inform managers about catch of depleted species, inseason action may be necessary to correct management measures that had been crafted according to current discard rates.

Variability in a stock's recruitment success is another source of uncertainty (see Section 4.4.2.1). Such variability is most common among winter-spawning shelf and slope groundfish, such as bocaccio, lingcod, and Pacific whiting. For these species, improved population trajectories over recent years can be aligned with climate shifts; for other species, such as cowcod and widow, the improvement in population trends is primarily due to deterministic recruitment trends and reduced harvest rates. The uncertainty surrounding the recruitment success of these species may provide additional support for managing fishing impacts to a value lower than the OY.

The considerations discussed above bring about a cumulative risk of exceeding the OY for certain depleted species. Much of this risk can be attributed to numerous sources of uncertainty, which are discussed further in Section 4.2.

General Action Alternative 1 Considerations
The management measures proposed in Action Alternative 1 all constrain fisheries below the Council preferred low OYs for depleted species (Table 2-14). However, for some species (i.e., Pacific ocean perch, widow rockfish, and bocaccio), there is little or no residual available to managers to buffer against uncertainty.

Under these low OYs, the Council must evaluate whether viable fisheries can be maintained. If it is determined that the management measures under Action Alternative 1 do not allow for viable fisheries, then other allocation scenarios may be considered by the Council (see discussion in 4.5.2.2 on allocating the entire OYs to the recreational fishery or to the commercial fishery).

The Council preferred low OYs bring about a similar situation to what is portrayed under Rebuilding Alternative 5. Under both of these, the management measures could result in fisheries that are equally constrained by most, if not all, of the depleted species' OYs. Though this suggests the need for additional room to buffer against management uncertainty, this is countered against the severe social and economic consequences that would be made even more acute by managing to a mortality impact lower than the OY.

General Action Alternative 2 Considerations
The management measures proposed in Action Alternative 2 are projected to constrain the depleted species impacts of all fisheries to levels that are intermediate between the Council preferred low and high OYs (Table 2-19). For some species (i.e., bocaccio, cowcod, and widow rockfish) under this action alternative, there is a large difference between the projected impacts and the high OY alternative. For Pacific ocean perch, on the other hand, the projected impact is nearly equal to the Council preferred high OY value. Unlike Action Alternative 1, this alternative allows for the higher values of research impacts for all depleted species.

General Action Alternative 3 Considerations
The management measures proposed in Action Alternative 3 are projected to constrain the depleted species impacts of all fisheries to levels at or below the Council preferred high OYs (Table 2-21). The anticipated impact to Pacific ocean perch, however, is equal to the high OY under this alternative. This alternative allows for the higher values of research impacts for all depleted species.

4.5.4.1 Limited Entry Trawl Impacts

<u>Non-Whiting Trawl Fishery</u>

The estimated impacts of the non-whiting limited entry trawl sector on depleted species and on target species under the action alternatives are displayed in Table 4-44.

Selective Flatfish Trawls

In 2005 a new management measure was implemented mandating the use of selective flatfish trawls shoreward of the trawl RCA north of 40°10' N latitude. This measure is maintained in the final Council-preferred alternative for this area (Tables 2-25 and 4-52). While mandating selective flatfish trawls shoreward of the RCA south of 40°10' N latitude was also considered for 2005–06, implementation was delayed in light of an ongoing EFP to measure bycatch rates of depleted species in that area. However, participation in the EFP was low and bycatch rate estimates for bocaccio and other depleted species in that area remain uncertain. Despite that uncertainty, bycatch reductions associated with this gear have been proven in the north, and it is expected that bycatch of canary rockfish would decrease in the south through the implementation of this gear. While bycatch rate reductions for bocaccio are also likely through the implementation of this gear, the GMT believed (in their recommendations to the Council in June 2006) that expected canary rockfish bycatch reductions alone were sufficient to justify the implementation of this gear in 2007–08 in order to reduce the bycatch of canary rockfish and to reduce the risk of early closure of the bottom trawl fishery. Projected impacts in Table 4-45 reflect the lower expected bycatch of canary rockfish using selective gear in the south. The projected canary mortality for the area south of 40°10' N latitude is 2.0 mt with selective gear, which represents a catch savings of approximately 0.5 mt (20 percent) over non-selective gear (Tables 4-52 and 4-53). While mandatory use of selective flatfish trawl gear while fishing shoreward of the RCA south 40°10' N latitude is not part of the final Council-preferred alternative, the Council wanted this management measure analyzed in this EIS so it can be considered as a routine inseason adjustment in 2007–08. One reason the Council did not recommend mandatory use of selective flatfish trawls in the south was a concern with the higher costs to fishermen associated with obtaining selective gear or converting their conventional trawls to selective trawls. Estimates of costs associated with converting small footrope trawls to selective flatfish trawls range from "minimal", if a two-seam net is already being used, to $8,000 and above for a new net. Under normal conditions, a selective flatfish trawl net would be expected to last several years. Selective flatfish trawl gear is currently being used south of 40°10' N latitude since it is considered legal small footrope gear and some fishermen prefer this gear since it does reduce rockfish bycatch. The GMT will analyze new WCGOP data as it becomes available to validate their assumptions regarding the effectiveness of selective trawls to reduce bycatch in the south and to reduce the uncertainty associated with presumed bycatch rate reductions for bocaccio using this gear.

Scottish Seine Exemption to RCA Restrictions

Under the final Council-preferred alternative, Scottish seine gear is exempt from RCA restrictions in the area between 36º N latitude and 38º N latitude and in depths shoreward of the 100 fm management line. The GMT recommended this exemption based on results from a three-year EFP study conducted by CDFG. This particular type of small footrope trawl gear was demonstrated to have lower bycatch rates of depleted species than more conventional trawl gear. This gear requires VMS and must adhere to declaration requirements to provide for enforcement of this exemption. The GMT recommended that this exemption apply only to the area north of 36º N latitude and south of 38º N latitude, where low bycatch rates of depleted species were demonstrated. The GMT further recommended that this exemption be limited to depths less than 100 fm. This encompasses the primary flatfish target areas off central California, but reduces risk associated with the exemption. This gear will remain within the WCGOP pool, enabling the GMT to monitor bycatch rates into the future. The GMT recommended that the Council's enforcement advisors (Enforcement Consultants) be consulted in order to develop regulations that clearly define Scottish seine gear; a process which was underway when this DEIS was submitted.

One Gear Aboard

Three out of the last four fishing years, early fishing closures resulted from inseason monitoring capability failing to predict the additional effort influx by vessels shifting fishing strategy. These early fishery segment closures result in an immediate financial shortfall for individual vessels, and reduce the annual fishery revenue by eliminating access to species with harvestable catch allotment remaining. Potential solutions for this problem include better prediction of fleet behavior and/or division of the fleet into deeper water vessels and shallower water vessels. Inseason management has attempted to segregate vessels into these two fishing strategies via differential trip limits (i.e., induce an effort shift seaward of the RCA by specifying relatively higher trip limits for the deeper water fishery). This mechanism no longer works in a predictable way.

For most of the 1990s vessels equipped with enough horsepower and cable targeted the lucrative DTS species (Dover sole, thornyheads and sablefish). Some of these vessels spent a portion of their time fishing shallower waters, but the majority of the fishing income was from deep water fishing. The remaining smaller trawl vessels without the horsepower, cable and other equipment necessary for bottom trawling deeper waters relied on shallower water fishing for their bottom trawl fishing income. These economic and equipment related decisions to fish deep or shallow tended to form a natural segregation of the fleet. The depleted status declaration of canary rockfish and yelloweye rockfish (as well as other depleted species) changed all of that. Protection for depleted groundfish stocks resulted in a large closed trawl area (RCA) that varied from 50-75 fm as the shoreward boundary and 200-250 fm as the seaward boundary. Vessels equipped to fish deeper water were not initially impacted as severely as shallower water vessels.

Gear research and an experimental fishery focused on designing a bottom trawl net that could be operated in shallow water to target healthy stocks (nearshore flatfish, Pacific cod, and petrale sole) while largely avoiding depleted rockfish like canary rockfish and yelloweye rockfish. The successful implementation of the selective flatfish trawl as a replacement for the traditional "hooded" trawl allowed vessels that traditionally fished shallower water to continue fishing with minimal impacts to depleted rockfish. In addition, the shoreward RCA boundary could be relaxed to 100 fm for a part of the spring/summer to allow access to species such as Pacific cod.

Unfortunately, a general decline in the value of deepwater fishing resulted in some vessels deciding to fish shoreward of the RCA more frequently than in the past. The recent spike in fuel cost has exacerbated the situation even more. Vessels need fishing flexibility, but management also needs to accurately forecast expected participation in various deep and shallow water target fisheries. Without accurate forecasts, vessel trip limits are either overly conservative (resulting in lost income) or overly optimistic (resulting in early season closures).

For a number of years the concept of allowing a vessel to fish with only one bottom trawl net type has been viewed as a potential way to more accurately predict target fishery participation. Now that a bycatch model is used to estimate depleted species' impacts, there is a need to accurately predict fishing effort distributions 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 still one way of achieving a more accurate prediction. Negative aspects of this option are some loss of fishing flexibility, and clearer definitions of net/target fishery (e.g., the use of selective flatfish indicated on the fish receiving ticket would imply that the vessel fished shoreward of the RCA; however, it is currently legal to use this net seaward of the RCA and some vessels have been successful doing so).

The purpose of this discussion is to identify the need to better predict fleet behavior. The intent is that a "one bottom trawl gear aboard" option would be analyzed against other alternatives. This option, or a better alternative, could then be implemented during the 2007–08 management cycle using a tiered EA and an additional notice and comment rulemaking.

A discussion with the Groundfish Advisory Subpanel trawl representatives and other interested parties at the Council's June 2006 meeting resulted in a number of additional alternatives for better prediction of fleet behavior and/or segregation. These alternatives along with the "one gear aboard" alternative are listed below for potential future analysis:

1. Only one bottom trawl gear used (aboard) during any 2-month cumulative fishing period.
2. Pre-season fleet survey/declaration of anticipated fishing participation.
3. Logbook analysis of fishing seaward or shoreward of the RCA from pervious years used to predict upcoming fishing year.
4. Inseason use of logbook information for real time information on fishing participation.

Table 4-44. Estimates of impacts (mt) to depleted species and total target catch associated with the limited entry non-whiting trawl fishery under the alternatives, without use of selective flatfish trawl gear south of 40°10' N latitude.

Species		No Action	Action Alternative 1			Action Alternative 2			Action Alternative 3			Council-preferred Alternative		
		Total	North	South	Total	North	South	Total	North	South	Total	North	South	Total
Rebuilding species	Canary	7.8	2.5	1.2	3.7	4.4	3.1	7.5	5.4	3.1	8.5	6.0	2.5	8.5
	POP	63.3	32.4	0.0	32.4	85.6	0.0	85.6	85.9	0.0	85.9	100.9	0.0	100.9
	Darkblotched	160.3	49.5	17.2	66.7	133.7	45.9	179.6	135.1	45.9	181.1	205.0	37.1	242.1
	Widow	1.0	0.1	0.0	0.1	1.0	0.1	1.0	1.0	0.1	1.0	0.6	0.1	0.7
	Bocaccio	47.4	0.0	9.1	9.1	0.0	50.5	50.5	0.0	50.5	50.5	0.0	48.0	48.0
	Yelloweye	0.3	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.0	0.1	0.1
	Cowcod	2.7	0.0	0.2	0.2	0.0	2.9	2.9	0.0	2.9	2.9	0.0	2.8	2.8
Target species	Sablefish		1,269	431	1,700	1,779	558	2,337	1,798	558	2356.0	1768.0	563.8	2331.8
	Longspine		171	335	507	178	577	756	178	577	755.5	285.4	565.6	851.1
	Shortspine		304	268	572	597	376	973	598	376	974.2	771.0	411.7	1182.7
	Dover		3,266	891	4,157	8,352	2,458	10,809	8,407	2,458	10865.1	9622.9	2895.7	12518.6
	Arrowtooth		1,311	19	1,330	5,192	51	5,243	5,117	51	5168.1	5005.4	43.7	5049.1
	Petrale		1,403	256	1,659	2,078	369	2,447	2,092	369	2460.8	1640.8	365.0	2005.8
	Other Flatfish		197	334	531	623	694	1,317	626	694	1319.7	534.0	635.1	1169.0
	Slope Rockfish		113	209	322	173	351	523	173	351	523.5	193.7	292.6	486.3

Table 4-45. Estimated impacts (mt) to depleted species and total target catch associated with the limited entry non-whiting trawl fishery under the alternatives, with use of selective flatfish trawl gear south of 40°10' N latitude.

Species		Action Alternative 1			Action Alternative 2			Action Alternative 3			Council-preferred Alternative a/		
		North	South	Total	North	South	Total	North	South	Total	North	South	Total
Rebuilding species	Canary	2.5	0.9	3.4	4.4	2.4	6.8	5.4	2.4	7.8	6.0	2.0	7.9
	POP	32.4	0.0	32.4	85.6	0.0	85.6	86.0	0.0	86.0	100.9	0.0	100.9
	Darkblotched	49.5	17.2	66.7	133.7	45.9	179.6	135.1	45.9	181.1	205.0	37.1	242.1
	Widow	0.1	0.0	0.1	1.0	0.1	1.0	1.0	0.1	1.0	0.6	0.1	0.7
	Bocaccio	0.0	9.1 b/	9.1	0.0	50.5 b/	50.5	0.0	50.5 b/	0.0	0.0	48.0	48.0
	Yelloweye	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.0	0.1	0.1
	Cowcod	0.0	0.2 b/	0.2	0.0	2.9 b/	2.9	0.0	2.9 b/	0.0	0.0	2.8	2.8
Target species	Sablefish	1,269	431	1,700	1,779	558	2,337	1,798	558	2356.0	1768.0	563.8	2331.8
	Longspine	171	335	507	178	577	756	178	577	755.5	285.4	565.6	851.1
	Shortspine	304	268	572	597	376	973	598	376	974.2	771.0	411.7	1182.7
	Dover	3,266	891	4,157	8,352	2,458	10,809	8,407	2,458	10865.1	9622.9	2895.7	12518.6
	Arrowtooth	1,311	19	1,330	5,192	51	5,243	5,117	51	5168.1	5005.4	43.7	5049.1
	Petrale	1,403	256	1,659	2,078	369	2,447	2,092	369	2460.8	1640.8	365.0	2005.8
	Other Flatfish	197	334	531	623	694	1,317	626	694	1319.7	534.0	635.1	1169.0
	Slope Rockfish	113	209	322	173	351	523	173	351	523.5	193.7	292.6	486.3

a/ The Council did not include mandatory use of selective flatfish trawl gear shoreward of the trawl RCA south of 40°10' N. lat. in it's final preferred alternative. However, the Council wanted this measure analyzed so it can be routinely considered as an inseason adjustment in 2007–08.

b/ Indicates that differences in bycatch for these species may occur, but the degree of change is unknown.

Whiting Trawl Fishery

Deciding 2007–08 Pacific whiting harvest specifications and management measures for fisheries targeting Pacific whiting are not part of the proposed actions in this EIS. However, the Council and NMFS need to understand the bycatch implications of 2007–08 whiting fisheries, reserve some yield of groundfish species of concern that are commonly caught in whiting fisheries, and, according to Section 6.2 of the Groundfish FMP, follow a two-meeting process to allow a full rulemaking for the 2007 whiting fishery in March 2007. This EIS and the Council/NMFS process to develop 2007–08 groundfish harvest specifications and management measures are being used to accomplish these objectives. This will allow final whiting decisions in March 2007 and expeditious implementation of the whiting trawl fishery in the spring of 2007.

In its final action on 2007–08 groundfish management measures, the Council stated their intent to continue to manage the whiting fishery using total catch limits for those depleted groundfish species known to be more vulnerable to whiting trawls. The Council also expressed an interest in individual whiting sector total catch limits (currently total catch limits apply collectively to all the non-tribal whiting sectors) and changes to the start dates for the whiting fishery (each sector tends to start their primary fishery on different dates), which have been relatively consistent in recent years. Analysis and discussion of these issues and actions follows.

The GMT models the bycatch implications of whiting fisheries using a weighted average of observed bycatch by species relative to whiting catch by sector during the previous four years (Table 4-46). The weighting formula for the bycatch analysis in this EIS is 40 percent for 2005 bycatch rates, 30 percent for 2004 rates, 20 percent for 2003 rates, and 10 percent for 2002 rates. The weighted average bycatch rate is then applied to alternative whiting OYs to determine the expected bycatch by species for a given U.S. whiting OY (Table 4-47). This bycatch analysis assumes that the total U.S. whiting catch will decrease in accordance with the allowable impacts to depleted species. An alternative strategy for managing 2007–08 whiting fisheries would be to impose total catch limits for these species and allow the fleet flexibility to avoid these species while attempting to attain their whiting quotas. Historically, the whiting fishery has been managed with sector-specific whiting allocations and seasons, observation coverage appropriate to the particular whiting sector, and in more recent years, depleted species' total catch limits. In past seasons, fishery participants have balanced bycatch concerns for Chinook salmon, and darkblotched, widow, and canary rockfish by moving their fishing operations to areas where these species can be avoided. Because these species are found in different areas at different times of the year, and because their distribution varies from year to year, whiting fishery participants have relied on flexibility of movement to constrain their bycatch of all species of concern. This is the reason the Council intends to continue the strategy of minimizing depleted species' bycatch through total catch limits rather than setting precautionary whiting OYs based on the observed bycatch rate of these depleted species. And under this strategy, future whiting OYs would therefore be set based on the conservation needs of the Pacific whiting stock only.

Under the No Action alternative, depleted species' total catch limits are used to minimize the bycatch of depleted species most prone to midwater whiting trawl take. Canary and widow rockfish total catch limits of 4.7 mt for canary rockfish and 200 mt for widow rockfish for all the non-tribal whiting sectors combined (i.e., motherships, catcher-processors, and shoreside whiting sectors) are specified under the No Action alternative. These total catch limits, once attained, would cause the non-tribal whiting fishery to close even if annual whiting quotas had not yet been attained. This closure would be an automatic action by NMFS without a Council recommendation as catches are tracked inseason. However, the Council can change these total catch limits as a routine inseason action.

While the Council will not set 2007 whiting fishery harvest specifications and management measures until March 2007, they did set aside yield of some depleted species to be reserved as total catch limits for the 2007 whiting fishery under the final Council-preferred alternative. Those total catch limits are the status quo limits of 4.7 mt of canary rockfish and 200 mt of widow rockfish. Additionally, the Council set aside 25 mt of darkblotched rockfish that can be used as a total catch limit for that species in the 2007 whiting fishery. The Council will formally consider depleted species' total catch limits in March 2007 when 2007 whiting management measures will be decided.

The Council also wanted to explore the concept of individual sector total catch limits for potential implementation during the 2007–08 management cycle. Unlike the status quo total catch limits that apply to all the non-tribal whiting sectors collectively, sector-specific total catch limits would be used to minimize bycatch of depleted species. This concept would potentially insulate the other whiting sectors from early closure prior to attaining their whiting allocations if one sector had enough bycatch to use up the collective total catch limit for any one species. With each sector starting their fishery at different times of the year, there is the potential that one sector starting earlier in the season could pre-empt fishing opportunities for other whiting sectors starting later in the year. At the onset of the 2006 primary whiting season for the mothership sector, widow rockfish bycatch rates were higher than anticipated. Reasons given for this occurrence were the whiting schools had yet to aggregate, compelling the catcher boats supplying fish to the motherships to search more for fish and tow longer to fill their bags. Coupled with higher encounter rates of widow rockfish due to strong recent recruitment (i.e., the rebuilding paradox), widow rockfish were difficult to avoid and the bycatch was larger than expected. The widow rockfish bycatch rate progressively decreased going into the second and third weeks of the fishery as the fleet changed locations to avoid widow rockfish and whiting started to school up. However, this experience illustrates the potential problems associated with a shared total catch limit by sectors that fish different seasons.

A concern in implementing sector-specific total catch limits is whether current catch monitoring systems are adequate for implementing this measure. Although each sector of the whiting fishery is monitored for total catch, only the at-sea sectors (i.e., motherships and catcher-processors) have a catch tracking system in place that can provide estimated catch totals in a near real-time manner. The shoreside whiting sector has at-sea observers on about 25 percent of their trips through the WCGOP. Under the terms of the shoreside whiting EFP, all participants must fully retain their catch and sorting at sea is not allowed. In 2004 and 2005, some shoreside whiting vessels had deck-mounted cameras as part of a NMFS experimental effort to test electronic monitoring technology. Camera monitoring is seen as a potential way to ensure full retention of catch with no at-sea sorting of catch is occurring in this sector. This experiment proved that, in general, camera monitoring showed promise in ensuring full retention and non-sorting requirements are followed (in fact, in 2006 camera monitoring became a requirement for the entire shoreside whiting fleet under the 2006 EFP), but determining the species composition of the catch was more problematic. This may prove to be an impediment to implementing a sector-specific total catch limit for this sector. However, the same uncertainty exists in the current management of bycatch in the whiting fishery where all three non-tribal sectors share species' total catch limits. Managing the primary whiting fishery with total catch limits is more effective than managing without total catch limits as shown by the responsiveness of the fleet to move and avoid bycatch species of concern. Without such a bycatch control mechanism, the whiting fishery could pre-empt fishing opportunities for other sectors if bycatch were to increase to the point where the OY is exceeded. Under a shared total catch limit, a race for fish by the whiting sectors could occur if one sector could not control their bycatch and other sectors' allocations were at risk of not being attained. A sector-specific total catch limit could prevent this; however, spreading a small total catch limit even thinner might result in less overall flexibility for managers and fishermen to control bycatch in this fishery. The Council anticipates further analysis of this issue in the fall of 2006 when NMFS will present a draft EA of the shoreside whiting monitoring program. Adequacy of observer coverage and electronic monitoring for implementing a total catch limit for this sector will be a focus of this analysis. It is anticipated an additional federal comment and response rulemaking consistent with the procedures in Section 6.2 of the FMP will occur after November 2006 if the Council decides to recommend sector-specific total catch limits for future whiting fisheries.

Table 4-46. Catch (mt) of Pacific whiting and depleted groundfish species by whiting trawl sector, 2002-2005.

Species	Year	Non-tribal						Tribal				Total wt. (mt)
		Catcher-Processors		Mothership		Shoreside		Mothership		Shoreside		
		Catch (mt)	Bycatch rate	Catch (mt)	Bycatch rate	Catch (mt)	Bycatch rate	Catch (mt)	Bycatch rate	Catch (mt)	Bycatch rate	
Canary	2002	1.594	0.00004	0.812	0.00003	0.212	0.00000	2.827	0.00013		NA	5.445
	2003	0.174	0.00000	0.084	0.00000	0.106	0.00000	0.669	0.00003	0.016	0.00000	1.049
	2004	0.381	0.00001	4.102	0.00017	1.183	0.00001	0.611	0.00003	0.035	0.00001	6.311
	2005	0.337	0.00000	0.700	0.00001	2.220	0.00002	0.410	0.00002	0.200	0.00002	3.867
Darkblotched	2002	2.192	0.00006	0.935	0.00004	0.001	0.00000	0.073	0.00000		NA	3.201
	2003	4.205	0.00010	0.102	0.00000	0.259	0.00001	0.022	0.00000		NA	4.589
	2004	4.360	0.00008	3.020	0.00013	0.740	0.00001		NA	0.000	NA	8.120
	2005	5.950	0.00008	5.080	0.00010	5.340	0.00005	0.020	0.00000	0.000	NA	16.390
Pacific ocean perch	2002	1.447	0.00004	2.172	0.00008	0.221	0.00000	0.213	0.00001		NA	4.054
	2003	5.045	0.00012	0.113	0.00000	0.297	0.00001	1.079	0.00006	0.101	0.00002	6.635
	2004	0.918	0.00002	0.104	0.00000	4.621	0.00005	0.023	0.00000	0.000	NA	5.665
	2005	0.776	0.00001	0.860	0.00002	0.000	NA	0.060	0.00000	0.000	NA	1.696
Widow	2002	115.098	0.00317	20.498	0.00077	5.319	0.00012	19.064	0.00087		NA	159.979
	2003	11.558	0.00028	0.691	0.00003	8.971	0.00018	2.162	0.00011	0.035	0.00001	23.418
	2004	8.113	0.00014	11.421	0.00047	20.835	0.00025	1.494	0.00006	0.005	0.00000	41.868
	2005	43.140	0.00055	35.500	0.00073	77.150	0.00079	1.390	0.00006	0.518	0.00005	157.698
Yelloweye	2002		NA		NA	0.000	NA		NA		NA	0.000
	2003	0.005	0.00000		NA	0.003	0.00000		NA		NA	0.008
	2004		NA	0.004	0.00000	0.003	0.00000		NA	0.000	NA	0.007
	2005	0.000	NA	0.000	NA	0.009	0.00000	0.000	NA		NA	0.009
Pacific Whiting	2002	36,341.41		26,593.29		45,276.00		21,793.11				130,003.81
	2003	41,214.39		26,021.40		50,964.62		19,374.73		4,078.83		141,653.96
	2004	57,288.58		24,102.00		84,889.84		23,459.22		4,472.86		194,212.50
	2005	78,889.57		48,571.23		97,378.25		23,419.00		11,420.00		259,678.05

Table 4-47. Estimated impacts (mt) to depleted species and total target catch associated with the Pacific whiting fishery under the alternatives.

Action Alternatives	Total US Catch (mt)	Sector	Whiting Allocation (mt)	Impact to depleted species (mt)				
				Canary	Darkblotched	POP	Widow	Yelloweye
No Action		Tribal		1.6	0.0	1.0	6.1	-
		Mothership			4.7	2.9		0.0
		CP		4.7	6.3	1.8	200.0	0.0
		Shoreside			5.2	0.6		0.0
		Total		6.3	16.2	6.3	206.1	0.0
Alternative 1	150,000	Tribal	25,000	1.1	0.0	0.5	4.3	-
		Mothership	29,520	1.8	2.5	0.5	15.3	0.0
		CP	41,820	0.4	3.3	1.6	26.5	0.0
		Shoreside	51,660	0.7	2.8	0.9	22.6	0.0
		Total		4.0	8.6	3.5	68.7	0.0
Alternative 2	200,000	Tribal	27,500	1.2	0.0	0.5	4.8	-
		Mothership	40,920	2.5	3.4	0.7	21.2	0.0
		CP	57,970	0.5	4.6	2.2	36.8	0.0
		Shoreside	71,610	1.0	3.8	1.3	31.3	0.0
		Total		5.2	11.9	4.7	94.0	0.0
Alternative 3	260,000	Tribal	35,000	1.6	0.0	0.6	6.0	-
		Mothership	53,520	3.2	4.5	0.9	27.7	0.0
		CP	75,820	0.7	6.0	2.8	48.1	0.0
		Shoreside	93,660	1.3	5.0	1.7	41.0	0.0
		Total		6.8	15.5	6.1	122.8	0.0

4.5.4.2 Limited Entry Fixed Gear Impacts

Sablefish Alternatives

The impacts associated with the action alternatives for sablefish (Table 4-48) are arrayed by A) holding the allocations for sablefish constant for the limited entry and open access fixed gear sectors under the Council's preferred sablefish OY and moving the fixed gear RCA line north of 40°10' N latitude from 100 to 125 and 150 fm respectively, and B) by lowering the OY for sablefish to achieve the same reductions in bycatch as by moving the fishery in the north out to the 125 fathom line and the 150 fathom line. These results show that savings in bycatch are achieved by advancing the line further seaward, or by lowering the sablefish allocation to these sectors, but either case creates an economic cost to sablefish fishers.

A review of West Coast groundfish observer data shows that sablefish vessels currently fish at depths deeper than 150 fm north of 40 degrees 10 minutes latitude, but for vessels that homeport in the Puget sound region of Washington, a 150 fathom line eliminates their fishing areas and would require vessels to fish substantially further south and further out to sea. This is because the shelf and slope areas off northern Washington are comprised of multiple canyons and broad areas with relatively the same depth. In other areas of the coast the bottom depths get deeper in a more continuous fashion as one moves further out to sea. Those vessels that don't home port in the Puget sound region and that currently don't fish at depths outside of 150 fm would need to travel further out to sea, however the additional distance required of these vessels to fish outside 150 fm is minor compared to vessels that home port in the Puget sound area.

Reducing the sablefish allocation is shown to give a comparison between area closures and reductions in target species catch that would achieve the same levels of bycatch. Reducing the sablefish allocation for these sectors would decrease bycatch because vessels would fish less and thereby exert less effort on the areas where depleted species are found. While reducing the sablefish allocations for limited entry and open access fixed gear vessels would decrease the catch and revenues to these vessels, it would allow vessels to fish closer to shore and decrease the cost of accessing that sablefish when compared to imposing fathom restrictions that achieve the same reductions.

Table 4-48. Estimated impacts (mt) associated with all fixed gear sablefish fisheries.

	Council Preferred Sablefish OY with Changes in Fathom Line			Reduced OY with Constant Fathom Line	
	Action Alt. 1	**Action Alt. 2**	**Action Alt. 3**	**Action Alt. 2b**	**Action Alt. 1b**
	150 North: 150 South[c/]	125 North: 150 South[b/]	100 North: 150 South[a/]	100 North: 150 South[a/]	100 North: 150 South[a/]
Total catch OY (mt)	5934	5934	5934	4450	2225
Landed Catch (mt)	2411	2411	2411	1800	885
Projected impacts (mt)					
Widow rockfish	0.00	0.00	0.02	0.01	0.01
Canary rockfish	0.13	0.39	0.57	0.43	0.21
Yelloweye rockfish	0.47	0.96	1.28	0.96	0.47
Bocaccio	0.00	0.00	0.00	0.00	0.00
Cowcod	0.00	0.00	0.00	0.00	0.00
Pacific ocean perch	0.27	0.36	0.29	0.22	0.11
Darkblotched rockfish	1.23	0.94	0.80	0.60	0.29

a/ Seaward boundary of RCA at 100 fm North of 40°10' and at 150 fm South of 40°10'

b/ Seaward boundary of RCA at 125 fm North of 40°10' and at 150 fm South of 40°10'

c/ Seaward boundary of RCA at 150 fm North of 40°10' and at 150 fm South of 40°10'

Non-Sablefish Alternatives

Impacts associated with the non-sablefish limited entry fixed gear sector (primarily targeting spiny dogfish and Pacific halibut) are displayed in Table 4-49.

Table 4-49. Impact estimates associated with the limited entry fixed gear sector (non-sablefish).

Species Category	Species	Impacts of the Alternatives: No Action	Action Alt. 1	Action Alt. 2	Action Alt. 3	Council-preferred
Depleted Species (mt)	Canary	0.2	0	0.1	0.2	0.2
	Darkblotched	0.4	0.4	0.4	0.4	0.4
	POP	0	0	0	0	0
	Widow	0.5	0.5	0.5	0.5	0.5
	Yelloweye	1.3	0.2	0.6	1.3	1.3
Impact to Target Species (lbs)	Spiny dogfish	530,211	150,268	262,667	530,211	530,211
	Pacific halibut	923,295	249,290	923,295	923,295	923,295

Non-Trawl Rockfish Conservation Area Alternatives

The main management measure distinguishing the action alternatives in this EIS is the configuration of the non-trawl RCA. While the Council recommends the No Action seaward boundaries of the non-trawl RCA (150 fm south of 40°10' N latitude and 100 fm north of 40°10' N latitude) under the final Council-preferred alternative, the Council does want the flexibility in 2007–08 to change these boundaries routinely during the season if needed to manage species' impacts in non-trawl fisheries. The alternative depth-based management lines considered for defining the seaward boundary of the non-trawl RCA (125 fm and 150 fm coastwide) are already specified with latitude/longitude waypoints in federal regulations and the analysis of species' impacts using the alternative non-trawl RCA configurations has been updated with new WCGOP data and reported in this EIS. Therefore, according to the Council's framework for routine inseason adjustments described in Section 6.2.1 in the Groundfish FMP, alternative non-trawl RCA changes can be considered as routine inseason adjustments in 2007–08.

The reason the Council recommends no immediate change be implemented to the seaward boundary of the non-trawl RCA is the loss of fishing opportunities for important target species such as spiny dogfish and Pacific halibut (Table 4-49). However, new WCGOP data for non-trawl fisheries is anticipated in the fall of 2006 and fall of 2007, which may revise our current understanding of the depth-based impacts to key constraining species in non-trawl fisheries such as bocaccio, cowcod, canary, or yelloweye rockfish. If any new information suggests that the current suite of management measures proposed under the final Council-preferred alternative are not effective in adequately reducing fishing mortalities for these or other species of concern, the Council intends to consider seasonal changes to the non-trawl RCA as a primary tool for managing non-trawl fisheries in 2007–08.

4.5.4.3 Open Access Impacts

Directed Groundfish Fisheries

As with the limited entry fixed gear fisheries, the primary means to constrain impacts of the open access sector on depleted species is by changing the non-trawl RCA boundaries. The same considerations described above for changing the non-trawl RCA boundaries as a routine inseason adjustment would also apply to those vessels operating in the open access sector that are not exempt from RCA restrictions. Beginning in 2007, any vessel operating under the open access regulations will be required to invest in VMS if they intend to land any federally-managed groundfish species (all limited entry trawl and fixed gear vessels are already required to have VMS).

The specific impacts under each of the action alternatives have been quantitatively assessed for only some portions of this diverse sector. Table 4-48 depicts the projected impacts for all sablefish fisheries (limited entry and open access) and Section 4.5.4.3 discusses the impacts of the nearshore commercial fisheries, which many of the vessels currently landing groundfish under open access regulations participate.

Incidental Groundfish Fisheries

The current uncertainty in the ability to accurately distinguish those open access vessels targeting groundfish species vs. those that incidentally take groundfish while targeting non-groundfish species should be lessened with the new mandate to have VMS if one intends to land groundfish. This mandate begins with the start of the 2007–08 management cycle. However, it will still be incumbent upon managers to account for at-sea groundfish discards by fishermen that elect to discard all their groundfish and not invest in VMS.

One of the proposals advanced from the salmon troll industry and analyzed in this EIS was the allowance of an incidental landing limit for lingcod while maintaining the troll exemption to RCA restrictions. The Council explicitly rejected this lingcod landing allowance, not out of concern for the potential impact on lingcod, which is at a healthy level of abundance in the north, but out of concern this may lead to targeting of lingcod by salmon trollers, which could increase impacts on co-occurring depleted rockfish.

The Council does recommend a new YRCA off the north Washington coast (Figure 2-11) where commercial salmon troll fishing would be prohibited in 2007–08. This area overlaps a portion of the "C-shaped" YRCA (Figure 2-4), and is already closed to recreational groundfish and halibut fishing.

The Council also recommends continuing the RCA exemption for the ridgeback prawn exempt trawl fishery south of 34°27' N latitude to allow the fishery to be prosecuted out to the 100 fm line, even when the non-trawl RCA is extended shoreward of that depth.

4.5.4.4 Nearshore Commercial Impacts

Table 4-50 depicts the estimated total mortality of nearshore commercial fisheries under each action alternative. The management measures proposed within Action Alternative 3 are the same as the No Action alternative, and therefore the estimated impacts for these two alternatives are equal. Under the most restrictive management measures (Action Alternative 1), the catch of black rockfish north of 40°10' N latitude is projected to drop by 60 percent from status quo, while the catch of other target species is projected to be maintained at status quo levels. South of 40°10' N latitude catch of shallow and deeper nearshore species, cabezon, and kelp greenling under Action Alternative 1 are all expected to reduce by about 15 percent due to the proposed area and depth restrictions.

Table 4-50a. Season structure and expected yelloweye rockfish and canary rockfish impacts under the 2007–2008 No Action and action alternatives for nearshore commercial fisheries north of 40°10' N latitude.

Alternative	Season Duration	Black Rockfish Reduction (%)	Shoreward RCA (fm)	Estimated Impact (mt) to Yelloweye Rockfish	Estimated Impact (mt) to Canary Rockfish
No Action	12 month season	0	30	2.1	1.7
1	<6 month season	60	20	0.8	0.7
2	12 month season	10	20	1.3	1.2
3a	12 month season	0	20	1.4	1.3
3b	12 month season	0	30	2.1	1.7

Table 4-50b. Season structure and expected yelloweye rockfish and canary rockfish impacts under the 2007–2008 No Action and action alternatives for nearshore commercial fisheries south of 40°10' N latitude to 34°27' N latitude

Alternative	Season Duration	Nearshore Rockfish Reduction (%)	Shoreward RCA (fm)	Estimated Impact (mt) to Yelloweye Rockfish	Estimated Impact (mt) to Canary Rockfish
No Action	10 month season	0	30 (Jan-Apr, Sep-Dec) 20 (May-Aug)	0.0	0.33
1	8 month season	15	20	0.0	0.26
2	10 month season	5	20	0.0	0.30
3a	10 month season	5	30	0.0	0.31
3b	10 month season	0	30	0.0	0.33

4.5.4.5 Tribal Fishery Impacts

Table 4-51 depicts the projected impacts to the depleted and target species associated with all tribal groundfish fisheries. The estimated impacts to depleted species are the same across all action alternatives (and are the same as the No Action alternative).

The projected catch of spiny dogfish is significantly higher under the action alternatives than under no action. The Makah Tribe is proposing a directed longline fishery for spiny dogfish for 2007 and 2008. The fishery would be restricted to the Limited Entry trip limits. Increased landings of dogfish by treaty fishermen in 2007 and 2008 would be dependent on successful targeting in 2006 while staying within current estimates of impacts on depleted species. The projected value for spiny dogfish landings in Table 4-51 (600,000 lbs or 272.2 mt) is a placeholder provided by Makah Fisheries Management; impacts will not be known until the test fishery is prosecuted. In addition, flatfish and rockfish impacts under all action alternatives are expected to increase by 25 percent due to increased effort (though not capacity) in Makah trawl fisheries.

Table 4-51. Estimates of impacts (mt) to species associated with the Tribal fishery under the alternatives.

Species Category	Species	Impacts (mt) of the Alternatives				
		No Action	Action Alt. 1	Action Alt. 2	Action Alt. 3	Council-preferred
Depleted Species	Canary rockfish	3.4	3.4	3.4	3.4	3.4
	Darkblotched rockfish	0.1	0.1	0.1	0.1	0.1
	Pacific ocean perch	3.7	3.7	3.7	3.7	3.7
	Widow rockfish	40.0	40.0	40.0	40.0	40.0
	Yelloweye rockfish	2.3	2.3	2.3	2.3	2.3
Non-depleted Species	Pacific whiting	34,357	25,000	27,500	35,000	35,000
	Sablefish	719.4	561.4	561.4	561.4	561.4
	Yellowtail rockfish	539.4	539.4	539.4	539.4	539.4
	Flatfish spp.	446.7	558.4	558.4	558.4	558.4
	Pacific cod	400.0	400.0	400.0	400.0	400.0
	Spiny dogfish	5.9	272.2	272.2	272.2	272.2
	Lingcod	29.8	29.8	29.8	29.8	29.8
	Skate spp.	23.2	23.2	23.2	23.2	23.2
	Unspecified rockfish					
	Slope rockfish	28.6	28.6	28.6	28.6	28.6
	Near-shore rockfish	0.2	0.2	0.2	0.2	0.2
	Shelf rockfish	9.3	9.3	9.3	9.3	9.3
	Walleye pollock	19.6	19.6	19.6	19.6	19.6
	Shortspine thornyhead	10.8	13.5	13.5	13.5	13.5
	Longspine thornyhead	0.2	0.2	0.2	0.2	0.2

4.5.4.6 Washington Recreational Impacts

Management measures proposed under the action alternatives serve to constrain the Washington recreational fishery to impacts on canary rockfish and yelloweye rockfish lower than those under the No Action alternative (Table 4-52).

Table 4-52. Estimates of impacts (mt) to depleted species associated with the Washington recreational fishery under the alternatives.

Species	Area	Impacts (mt) of the Alternatives				
		No action	Action Alt. 1	Action Alt. 2	Action Alt. 3	Council-preferred
Canary	North Coast	1.4	0.5	0.6	1.1	1.1
	South Coast	0.2	0.2	0.2	0.2	0.2
	Columbia	0.0	0.0	0.0	0.0	0.0
	Total	1.6	0.7	0.8	1.4	1.4
Yelloweye	North Coast	3.2	1.2	1.4	2.5	2.5
	South Coast	0.5	0.4	0.4	0.5	0.5
	Columbia	0.0	0.0	0.0	0.0	0.0
	Total	3.8	1.5	1.8	3.1	3.1

Discussion of the Council-Preferred Alternative

Canary and Yelloweye Harvest Guidelines

The two most constraining species for the Washington recreational groundfish and Pacific halibut fisheries are canary and yelloweye rockfish. Under the Council-preferred alternative, a shared harvest guideline with the Oregon recreational fishery is recommended for managing impacts to these two species by these sectors (Table 2-26). The automatic actions the WDFW would consider inseason to stay within these harvest guidelines are described in Section 2.2.3.5.6.

It will be challenging in the next two management cycles to modify the Washington recreational fishery to reduce the harvest rate of yelloweye rockfish, particularly in the offshore recreational fishery targeting Pacific halibut. This is an important fishery for the two northern-most ports in Washington (La Push and Neah Bay) and accounts for a significant amount of the fishing-dependent income to those communities (see Chapter 7 for a discussion and analysis of these effects). However, of all the sectors impacting yelloweye rockfish, the Washington recreational sector may be the most vulnerable to management adjustments necessary to reduce yelloweye impacts. In 2005, the Washington recreational fishery was restricted to depths of less than 30 fm in early August because the yelloweye rockfish harvest guideline was attained. The same yelloweye rockfish harvest guidelines and automatic management responses are part of the final Council-preferred alternative, which effectively limited cumulative impacts to below the OY in 2005. Similar mechanisms are proposed to manage the Washington recreational fishery to stay within the canary rockfish harvest guideline shown in Table 2-26.

Yelloweye Rockfish Conservation Areas

The No Action YRCA in waters off northern Washington (Figure 2-4), a new YRCA in waters off northern Washington (Figure 2-8), and a new YRCA in waters off southern Washington (WA South Coast B in Figure 2-9) would be closed to recreational fishing under the final Council-preferred alternative. While there is no quantitative analysis of impacts associated with closing these areas to recreational fishing, there is also no impact "savings" credit or estimate of reduced yelloweye rockfish mortality associated with closing these areas. To determine which proposed alternative YRCAs would be recommended for managing 2007–08 fisheries, the WDFW reviewed available yelloweye rockfish encounter data. They plotted the coordinates of the closed areas with Geographic Information Systems (GIS) software with overlays of state observer data from recreational, salmon troll, and exempted fisheries for trawl and longline, groundfish trawl logbook data, and data from the annual International Pacific Halibut Commission (IPHC) halibut survey, the NMFS triennial trawl survey, and the WDFW submersible survey for yelloweye rockfish. Based on this review, and information communicated from recreational and commercial fishers, the WDFW believes that closing these areas to the specified fisheries will help conserve yelloweye rockfish. Over the next 18 months, WDFW will hold a series of meetings with recreational and commercial fishers to complete a more comprehensive review of the data and information about fishing locations to further refine these YRCAs and potentially define new sites. While all this analysis focused on yelloweye rockfish distribution, it is expected these YRCAs will also reduce mortality on co-occurring canary rockfish as well.

Lingcod Minimum Length Limit

The lingcod minimum length requirement was reduced from 24 inches (2005 and 2006) to 22 inches for the Washington recreational fishery under the Council-preferred Alternative for 2007 and 2008. The smaller length limit was adopted in order to reduce time on the water by allowing anglers to achieve the bag limit quicker. This management measure reduces impacts to depleted rockfish species (primarily canary rockfish and yelloweye rockfish). Analyses revealed that reducing the minimum length limit will result in greater lingcod harvests than increasing the lingcod daily-bag-limit, thus providing more access to the increased amount of harvestable lingcod available with fewer impacts to depleted rockfish species. Higher lingcod impacts are estimated to be sustainable in 2007–08 now that the stock's spawning biomass has increased to a healthy abundance ($B_{87\%}$) in the north.

4.5.4.7 Oregon Recreational Impacts

Management measures, proposed under the action alternatives and the Council-preferred Alternative, serve to constrain the Oregon recreational fishery to depleted species impacts lower than those under the No Action alternative (Table 4-53). These measures also restrict the catch of target species (with the exception of lingcod), which are projected to be equal to or lower than No Action levels under all alternatives.

Discussion of the Council-Preferred Alternative

A modified version of Alternative 3b (described under Section 2.2.3.4.7) was adopted as the final Council-preferred Alternative for the Oregon recreational groundfish fishery in 2007 and 2008 (Table 2-27). 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 fathoms (Table 2-27). Closing the fishery from April 1 to September 30, months where yelloweye and canary harvests are highest, mitigate the impacts to depleted rockfish species (primarily canary rockfish and yelloweye rockfish).

Bag limits

A marine fish daily-bag-limit of eight 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 eight fish in aggregate to manage the harvest of black rockfish within the recreational fishery harvest guideline which is adopted in the yearly state process. Therefore the projected black rockfish impacts detailed in Table 4-53 reflect the potential harvest guideline. Changes to the marine fish daily-bag-limit primarily affect black rockfish harvest rates, as data showed little difference in trip hours under 10, 8, or 5 fish bag limits, and no reduction to canary rockfish and yelloweye rockfish impacts resulting from reduced marine fish daily-bag-limits.

A flatfish daily-bag-limit of 25 fish in aggregate was approved under the Council-preferred Alternative. 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). Adoption of this alternative required removing flatfish from the status quo definition of "marine fish".

Implementation of a lingcod daily-bag-limit of two fish, under the Council-preferred Alternative, is consistent with the status quo management measures effective in 2005 and 2006. An increased lingcod bag limit was not selected because it would increase angler time on the water, resulting in increased impacts to depleted rockfish species (primarily canary rockfish and yelloweye rockfish) and constraining target species (i.e., black rockfish). Analyses demonstrated that a reduced size limit provides more access to the harvestable amount of lingcod available while mitigating affects on depleted rockfish stocks.

Minimum Length Limits

The lingcod minimum length requirement was reduced from 24 inches (2005 and 2006) to 22 inches for the Oregon recreational fishery under the Council-preferred Alternative for 2007 and 2008. The smaller length limit was adopted in order to reduce time on the water by allowing anglers to achieve the bag limit quicker. This management measure reduces impacts to depleted rockfish species (primarily canary rockfish and yelloweye rockfish) and constraining target species (i.e., black rockfish). Analyses revealed that reducing the minimum length limit will result in greater lingcod harvests than increasing the lingcod daily-bag-limit, thus providing more access to the increased amount of harvestable lingcod available with fewer impacts to depleted rockfish species. Higher lingcod impacts are estimated to be sustainable in 2007–08 now that the stock's spawning biomass has increased to a healthy abundance ($B_{87\%}$) in the north.

The Council-preferred Alternative also includes minimum length limits for cabezon and kelp greenling of 16 inches and 10 inches, respectively. This management measure is consistent with the status quo management measures effective in 2005 and 2006. These length limits are effective tools in reducing harvest of these species, primarily in the shore and estuary fishery. Additionally, these requirements provide consistency with state regulations governing the Oregon nearshore commercial 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 (Option A in Figure 2-5). In 2005 and 2006, the Pacific halibut rules prohibited targeting and retaining Pacific halibut within the Stonewall Bank in effort to reduce canary rockfish and yelloweye rockfish impacts attributed to that fishery. Prohibiting the targeting and retaining of groundfish in addition to Pacific halibut in the YRCA will further reduce incidental catch of yelloweye and canary rockfish.

Other Stonewall Bank YRCA closures than Option A in Figure 2-5 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. Data is currently being collected to establish yelloweye rockfish encounter rates for anglers targeting Pacific halibut in the open areas surrounding Stonewall Bank in order to assess whether the expanded areas would further reduce yelloweye rockfish encounters. Furthermore, ODFW is exploring the option of conducting cooperative research with the International Pacific Halibut Commission to investigate the distribution and abundance of yelloweye rockfish in the Stonewall Bank area, as well as additional areas coastwide that have not yet been determined. These data will be analyzed and, if deemed appropriate, the expanded YRCA options considered in the EIS will be implemented in order further reduce yelloweye rockfish encounters.

Groundfish Retention in the All-Depth Pacific Halibut Fishery

In 2005 and 2006, 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 2007 and 2008.

Inseason Management Tools

Inseason management action may be implemented in 2007 or 2008 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, depth, and area closures.

Season, depth, and area closures are the primary inseason tools for limiting canary rockfish and yelloweye rockfish impacts, since retention of these species is prohibited. If catch rates indicate that the harvest targets for either canary rockfish or yelloweye rockfish will be reached prematurely, offshore depth closures may be implemented inseason at 30, 25, or 20 fathoms as these two species are less abundant nearshore and release survival rates are higher in shallow waters. 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 canary or yelloweye 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 may be implemented to achieve the goal of a 12 month season in the event of accelerated or decelerated black rockfish or other nearshore rockfish harvest. Season and/or area closures will be considered if catch rates indicate that harvest targets will be attained prematurely. Non-retention and length restrictions are the likely inseason tools to limit cabezon and greenling harvest as release survival is very high. They may also be used to reduce impacts to nearshore species, such as black rockfish or other nearshore rockfish.

Gear restrictions and/or release technique requirements may be implemented to reduce the mortality of depleted rockfish species if successful techniques are developed, researched, reviewed, and accepted. Research in this area is currently being conducted, 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 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. Fisheries will be monitored to ensure that impacts to yelloweye and canary rockfish are within the harvest targets.

Table 4-53. Estimates of impacts to depleted species and to target species associated with the Oregon recreational fishery under the alternatives.

Species Category	Species	Impacts (mt) of the Alternatives						
		No Action	Action Alt. 1a	Action Alt. 1b	Action Alt. 2	Action Alt. 3a	Action Alt. 3b	Council-Preferred
Depleted Species	Yelloweye Rockfish	3.6	1.6	1.5	1.9	2.5	2.9	3.1
	Canary Rockfish	5.3	1.6	2.3	2.6	3.7	4.0	4.3
	Widow Rockfish	1.6	0.1	0.1	0.1	0.4	0.6	1.1
Other Nearshore Rockfish Species Complex	Blue Rockfish	34.1	20.8	27.6	30.7	30.9	30.9	34.4
	Brown Rockfish	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	China Rockfish	2.2	2.1	1.9	1.9	2.0	2.0	2.2
	Copper Rockfish	4.9	4.4	4.5	4.5	4.6	4.6	4.9
	Grass Rockfish	1.4	1.3	1.3	1.3	1.3	1.3	1.4
	Quillback Rockfish	3.3	3.6	3.0	2.9	2.9	2.9	3.3
	Total	46.0	32.3	38.4	41.4	41.8	41.8	46.3
Target Species	Black Rockfish	328.7	308.1	294.1	293.7	294.2	294.2	330.9
	Vermilion Rockfish	6.8	6.8	6.0	6.0	6.1	6.1	6.8
	Tiger Rockfish	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Lingcod (2007)	209.2	141.8	199.1	192.4	225.1	230.0	236.3
	Lingcod (2008)	244.7	164.2	231.3	223.9	262.7	267.9	275.2
	Cabezon	19.1	17.8	17.2	17.3	17.3	17.3	19.2
	Kelp greenling	19.4	19.4	18.9	19.0	19.0	19.0	19.4
	Rock greenling	2.2	2.2	2.2	2.2	2.2	2.2	2.2

4.5.4.8 California Recreational Impacts

Table 4-54 depicts the projected impacts to depleted species under the action alternatives associated with the California recreational fisheries. Table 4-55 provides projected impacts to target species under the action alternatives.

Harvest Guidelines

The depths and seasons recommended under the final Council-preferred alternative provide somewhat more fishing opportunity than those specified under the No Action alternative, but the harvest guidelines for canary and yelloweye rockfish (Table 2-26) are smaller. Given the impact modeling uncertainty (only two years of CRFS data are available), there is the possibility of early attainment of these harvest guidelines, which could force early closures or more conservative inseason adjustments to depths and seasons by region. The status quo catch sharing agreement with the state of Oregon for the southern black rockfish OY, which allocates 42 percent of the OY to California for recreational and nearshore commercial fisheries, is recommended under the final Council-preferred alternative. Managing this fishery with harvest guidelines has proven effective in the past, since CDFG has the authority to close all or a part of their recreational fishery if a federal OY or harvest guideline is attained. Therefore, the issue of California recreational impact projection uncertainty is more likely to have consequences to fishing opportunities in 2007–08 than to negative species' impacts, such as overfishing.

Diver and Shore-Based Angler Exemptions

The CFGC will meet later this year to decide whether to continue the exemption for divers from the seasonal closures and depth restrictions for rockfish, greenlings, California scorpionfish, California sheephead, and ocean whitefish. Otherwise, the Council recommends continuing this exemption for shore-based anglers under the final Council-preferred alternative.

Lingcod Minimum Length Limit

The lingcod minimum length requirement was reduced from 24 inches (2005 and 2006) to 22 inches for the California recreational fishery under the Council-preferred Alternative for 2007 and 2008. The smaller length limit was adopted in order to reduce time on the water by allowing anglers to achieve the bag limit quicker. This management measure reduces impacts to depleted rockfish species (primarily canary rockfish and yelloweye rockfish) and constraining target species (i.e., black rockfish). The Council-preferred lingcod OY for waters off California (south of 42° N latitude) of 612 mt is the status quo OY and should be adequately conservative to address the localized depletion concerns for the southern substock (see Section 4.3.3.8).

Table 4-54. Estimates of impacts (mt) to depleted species associated with the California recreational fishery under the alternatives.

Alternatives	Area	Impacts (mt) to Depleted Species				
		Bocaccio	Canary	Cowcod	Widow	Yelloweye
No Action	Total	51.8	6.1	0.2	5.6	1.5
Action Alt. 1	North region	N/A	0.5	N/A	0	0.8
	North Central	0.2	3	0	1.3	0.4
	S. Central - Monterey	1.8	0.3	0	0.1	0
	S. Central - Morro Bay	0.5	0.7	0	0	0
	South Region	13.4	0.3	0	0.2	0
	Total	15.9	4.8	0	1.6	1.2
Action Alt. 2	North region	N/A	0.7	N/A	0	0.9
	North Central	0.2	3.8	0	2.0	0.6
	S. Central - Monterey	1.8	0.3	0	0.1	0
	S. Central - Morro Bay	0.6	0.8	0	0	0
	South Region	29.1	0.3	0.1	1.1	0
	Total	31.7	5.9	0.1	3.2	1.5
Action Alt. 3	North region	N/A	0.7	N/A	0	0.7
	North Central	1.0	5.7	0	12.1	0.5
	S. Central - Monterey	12.0	0.6	0	1.0	0.0
	S. Central - Morro Bay	3.9	1.3	0	0	0.1
	South Region	89.9	0.3	0.3	5.2	0
	Total	106.8	8.6	0.3	18.3	1.3
Council-preferred	North region	N/A	0.7	N/A	0	0.9
	North Central	0.2	5.5	0	2.2	0.6
	S. Central - Monterey	7.4	0.5	0	0.9	0
	S. Central - Morro Bay	2.5	1.3	0	0.1	0
	South Region	57.4	0.3	0.3	5.2	0
	Total	67.5	8.3	0.3	8.4	1.7

Table 4-55. Estimates of impacts (mt) to target species associated with the California recreational fishery under the alternatives.

Alternatives	Area	Impacts (mt) to Target Species				
		Minor Nearshore Rockfish North	Minor Nearshore Rockfish South	CA Scorpion-fish	Lingcod	Lingcod + Dec Open (except SCMB)
Action Alt. 1	North region	17.1	N/A	0	51	55
	North Central	N/A	126	0	105	120
	S. Central - Monterey	N/A	98	0	26	29
	S. Central - Morro Bay	N/A	81	0	21	21
	South Region	N/A	58	79	22	29
	Total	17.1	363	79	225	254
Action Alt. 2	North region	17.3	N/A	0	51	55
	North Central	N/A	162	0	135	151
	S. Central - Monterey	N/A	98	0	26	29
	S. Central - Morro Bay	N/A	87	0	23	23
	South Region	N/A	57	74	24	33
	Total	17.3	404	74	259	291
Action Alt. 3	North region	14.8	N/A	0	42	46
	North Central	N/A	147	0	120	133
	S. Central - Monterey	N/A	114	0	29	32
	S. Central - Morro Bay	N/A	79	0	21	21
	South Region	N/A	61	75	28	37
	Total	14.8	401	75	240	269
Council-preferred	North region	17.3	N/A	0	51	N/A
	North Central	N/A	165	0	152	
	S. Central - Monterey	N/A	104	0	29	
	S. Central - Morro Bay	N/A	92	0	24	
	South Region	N/A	61	75	26	
	Total	17.3	422	75	282	

5.0 PROTECTED SPECIES

Four different laws designate a species or stock as "protected" within U.S. waters: the ESA, the Marine Mammal Protection Act (MMPA), the Migratory Bird Treaty Act (MBTA), and EO 13186. Briefly, the substance of these mandates is:

- The ESA protects species in danger of extinction throughout all or a significant part of their range and mandates the conservation of the ecosystems on which they depend. "Species" is defined by the Act to mean a species, a subspecies, or—for vertebrates only—a distinct population. Under the ESA, a species is listed as "endangered" if it is in danger of extinction throughout a significant portion of its range and "threatened" if it is likely to become an endangered species within the foreseeable future throughout all, or a significant part, of its range.
- The MMPA guides marine mammal species protection and conservation policy off the U.S. West Coast. NMFS is responsible for MMPA-based management of cetaceans and pinnipeds, while the United States Fish and Wildlife Service (USFWS) is responsible for sea otter management. Stock assessment reports review new information every year for strategic stocks and every three years for non-strategic stocks. "Strategic stocks" are those with a human-caused mortality and injury level that exceeds the potential biological removal level. (At 50 CFR 229.2, "potential biological removal level" is defined as, "the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population…") Marine mammal populations with an abundance that falls below its optimum sustainable level are listed as "depleted" under the MMPA. All marine mammal species are protected under the MMPA, regardless of whether a particular species or stock is listed as threatened or endangered under the ESA.
- The MBTA implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the Act, it is unlawful to take, kill, or possess migratory birds. In addition to the MBTA, an Executive Order, *Responsibilities of Federal Agencies to Protect Migratory Birds*, (EO 13186), directs federal agencies to negotiate Memoranda of Understanding with the USFWS that would obligate agencies to evaluate the impact on migratory birds as part of any NEPA process. All migratory seabird species are protected under the MBTA and EO 13186, regardless of whether a particular species or stock is listed as threatened or endangered under the ESA.

NMFS and the Council have published recent NEPA documents that describe protected species found in the West Coast EEZ. 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 3.4 and provided information on fisheries interactions, where available and applicable. The December 2004 Final EIS on "Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2005-06 Pacific Coast Groundfish Fishery" (2005-06 Specifications EIS) (PFMC 2004a) 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 marine mammals have been completed since the publication of either the EFH EIS or the 2005-06 Specifications EIS. NMFS publishes an annual list of fisheries in the Federal Register separating commercial fisheries into one of three categories based on the level of serious injury and mortality of marine mammals occurring incidentally in that fishery. The categorization of a fishery in the list of fisheries determines whether participants in that fishery are subject to certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements. West Coast groundfish fisheries are designated as Category III fisheries, denoting a remote likelihood of, or no known, serious injuries or mortalities to marine mammals (71 FR 247, January 4, 2006).

- No new scientific analyses on the interactions between the groundfish fisheries and seabirds have been completed since the publication of either the EFH EIS or the 2005-06 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. This assessment is part of NMFS's work with the USFWS on a Memorandum of Understanding concerning seabirds and the groundfish fisheries, as required under EO 13168.
- No new scientific analyses on the interactions between the groundfish fisheries and sea turtles have been completed since the publication of either the EFH EIS or the 2005-06 Specifications EIS (PFMC 2004b). 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 ridley 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.

Under the Council on Environmental Quality (CEQ) implementing regulations for NEPA at 40 CFR 1502.21, *Incorporation by Reference*, "Agencies shall incorporate material into an environmental impact statement by reference when the effect will be to cut down on bulk without impeding agency and public review of the action. The incorporated material shall be cited in the statement and its content briefly described. No material may be incorporated by reference unless it is reasonably available for inspection by potentially interested persons within the time allowed for comment. Material based on proprietary data which is itself not available for review and comment shall not be incorporated by reference." Based on these NEPA implementing regulations, the relevant content of the aforementioned EISs is incorporated by reference.

The 2005-06 groundfish harvest specifications EIS did not find that the proposed action 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. Groundfish trawl fishing effort as reported in logbooks has fallen over the past few years; for example, 110,512 tow-hours were reported in 2000 while 64,763 tow hours were logged in 2004. Declining groundfish trawl effort is a predictable response to lowered OYs and more restrictive management measures imposed to reduce bycatch of depleted groundfish and it is reasonable to conclude that non-trawl sectors experienced similar declines. Furthermore, because OYs for some depleted species—principally canary and yelloweye rockfish—have not increased, it is likely that fishing effort in 2005 and 2006, and the 2007-08 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. For this reason effects to sea turtles, marine mammals, and seabirds are not evaluated in further detail within this EIS. However, given the new information contained in the 2006 supplemental biological opinion on the groundfish fisheries, this EIS focuses on impacts of the alternatives on the ESA-listed salmon evolutionarily significant units (ESUs) identified in that opinion.

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 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 West Coast Groundfish Observer Program (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 The Whiting Fishery

Salmon bycatch has generally been well below the 11,000 fish consultation standard (averaging 7,281 since 1991); although, as noted above it has been exceeded three times (see Table 5-1), in 1995 (14,533 fish), 2000 (11,513 fish), and 2005 (11,916 fish). Figure 5-1 breaks out the Chinook bycatch by the various whiting sectors over time.

Both the absolute and relative effects of the different whiting subsectors may considered in describing past impacts. Table 5-2 shows, for the whole 1991-2005 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 (0.1171 Chinook/mt,) but ranks second to last in terms of absolute impact. The nontribal mothership sector has had the highest absolute impact (31.73 percent) and the second-highest relative impact (0.0506 Chinook/mt). The catcher/processor sector has the lowest overall bycatch rate for the period followed (0.0219 Chinook/mt) and accounted for the third-lowest proportion of overall bycatch (22.81 percent). The tribal shorebased sector has only operated since 2003 and thus accounts for a very small share of total bycatch for the period.

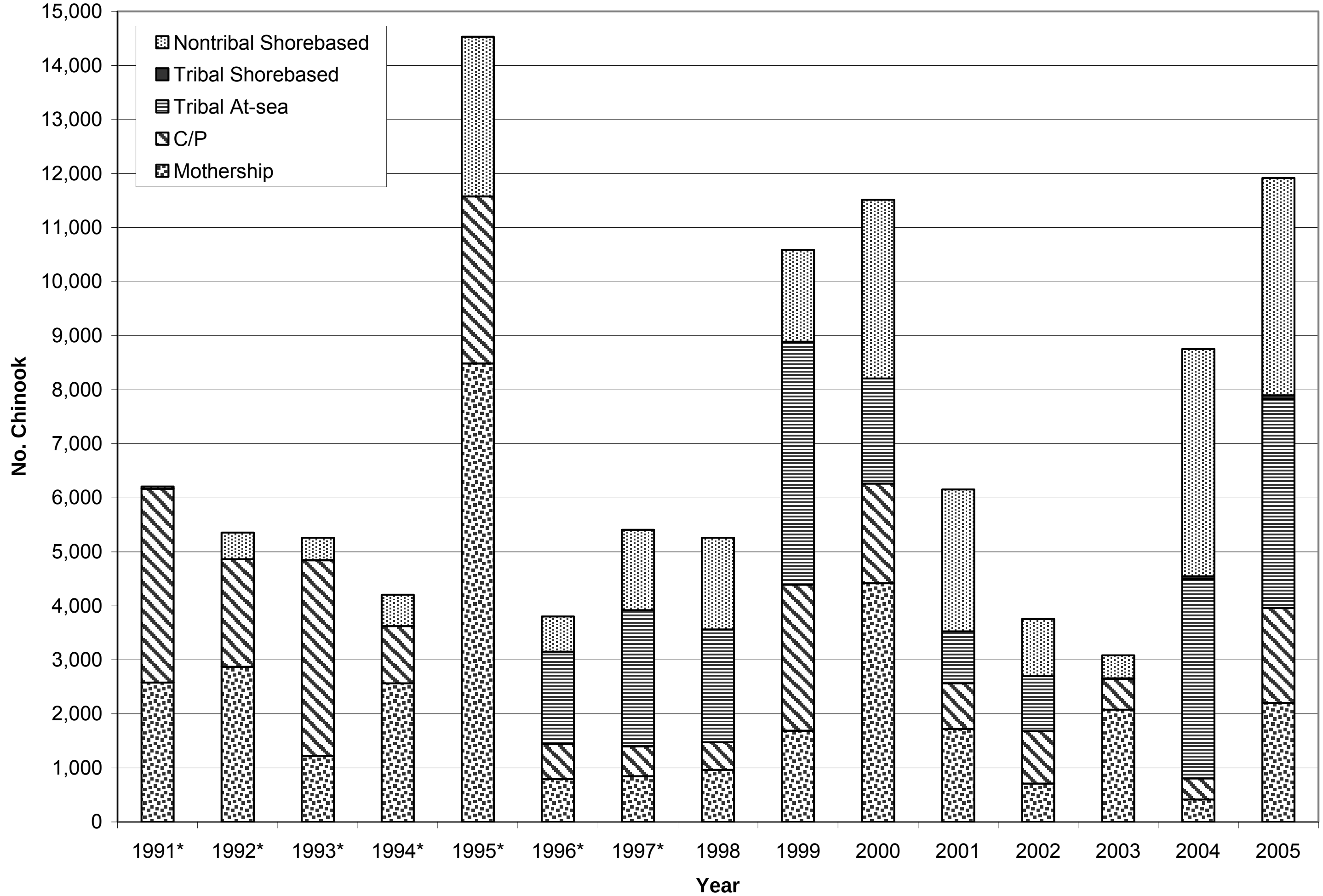
Table 5-1. Annual bycatch of salmonids in the whiting fishery.

	Salmonid Species							
Year	**Chinook**	**Coho**	**Pink**	**Chum**	**Sockeye**	**Steelhead**	**Unidentified**	**Total**
1991	6,206	138	24	8	0	0	NA	6,376
1992	5,353	193	0	48	0	0	NA	5,594
1993	5,262	17	3397	58	116	0	NA	8,850
1994	4,207	69	32	214	0	0	NA	4,522
1995	14,533	1381	1590	182	6	0	NA	**17,692**
1996	3,803	64	0	178	0	0	NA	4,045
1997	5,404	350	497	114	0	0	NA	6,365
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	3774	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**
Average	7,281	250	708	114	9	0	91	8,398

Source: NMFS 2006

Table 5-2. Relative impact (average Chinook salmon/mt whiting) and absolute impact (percent of all Chinook caught 1991-2005) by whiting sector.

	Relative Impact (rate)	**Absolute Impact (% all Chinook)**
Mothership	0.0506	31.73%
Catcher/Processor	0.0219	22.81%
Nontribal Shorebased	0.0246	24.25%
Tribal Mothership	0.1171	21.07%
Tribal Shorebased	0.0066	0.13%



* NOTE: 1991-1997 is based final inseason data files and may vary from estimates derived from NORPAC data. Shoreside data updated from Nottage and Parker 2005.
2002 shore-based landings does not include 432 mt of whiting or salmon taken in trip limit fishery
2003 shore-based landings does not include 195 mt of whiting or salmon taken in trip limit fishery
2004 shore-based landings does not include 1,644 mt of whiting or salmon taken in trip limit fishery - first year of video monitoring at-sea 2005 shore-based landings does not include 310 mt of whiting or salmon taken in trip limit fishery

Figure 5-1. Summary of Chinook salmon bycatch in the Pacific whiting fishery by sector in number of fish, 1991-2005. (Data from Table 4 in NMFS 2006)

The supplemental biological opinion summarizes previous work to identify causative factors that would account for variations in salmon bycatch. 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 tribal 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 (page 19 in 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 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. In reaffirming this conclusion, the supplemental biological opinion notes that, on average, bycatch has been well below this threshold, averaging about 7,300 Chinook over the last 15 years. Furthermore, the status of the Chinook ESUs most likely to be affected by the whiting fishery has generally improved since the 1999 section 7 consultation.[26]

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 may prove to be a valuable mitigation measure and the 2006 EFP for the shore-based whiting sector allows NMFS to invoke a similar closure if bycatch threatens to exceed the 11,000 fish threshold. At the same time, the Council has not recommended a blanket nearshore area closure throughout the whiting season because such a closure would force the whiting fishery into offshore waters where canary, widow and darkblotched rockfish bycatch may be high. The more flexible approach of applying this mitigation measure in response to conditions in the fishery allows industry and NMFS to tradeoff 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).

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 establish a new salmon conservation zone. The new zone was referred to as the Ocean Salmon Conservation Zone and was defined as all waters shoreward of a boundary line approximating the 100-fm (183-m) depth contour (70 FR 51682, August 31, 2005). Fishing for whiting during the remaining portion of the 2005 primary season was prohibited within the Ocean Salmon Conservation Zone. For 2006, NMFS will continue to monitor Chinook catch in the whiting fishery. If the 11,000 Chinook threshold is projected to be reached before the whiting allocation is projected to be reached, provisions within the terms and conditions of the EFPs that are issued to the shore-based participants would allow the Ocean Salmon Conservation Zone to be reinstated for the shore-based sector. If the Ocean Salmon Conservation Zone is reinstated for the shore-based sector, the at-sea sectors will be asked to voluntarily fish deeper than the 100 fm depth contour for the remainder of the 2006 primary whiting season. A substantial portion of the shore-based whiting fishery has occurred inside the 100 fm depth contour in recent years, while the at-sea sectors have voluntarily fished in deeper waters to avoid Chinook salmon. Having the Ocean Salmon Conservation Zone in effect throughout the whiting season was not recommended by the Council

26 The 1999 re-initiation was in response to the listing of 22 additional salmonid ESUs since the previous consultation.

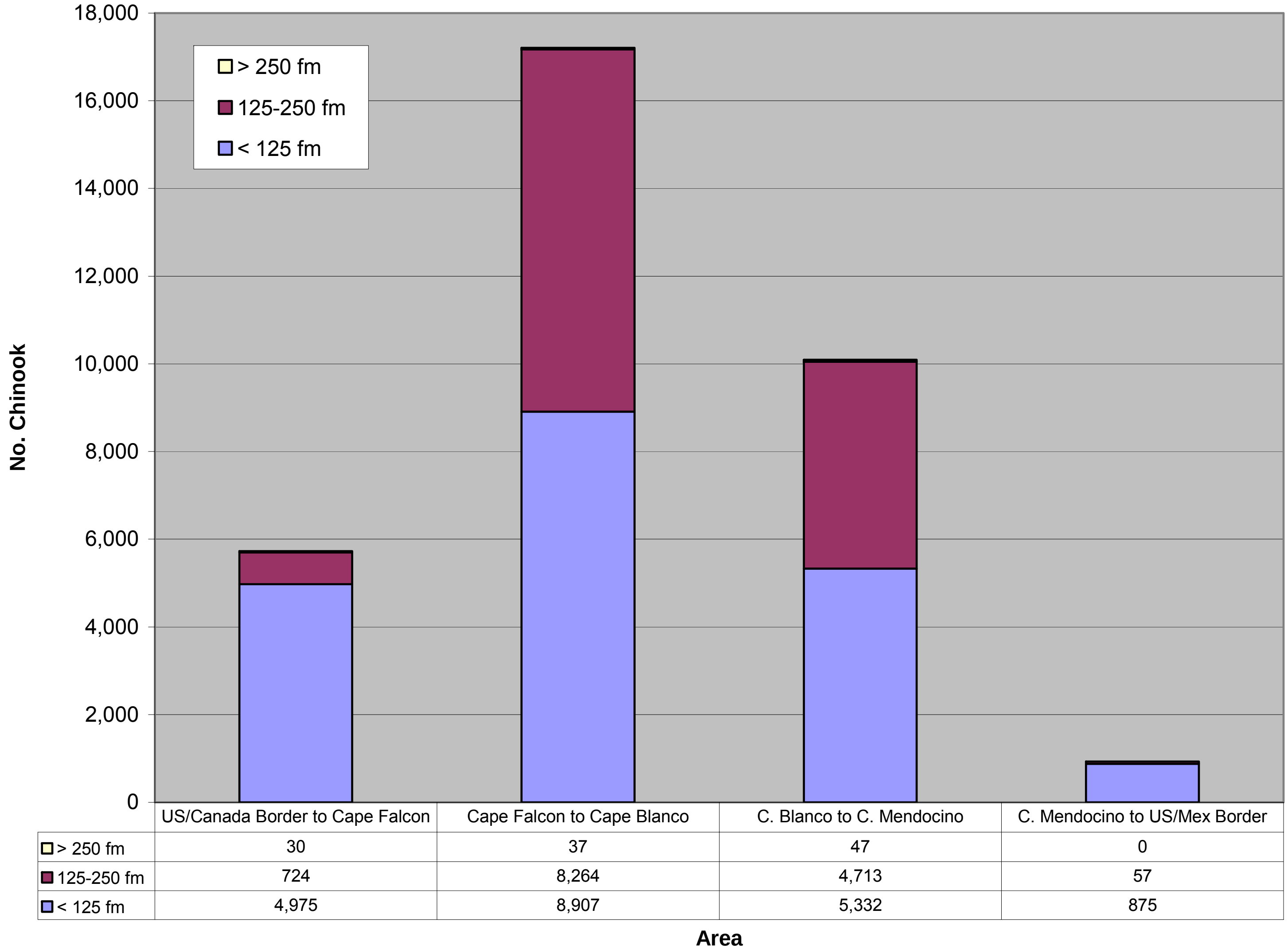
because such a closure could shift effort into offshore waters between 100 fm and 150 fm where historical data indicates there are higher catch rates for canary and darkblotched rockfish. Maintaining the ability to close the whiting fishery in the nearshore area inseason provides the fishery participants with flexibility to avoid overfished species, but maintains a mechanism for reducing the incidental take of Chinook salmon.

5.1.2 Limited Entry Bottom Trawl Fishery

As noted above, estimates of Chinook salmon bycatch for the (non-whiting) bottom trawl fishery have only recently become available. Data from the WCGOP were used to estimate that 18,120 salmon were caught in 2002, 13,862 fish in 2003, and 1,978 fish in 2004. Virtually all of the salmon caught were Chinook salmon (see Table 11 in NMFS 2006). Since these bycatch levels exceed the previous estimate of 6,000-9,000 Chinook specified in previous incidental take statements, NMFS also reinitiated its consultation on the Groundfish FMP and included an evaluation in the 2006 supplemental biological opinion. The previous estimates of salmon bycatch in the bottom trawl fishery were extrapolated from two coastwide research studies, one related to discards conducted from 1985 to 1987, and a second related to mesh size conducted from 1988 to 1990 (NMFS 1992). These were the only relevant data sources until NMFS began placing observers on bottom trawl vessels in August 2001.

The magnitude and distribution of bycatch in the trawl fishery from 2002 to 2004 was affected by significant changes in regulation and management of the fishery to protect overfished groundfish stocks. Between 1999 and 2002, NMFS declared eight groundfish species as overfished pursuant to the MSA (see Chapter 1). 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 has 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 overfished species. The evolution and testing of RCAs and other regulatory strategies is ongoing, but fishery management and regulation substantially changed in the 2000-04 time period. Because of changing regulations, shifts in fishing areas, reductions in trawl fishery effort from the December 2003 trawl vessel and permit buyback program, and gear innovations (including the new selective flatfish trawl gear) coastwide, it is difficult to pinpoint which of these various factors may be affecting Chinook bycatch negatively or positively.

The supplemental biological opinion evaluates Chinook salmon bycatch by latitudinal and depth strata based on estimates from WCGOP data. Figure 5-2 aggregates this information (Table 12 in the supplemental biological opinion) across the three years of available data. The highest bycatch occurs in depths shallower than 125 fm across all latitudinal strata with the highest overall 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 alone over the three years, 56 percent of estimated Chinook bycatch occurred in the Cape Falcon-Cape Blanco region; in 2003 two-thirds of estimated bycatch was from that region. The 2006 supplemental biological opinion notes that "more bycatch, in the bottom trawl fishery in particular, was shifted south into northern California than was previously thought" (page 30). As a result, Sacramento winter-run Chinook, California coastal Chinook, and Central Valley spring-run Chinook may be disproportionately affected. However, component ESUs for these stocks have increased or remained stable over the past 10 years.



	US/Canada Border to Cape Falcon	Cape Falcon to Cape Blanco	C. Blanco to C. Mendocino	C. Mendocino to US/Mex Border
> 250 fm	30	37	47	0
125-250 fm	724	8,264	4,713	57
< 125 fm	4,975	8,907	5,332	875

Figure 5-2. Aggregated estimate of Chinook bycatch 2002–04 in the groundfish bottom trawl sector. (Data from Table 12 in NMFS 2006.)

Take of Chinook salmon in the trawl fishery is a relatively rare event with a few tows accounting for a disproportionate share of the estimates of catch. Thus, in terms of salmon bycatch, the distribution of effects is highly skewed. As a result, comparing tows within a given spatio-temporal sampling stratum, approximately 45 percent of all observed Chinook bycatch occurs in the single largest tow for any given stratum. For example, in the 2002 Cape Falcon-Cape Blanco and less-than-125-fathom-depth stratum there were 341 observed tows. One or more salmon was observed in only 24 of these tows while a single tow accounted for 179 salmon, which was 56 percent of all the observed salmon used to derive the estimate of 2,207 Chinook for that stratum.

This skewed distribution in the occurrence of salmon also affects the reliability of estimates derived from subsamples. In the groundfish bottom trawl sector only a portion of tows are observed. Even in the whiting fishery, where there is 100 percent observer coverage, observers may subsample some hauls rather than counting all fish brought aboard.

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, in the 2006 supplemental biological opinion NMFS reaffirmed 9,000 Chinook as a benchmark for making a jeopardy determination. 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. However, in response to the larger than expected bycatch in two of three sample years NMFS will continue to monitor and collect data to analyze take levels.

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 2007 or 2008 or would the average bycatch for the 2005-08 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, that 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 2007 or 2008 or would the average bycatch in the 2005-08 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. The supplemental biological opinion discusses a number of management measures that should be adopted as part of this harvest specifications process to mitigate Chinook bycatch. These include:

- For the whiting fishery, implement automatic action authority that would allow NMFS to 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.

- For the whiting fishery, implement a hard bycatch limit that would couple a four-year running average of 11,000 with a year-specific cap of 14,000 or some similar construction. Under such a limit, the bycatch may be as high as 14,000 in any one year, but would also be constrained such that the average bycatch in the current year and previous three years may not exceed 11,000.

- For the whiting fishery, authorize inseason action to immediately close fishing for whiting shoreward of 100 fm if and when NMFS determines that Chinook bycatch is likely to exceed the 11,000 fish threshold.

Establishing the harvest specification and management measures 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 2007 whiting fishery will occur during the March–April 2007 time frame in the Council process. The Council anticipates recommending the 2007 whiting ABC/OY in early 2007 and it initially considered the first of the above three potential salmon protection measures for the whiting fisheries in 2007-08 during its June 2006 meeting. This measure is discussed in this EIS in order to provide the necessary NEPA analysis to implement the measure in time for the 2007 whiting fisheries. In keeping with the FMP at Section 6.2, the Council will re-consider the Ocean Salmon Conservation Zone at a second Council meeting before determining whether to recommend it for the 2007-08 whiting fisheries. 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 2005-06 period, these boundaries varied seasonally and geographically between either 100 or 75 fm, while the seaward boundary varied between 150 and 200 fm. This makes the RCA boundaries a good proxy for a zone where Chinook bycatch is likely to be higher versus a zone where bycatch is likely to be low.

- 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.

- Does the alternative expand the selective flatfish trawl requirement? The supplemental biological opinion notes that this gear type may reduce Chinook salmon bycatch rates, although there is not enough observer data to confirm such an effect. Selective flatfish trawl gear is currently required shoreward of the RCA north of 40°10' N latitude, which encompasses the areas with the highest salmon bycatch rates. This requirement may be expanded to the areas south of 40°10' N latitude in 2007-08. Although bycatch rates in this region are substantially lower, such a measure could have a modest effect on overall salmon bycatch.

- 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 the least 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 Discussion of Direct and Indirect Impacts

5.3.1 Harvest Limits (OY Alternatives)

Chapter 2 describes two sets of harvest limit alternatives, the rebuilding alternatives and the 2007-08 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 2007-08 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. Furthermore, the general distribution of depleted 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 2.1.1.2 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.

The status quo rebuilding alternatives comprise depleted species OYs based on estimated 2005 harvests projected forward to account for changes in exploitable biomass. The distribution of fishing effort is thus likely to be similar as occurred in 2005-06. Although the resulting incidental take of Chinook salmon cannot be predicted, in 2007-08 it is likely to be within the range of incidental take experienced in the recent past. Depending on what mitigation measures are adopted, the consultation standards discussed above could be exceeded in the whiting and bottom groundfish fishery sectors.

Rebuilding alternative 1 would result in an increase in slope and midwater trawl fishing opportunities. Subject to target species harvest limits, this alternative would 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.

Rebuilding alternative 2 would result in higher southern shelf fishing opportunities, and close to status quo fishing opportunity for northern bottom and midwater trawl sectors. This alternative could result in increased incidental take of Chinook salmon in comparison to status quo if fishing effort increases on the southern shelf.

Rebuilding alternative 3 would result in higher shelf fishing opportunities coastwide and also higher slope and midwater fishing opportunities. This alternative could result in increased incidental take of Chinook salmon in comparison to status quo and alternatives 1 and 2. Absent mitigation measures, there would be an increased risk of exceeding the consultation thresholds for both the whiting and groundfish bottom trawl fisheries.

Rebuilding alternative 4 would dramatically lower northern shelf fishing opportunities while also constraining southern shelf fisheries north of Point Conception. It would allow increased slope and midwater trawl opportunities. This alternative could result in lower incidental take of Chinook salmon in comparison to status quo and alternatives 1–4 because of the reduction in shelf fishing opportunity.

Rebuilding alternative 5 would dramatically lower shelf, slope, and midwater fishing opportunities coastwide. This alternative could result in the lowest incidental take of Chinook salmon in comparison to all of the other rebuilding alternatives.

The 2007-08 ABC/OY alternatives include the No Action alternative, which would establish the same OYs that were established for 2005-06, six action alternatives, and the Council-preferred alternative, which as of this writing has not been fully specified. The action alternatives (Alternatives 2–6. the Council-preferred alternative) provide ranges of OYs for each of the stocks or stock complexes. In Table 2–1, which shows the OYs for each species or species group under each of the alternatives 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 set of OYs that could be reasonably implemented across all species/species group categories. For depleted species several intermediate values are presented, which are related to possible long-term rebuilding targets. In addition, and again more as a heuristic device, the low end of the ranges for depleted species is zero, in order to demonstrate the overall effect of rebuilding in the shortest possible time period. At their April meeting the Council identified a low and high range of OYs for depleted species, presented as the “preferred” low and high OY alternatives along with identifying the Council-preferred OYs for non-depleted species. The “preferred” low-high range served as a basis for further analysis informing the Council’s choice of a final preferred alternative at their June meeting. 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), the “preferred” low-high range for depleted species, and 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 the 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 maximum likely 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 2005-06 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.

Any alternative that sets 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 2–5 shows the projected total catch of depleted groundfish species across groundfish sectors in 2006. Note that the non-tribal whiting fisheries are operating under a total catch limit (cap) for canary 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 Dover sole-thornyhead-sablefish (DTS) fishery to targeting flatfish. This could increase the risk of Chinook take. 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 low or no OY for these species, and thus less effect on Chinook incidental take. 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 while the whiting fishery would be largely unaffected. Changes in Chinook incidental take would therefore likely be minimal. 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 would be effectively eliminated.

With respect to the Council's "preferred" low-high OY range, the low end OYs are well below the projected 2006 catch of these species shown in Table 2–5. If all were adopted it would be necessary to severely constrain all groundfish fisheries or selectively close certain sectors. The high end OYs are close to or somewhat higher than 2006 OYs, but generally above projected 2006 catches. The Council-preferred OYs for depleted species tend to be at or, in the case of darkblotched rockfish and POP, above the high end OY values. (The exception is the Council-preferred OY for cowcod.) The Council-preferred OYs are generally very close to projected 2006 catches for shelf species (yelloweye, canary, and cowcod) and higher than 2006 projected catch for the slope and midwater species (darkblotched and widow rockfish, and POP). Overall, this suggests that constraints on slope fisheries will be somewhat less on shelf fisheries in comparison to 2006 and similar or somewhat greater on shelf fisheries. Given the indirect effect of OYs on salmon bycatch in groundfish whiting and bottom trawl fisheries, 2007-08 specifications are likely to have effects indistinguishable from 2005-06 in terms of the likelihood of taking listed Chinook salmon. Management measure alternatives 1–3 have been developed to fall within the "preferred" low-high OY range while the preferred management measure alternative is projected to stay within the Council-preferred OYs in terms of projected 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, and associated management measures, is not part of the proposed action, but a range of possible OYs, represented by the values under alternatives 1 and 2 are presented for analytical purposes. Subject to constraints imposed by depleted species OYs, particularly canary and widow rockfish, a higher Pacific whiting OY would allow greater fishing opportunity in this sector, contributing to the potential for Chinook salmon incidental take. Similarly, higher OY values for target species in the groundfish trawl fishery (principally the DTS fishery and nearshore flatfish fisheries) could result in higher incidental take, subject to the constraints of depleted species OYs. The Council-preferred alternative includes target species OYs similar to those in place for 2005-06 except limits for some flatfish species such as Dover sole and English sole, which are higher. This could allow increased bottom trawl effort on the shelf, with an increase risk of Chinook salmon take.

5.3.2 2007-08 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 2005-06, could act as constraint on overall fishing effort if they force early closure of the fishery. Second, depending on the mix of trip limits, 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 limited data available from the groundfish bottom trawl sector show a large difference between the 2002-03 estimates and the 2004 estimate that cannot be obviously correlated with characteristics of the fishery in those years. The 2007-08 management measure alternatives have been structured to meet the range of “preferred” low-high OY range identified by the Council at their April meeting. The Council-preferred management measure alternative is in many respects similar to the current suite of management measures. In the whiting fishery, “placeholder” bycatch limits for canary and widow rockfish at the same level as 2006 are identified. (As noted above, adoption of management measures for this fishery is a separate action and the placeholder values are used for evaluation purposes in this EIS.) In addition, a 25 mt bycatch limit for darkblotched rockfish is identified. It is not possible to 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 2007-08 period. Additional mitigation measures, discussed below, could be implemented to address the risk of higher Chinook take.

For 2007 and beyond, the Council is considering establishing automatic action authority under 50 CFR 660.370 (d) to implement an Ocean Salmon Conservation Zone, as discussed in Section 5.1.1 in relation to the 2005 and 2006 seasons, for the whiting fishery in response to high salmon take. 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.

As needed to stay within the available OY for overfished species, each of the management alternatives other than status quo could contain additional depth closures or provisions to create additional closures that are imposed on the whiting fishery mid-season, if an Ocean Salmon Conservation Zone becomes effective. Shifts in fishing effort between 100 and 150 fm may need to be restricted under some alternatives.

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 and changes in fishing effort as a result of the trawl buyback program. 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. Once 2005 observer data are available and have been analyzed for salmon bycatch levels, the Council's GMT plans to evaluate whether there are appropriate management measures for constraining Chinook bycatch in the bottom trawl fishery in 2007-08.

5.4 Discussion of Cumulative Impacts

"Cumulative impact" is 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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR 1508.7)

Based on this definition, 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. First are actions occurring in the past or the present (which is defined as the period through December 31, 2006) that will have effects persisting into the period when the proposed action is implemented (i.e., January 1, 2007) and possibly beyond. Second are reasonably foreseeable effects, which will be implemented on or after January 1, 2007 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:

- Groundfish harvest specifications and management measures, 1998-2006: Past management measures authorized fishing, indirectly affecting the incidental take of Chinook salmon, as described in Section 5.1. The 1998–2006 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. Given the life cycle of Chinook salmon, fishing mortality in more recent years would have a much greater contributory effect on population status.

- West Coast non-groundfish fisheries: Commercial and recreational salmon fisheries target non-listed 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.

- Nonfishing actions: 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 is 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.

Reasonably foreseeable future actions:

- Groundfish harvest specifications and management measures, 2009-10 and beyond: 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 2007-08 will have cumulative effects on year classes intercepted by the fisheries during that time. This cumulative effect will only persist as long as the affected year classes. For 2007-08 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 incidental take of Chinook salmon, 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.

- West Coast non-groundfish fisheries: Similar to groundfish fisheries, future take in non-groundfish fisheries (i.e., on or after January 1, 2007) contributes to year-class-specific total fishing mortality.

- Non-fishing actions: Adverse impacts to freshwater habitat 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 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 2007-08. This is because Chinook salmon are relatively short-lived species so the year classes intercepted in 2007-08 would only experience fishing mortality from groundfish fisheries in the bienniums immediately preceding and following 2007-08. 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. However, it is not possible to predict what effect this 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 in comparison to the description of direct/indirect effects described in Section 5.3.1.

5.5.2 2007–08 Management Measure Alternatives

As with the OY alternatives, there is no information to indicate how other actions contributing to cumulative effects might combine with indirect/effects to produce relative differences in effects among the alternatives.

6.0 DESCRIPTION OF THE FISHERIES MANAGEMENT REGIME

6.1 Management Systems

This chapter addresses policy, science, and management entities directly affected by changes to the current management regime, but does not include participants in the fishery or the fishing communities of the West Coast (see Chapter 7 for a description of the socioeconomic environment). The management regime is an important issue because it generates direct and indirect impacts. The regime is also itself affected by changes in law and policy, which can cumulatively affect the environment. This section is not intended to be a comprehensive description of the entire West Coast groundfish management regime. Rather the chapter provides a general overview of the management regime and focuses on management regime components such as stock assessments, catch accounting, observer programs, enforcement, and research fisheries. These components are all crucial to the process of determining sustainable fishery yields and many have been substantially modified by NMFS and the Council in recent years. Additionally the chapter briefly discusses enforcement issues affecting the efficacy of prescribed management measures with an emphasis on vessel monitoring systems. Impacts, considered in terms of public sector costs, are evaluated in Chapter 7.

In November 2002, the Council approved Amendment 17 to the groundfish FMP which implemented a biennial management cycle. The complexity of the previous annual cycle left little time for fishery managers to work on other initiatives to improve the management regime. 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. More information on the management cycle and Council decision-making may be found in Appendix A, Section 1.1.2 of the 2005–06 groundfish harvest specifications FEIS (PFMC 2004b). More information Council priorities for preventing overfishing and achieving OY, for specification and apportionment of harvest levels, and for setting both short-term management measures and long-term management programs may be found in Chapters 4–6 of the FMP (PFMC 2006a).

Uncertainty in fishery management and constraining OYs combine to create a potentially intensive inseason management burden on the management regime. This section focuses on data systems and mechanisms for inseason management. Ongoing research, existing observer programs, and revised fishery sampling programs could provide improved information during the 2006–07 management cycle. Entities and documents including the Pacific Coast Groundfish FMP, the Council, and NEPA all provide rules and guidance on inseason use of new information.

6.1.1 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). A description of the relevant data systems used to monitor total catch and discards in commercial, recreational, and research fisheries follows. A description of how these data sources are used in modeling fishery impacts is in Section 4.5.

6.1.1.1 Monitoring Commercial Landings

Sorting requirements are now in place for all species with trip limits, HGs, or OYs, including all depleted species. This provides accounting for the weight of landed depleted species when catches are hailed at sea or landed. Limited entry groundfish trawl fishermen are also required to maintain state logbooks to record the start and haul locations, time, and duration of trawl tows, as well as the total catch by species market category (i.e., those species and complexes with sorting requirements). Landings are recorded on state fish receiving tickets. Fish tickets are designed by the individual states, PSMFC coordinates record-keeping requirements between state and Federal managers. Poundage by sorted species category, area of catch, vessel identification number, and other data elements are required on fish tickets. Landings are also sampled in port by state personnel to collect species composition data, otoliths for ageing, lengths, and other biological data. Federal observer sample rates vary between fishery and state, but the WCGOP attempts to sample about 20% of the landed catch. A suspension of at-sea sorting requirements coupled with full retention of catch is allowed in the whiting fishery (by FMP Amendment 10 and an annual EFP in the Shoreside Whiting sector). The at-sea whiting fishery has 100% on-board observer coverage, while the shoreside whiting sector brings most of their catch to port for sampling. Landings, logbook data, and state port sampling data are reported inseason to the PacFIN database managed by PSMFC (www.psmfc.org/pacfin/index.html). The GMT and PSMFC manage the Quota Species Monitoring (QSM) dataset reported in PacFIN. All landings of groundfish stocks of concern (depleted stocks and stocks below B_{MSY}) and target stocks and stock complexes in West Coast fisheries are tracked in QSM reports of landed catch. The GMT recommends prescribed landing limits and other inseason management measures to the Council to attain, but not exceed, total catch OYs of QSM species. Stock and complex landing limits are modified inseason to control total fishing-related mortality; QSM reports and landed catch forecasts are used to control the landed catch component.

6.1.1.2 Monitoring Recreational Catch

Recreational catch is monitored by the states as it is landed in port. These data are compiled by the PSMFC in the RecFIN database. The types of data compiled in RecFIN include sampled biological data, estimates of landed catch plus discards, and economic data. Descriptions of the RecFIN program, state recreational fishery sampling programs in Oregon and Washington, and the most recent data available to managers, assessment scientists, and the general public, can be found on the PSMFC web site at www.psmfc.org/recfin.

The MRFSS has been an integral part of the RecFIN program. Traditionally, there have been two primary components of the survey; field intercept surveys (administered under supervision of PSMFC) and a random phone survey of coastal populations (administered by a third party contracted by NMFS). The field intercept surveys have been used to estimate catch, and the phone survey has been used to estimate effort. The results of these two efforts are combined in the RecFIN data system maintained by PSMFC, and estimates of total effort and fishing mortality are produced along with other data potentially useful for management and stock assessments. However, MRFSS was not designed to estimate catch and effort at the level of precision needed for management or assessment; it was designed to provide a broad picture look of national fisheries. Comparison with independent and more precise estimation procedures has shown wide variance in catch estimates. Inseason management of recreational fisheries using MRFSS has been compromised by inseason variance of catch estimates.

In recent years, efforts have been made to improve MRFSS for use in inseason management. Observing a growing concern with the use of MRFSS program data on the West Coast, California and policy representatives from the West Coast recommended the development of a new program to replace MRFSS. In response, staff from the CDFG and the PSMFC designed the CRFS, a new program for sampling California's recreational fisheries which incorporated both the comprehensive coverage of the MRFSS program and the high frequency on-site sampling of CDFG's Ocean Salmon Project. Additionally, in 2001 PSMFC, with support from NMFS, began a new survey to estimate CPFV fishing effort in California.

Washington and Oregon use the MRFSS system as a supplement to the extensive port sampling programs they use to derive most of their recreational catch estimates are derived. The Washington Ocean Sampling Program and the Oregon Boat Survey both operate annually from approximately April through October and focus on recreational finfish (including salmon, groundfish, halibut, and tuna) from private and charter fishing vessels.

A primary goal of West Coast recreational survey programs is to produce timely marine recreational, fishery-based data needed for sustainable management of marine recreational fishery resources. Continuing improvements to West Coast recreational fishery surveys should reduce uncertainty in recreational harvest estimates and improve preseason and inseason management processes, two important components of coastwide groundfish fishery management under constraining OYs.

6.1.1.3 Management Response to Catch Monitoring

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 as follows:

> <u>Acceptable Biological Catch</u> *is a biologically based estimate of the amount of fish that may be harvested from the fishery each year without jeopardizing the resource. It is a seasonally determined catch that may differ from MSY for biological reasons. It may be lower or higher than MSY in some years for species with fluctuating recruitment. The ABC may be modified to incorporate biological safety factors and risk assessment due to uncertainty. Lacking other biological justification, the ABC is defined as the MSY exploitation rate multiplied by the exploitable biomass for the relevant time period.*
>
> <u>Optimum yield</u> *means the amount of fish which will provide the greatest overall benefit to the U.S., particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems, is prescribed as such on the basis of the maximum sustainable yield from the fishery as reduced by any relevant*

> *economic, social, or ecological factor; and in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery (Federal regulations adds final sentence: OY may be expressed numerically (as a HG, quota, or other specification) or non-numerically).*
>
> *Quota means a specified numerical harvest objective, the attainment (or expected attainment) of which causes closure of the fishery for that species or species group. Groundfish species or species groups under this FMP for which quotas have been achieved shall be treated in the same manner as prohibited species (the second sentence is not included in Federal Regulations).*
>
> *Harvest guideline is a specified numerical harvest objective which is not a quota. Attainment of a harvest guideline does not require closure of a fishery. (Identical language in Federal Regulations 50 CFR Part 660, Subpart G).*

California

California has three possible courses of regulatory action for recreational fisheries when a harvest limit is reached.

1. Closure of recreational fisheries for any Federal groundfish, greenlings (of the genus *Hexagrammos*), California sheephead, and ocean whitefish when a Federal annual harvest limit for lingcod, rockfish, cabezon, or a subgroup of rockfish, and/or California scorpionfish has been exceeded or is projected to be exceeded (Section 27.82 of Title 14, California Code of Regulations).

   The CFGC has given CDFG the authority to close the following recreational fisheries when an annual harvest limit (OY or HG) established in regulation by NMFS for lingcod, rockfish, cabezon, or a subgroup of rockfish, and/or California scorpionfish has been exceeded or is projected to be exceeded: lingcod, rockfish, a subgroup of rockfish, California scorpionfish, cabezon, greenlings (of the genus *Hexagrammos*), California sheephead, ocean whitefish, and any Federal groundfish. Closures may encompass all state waters or specific areas, and may be for all or part of the calendar year. The CDFG must provide the public with a notice of the closure (via press release) at least 10 days before the closure is to take effect.

2. Closure of recreational fisheries for California sheephead, cabezon, or greenlings (of the genus *Hexagrammos*) when a state-established TAC or allocation is reached or is projected to be reached (Section 52.10 of Title 14, California Code of Regulations).

   Statewide TACs are established in regulation for California sheephead, cabezon, or greenlings (of the genus *Hexagrammos*). The regulation sets allocations for recreational and commercial fisheries. CFGC has given the CDFG the authority to close the recreational and commercial fisheries for these species when an allocation or TAC is reached or is projected to be reached prior to the end of the calendar year. For the closure of a recreational fishery, CDFG is required to provide the public with at least 10 days notice (via press release) prior to the closure.

3. Emergency action by CFGC (Section 240 of the Fish and Game Code).

The California State Legislature has authorized CFGC to adopt or repeal regulations on an emergency basis, provided the action is necessary for (1) the immediate conservation, preservation, or protection of birds, mammals, reptiles, or fish, including, but not limited to, any nests or eggs thereof, or (2) the immediate preservation of the public peace, health and safety, or general welfare. CFGC may adopt emergency regulations for recreational fisheries and for those commercial fisheries the Legislature has given CFGC the authority to regulate.

The law requires CFGC hold at least one hearing before taking emergency action, and the action is subject to the review of the Office of Administrative Law (OAL). Once CFGC takes action and submits the rulemaking file to OAL, OAL has 10 days to review the file and approve or disapprove the regulation. If OAL approves the regulation, then it is filed with the Secretary of State and is in effect for 120 days (unless the regulation specifies a shorter time period).

Emergency regulation lapses by operation of law unless CFGC files a completed rulemaking for a permanent regulation with OAL or OAL approves a re-adoption of the emergency regulation. The rulemaking for the permanent regulation must follow the normal rulemaking provisions of the Administrative Procedures Act. This includes a 45-day public notice.

Oregon

The Oregon State Legislature granted the Oregon Fish and Wildlife Commission (OFWC) the authority to adopt regulations under the Oregon Administrative Rules (OAR). The OFWC delegates the authority to adopt temporary rules to the Director of ODFW (Director). Temporary rules may be considered for various reasons, including the achievement of quotas, OYs, harvest limits or HGs, and to conform to Federal regulations. Temporary regulations can be adopted, filed and in effect within a single business day, but in practice, 72 hours public notice is usually provided. A temporary rule approved by the Director is ratified by the OFWC at its next meeting, usually within 30 days.

Once filed, copies of the temporary rule are distributed to all marine related ODFW and Oregon State Police offices. The ODFW information and education program creates and distributes a general public news release. Additionally, specific industry notices are developed and distributed throughout local fishing communities.

Once adopted, temporary regulations are in effect for 180 days. If the regulations need to remain in place for a longer duration, ODFW can adopt a permanent rule through the full OFWC process. This two-meeting process includes public notice of the intent for rulemaking, an economic analysis, and adequate public review.

Washington

The Washington State Legislature has granted the Washington Fish and Wildlife Commission (WFWC) the authority to adopt emergency regulations under the Revised Code of Washington (RCW) 77.04.090. WFWC has delegated the authority to adopt emergency regulations to the Director of WDFW. Emergency regulations may be considered for various reasons, including the achievement of quotas, OYs, harvest limits or HGs, and to conform with Federal regulations. The parameters for approving emergency regulations are not specified in the authority language. Emergency regulations can be adopted, filed, and in effect within 24 hours of being drafted.

Once adopted, emergency regulations are in effect for 120 days. During this time, if the regulation needs to remain in place for a longer duration, WDFW may consider adopting a permanent rule. Depending on the nature of the rule, it may have to go through the WFWC approval process. Once the permanent rule process has been initiated, a second emergency regulation may be filed to extend the time period. For example, an emergency regulation filed on March 1 that must remain in effect for the calendar year would expire on June 28. Provided a permanent rule process has been initiated, a subsequent emergency regulation can be filed on June 29, that would remain in effect through October 26, in order to accommodate the time needed for the permanent rule process to be finalized.

Washington Administrative Code (WAC) 220-28-010 strengthens state's the ability to enforce emergency regulations, by stating, "It shall be unlawful to take, fish for or possess food fish or shellfish taken contrary to the provisions of any special season or emergency closed period prescribed in this chapter." A note at the end of the rule language also clarifies, "The department of fish and wildlife frequently adopts emergency rules of limited duration that relate to seasons, closures, gear, and other special matters concerning the industry...."

Once filed, copies of the emergency regulation are faxed to all WDFW regional offices and enforcement staff. WDFW also uses its Outreach and Education Program to inform the public of emergency regulations. Typically, a Fishing Rule Change Notice is distributed to local media and WDFWs sportfishing hotlines are updated within 24 hours of the rule adoption.

6.1.2 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. This section describes West Coast programs designed to achieve these goals.

At its November 2005 meeting, the Council approved Amendment 18 to the Groundfish FMP. The Council recommendation addresses National Standard 9 and Section 303(a)(11) of the MSA, which require practicable means to minimize bycatch and bycatch mortality a standardized bycatch reporting methodology. The purpose of FMP Amendment 18 is to clearly and comprehensively describe measures that address these requirements, which have been established through long-term regulations and the biennial management process. The amendment also describes new measures that could be implemented by future regulatory or amendment actions. For additional information on Amendment 18 see the Council web page (www.pcouncil.org/groundfish/gffmp/gfa18.html).

6.1.2.1 West Coast Groundfish Observer Program

The WCGOP includes the Observer Team and collaborators from the PSMFC that direct the program, train new observers, and manage and analyze the bycatch data. On May 24, 2001, NMFS established the WCGOP to implement the *Pacific Coast Groundfish Fishery Management Plan* (50 CFR Part 660). This regulation requires all vessels that participate in commercial groundfish fisheries to carry an observer when notified to do so by NMFS or its designated agent. These observers monitor and record catch data, including species composition of retained and discarded catch. Observers also collect critical biological data such as fish length, sex, and weight. The program currently deploys observers coastwide on the permitted trawl and fixed-gear groundfish fleet, as well as on some vessels that are part of the open-access groundfish fleet.

The WCGOP is designed to provide estimates of fleet-wide discards in commercial fisheries; fish tickets are the mandated landings accounting mechanism. Logbook data need to be available to fully use observer data because observers initially record hail weights and logbook data for retained catch, and these values need to be adjusted by fish ticket information to achieve total catch estimates. One difficulty is the need for a statistically significant number of observations of discard across all strata to determine representative bycatch rates for these strata.

NMFS first implemented the WCGOP in August 2001 to make direct observations of commercial groundfish discards. Given the skewed distribution of bycatch in West Coast groundfish fisheries, many observations in each sampling strata (i.e., target effort by gear type by area) are needed to estimate representative bycatch rates of depleted groundfish species. The seasonality of bycatch is an important management consideration. Target opportunities for healthy flatfish and DTS species vary seasonally and geographically. It is reasonable to expect bycatch rates of depleted groundfish species to vary in accordance with the co-occurrence of target species and depleted species.

The WCGOP has annually released annual reports since 2003 which describe the analysis of observer data for various fishery sectors and species collected under the program. These reports and background materials on the WCGOP are available on the Northwest Fisheries Science Center website at: www.nwfsc.noaa.gov/research/divisions/fram/observer/datareport/index.cfm.

NMFS continually reviews the program and has gradually expanded the programs coverage since its inception. Additionally, the NWFSC has worked closely with the Council and NMFS NWR to coordinate the availability of WCGOP results into the management regime. New WCGOP results are now incorporated into the fishery models and management regime in the fall, prior to the November through June management cycle. A description of how data from the WCGOP is being used in the modeling of commercial fishery impacts can be found in Section 4.5.

6.1.2.2 At-Sea Pacific Whiting Observer Program

To increase the utilization of bycatch otherwise discarded as a result of trip limits, Amendment 13 to the Groundfish FMP implemented an increased utilization program on June 1, 2001, which allows catcher/processors and motherships in the whiting fishery to exceed groundfish trip limits without penalty, providing specific conditions are met. These conditions include provisions for 100% observer coverage, non-retention of prohibited species, and either donation of retained catch in excess of cumulative trip limits to a bona fide hunger relief agency or processing of retained catch into mince, meal, or oil products.

Vessels participating in the at-sea Pacific whiting fisheries have been carrying observers voluntarily since 1991. NMFS made observer coverage mandatory for at-sea processors in July 2004 (65 FR 31751). These provisions have not only given fishery managers the tools necessary to allow the At-Sea Pacific Whiting Program to operate efficiently while meeting management goals, but have also provided scientists, through the observer coverage, an extensive amount of information on bycatch species. This dataset has both provided valuable information in the management of Pacific whiting, but has been used as a stock assessment data source.

6.1.2.3 Shore-based Pacific Whiting Observation Program

The Shoreside Hake Observation Program (SHOP) was established in 1992 to provide information for evaluating bycatch in the directed Pacific whiting fishery and for evaluating conservation measures adopted to limit the catch of salmon, other groundfish, and prohibited species. Though instituted as an experimental monitoring program, it has been continued annually to account for all catch in targeted whiting trip landings, enumerate potential discards, and accommodate the landing and disposal of non-sorted catch from these trips. Initially, the SHOP included at-sea samplers aboard shore-based whiting vessels. However, when an ODFW analysis of bycatch determined no apparent difference between vessels with and without samplers, sampler coverage was reduced to shoreside processing plants. In 1995, the SHOP's emphasis changed from a high observation rate (50% of landings), to a lower rate (10% of landings), and increased emphasis on collection of biological information (e.g., otoliths, length, weight, sex, and maturity) from Pacific whiting and selected bycatch species (yellowtail rockfish, widow rockfish, sablefish, chub (Pacific) mackerel (*Scomber japonicus*), and jack mackerel (*Trachurus symmetricus*). The required observation rate was decreased as studies indicated that fish tickets were a good representation of what was actually landed. Focus shifted again due to 1997 changes in the allocation of yellowtail rockfish and increases in yellowtail bycatch rates. Since then, yellowtail and widow bycatch in the shoreside whiting fishery has been dramatically reduced because of increased awareness by fishermen of the bycatch and allocation issues involved in the SHOP program.

The SHOP is a cooperative effort between the fishing industry and state and Federal management agencies to sample and collect information on directed Pacific whiting landings at shoreside processing plants. Participating vessels apply for and carry an EFP issued by NMFS. Permit terms require vessels to retain all catch and land unsorted catch at designated shoreside processing plants. Permitted vessels are not penalized for landing prohibited species (e.g., Pacific salmon, Pacific halibut, Dungeness crab), nor are they held liable for overages of groundfish trip limits. For additional information and complete reports go to: www.dfw.state.or.us/MRP/hake/.

Since inception, an EFP has been adopted annually to allow suspension of at-sea sorting requirements in the shore-based whiting fishery enabling full retention and subsequent port sampling of the entire catch. However, EFPs are intended to provide for limited testing of a fishing strategy, gear type, or monitoring program that may eventually be implemented on a larger fleet-wide scale and are not a permanent solution to the monitoring needs of the shore-based Pacific whiting fishery.

The Council and NMFS are currently working to adopt a monitoring program to provide a full retention opportunity without the use of the EFP process and the Council adopted a preliminary range of alternatives for public review in June 2004. However, a number of issues on how a monitoring program would operate to meet analytical requirements under the MSA and ESA remain to be resolved and NMFS is working with the states and industry to prepare a revised range of alternatives for Council consideration. Council action is now scheduled for September and November 2006. If the Council takes final action according to this schedule NMFS will then develop the regulations needed to implement the program in 2007 and beyond.

6.1.2.4 Central California Marine Sport Fish Project

The CDFG has been collecting angler catch data from the CPFV industry intermittently for several decades in order to assess the status of the nearshore California recreational fishery. The project has focused primarily on rockfish and lingcod angling and has not sampled salmon trips. Reports and analyses from these projects document trends by port area in species composition, angler effort, catch, and, for selected species, CPUE, mean length, and length frequency. In addition, total catch and effort estimates are made based on adjustments of logbook data by sampling information.

Before 1987, catch information was primarily obtained on a general port basis from dockside sampling of CPFVs, also called party boats. This did not allow documentation of specific areas of importance to recreational anglers and was not sufficient to assess the status of rockfish populations at specific locations.

CPFV operators are required by law to record total catch and location for all fishing trips in logbooks provided by the CDFG. However, the required information is too general for use in assessing the status of the multi species rockfish complex on a reef by reef basis. Rockfish catch data are not reported by species and information on location is only requested by block number (a block is an area of 100 square miles). Many rockfishes tend to be residential, underscoring the need for site specific data. Thus, there is a strong need to collect catch information on board CPFVs at sea. However, locations of specific fishing sites are often not revealed for reasons of confidentiality.

In May 1987, the Central California Marine Sport Fish Project began on board sampling of the CPFV fleet. Data collection continued until June 1990, when state budgetary constraints temporarily precluded further sampling, resumed in August 1991, and continued through 1994. The program depends on the voluntary cooperation of CPFV owners and operators. Angler catches on board central and northern California CPFVs were sampled from fourteen ports, ranging from Crescent City in the north to Port San Luis (Avila Beach) in the south. For additional information on this program, see the PSMFC website at: (www.psmfc.org/recfin/ccmsp.htm).

6.1.2.5 Oregon Marine Recreational Observation Program

In response to depleted species declarations and increasing concerns about fishery interactions with these species, ODFW started this program to improve understanding of recreational impacts. There were three objectives to this program: (1) document the magnitude of canary rockfish discard in the Oregon recreational fishery; (2) improve the biological database for several rockfish and groundfish species; and (3) gather reef location information for future habitat mapping. A seasonal sampler was stationed in each of the ports of Garibaldi, Newport, and Charleston to ride recreational groundfish charter vessels coastwide in Oregon from July through September, 2001. The Garibaldi sampler covered boats out of Garibaldi, the Newport sampler covered both Newport and Depoe Bay, and the Charleston sampler covered Charleston, Bandon, and Brookings charter vessels. During a typical day the sampler would ride a five to eight hour recreational groundfish charter trip and spend the remainder of the day gathering biological and genetic data dockside from several rockfish and groundfish species for which little is known mostly due to their infrequency in the catch. When allowed by the captain, the sampler also obtained Global Positioning System (GPS) locations of fishing sites for future use by the Habitat Mapping Project of the ODFW Marine Resources Program. Results from this program have been incorporated into recreational fishery modeling by ODFW. This program has continued and expanded to document the magnitude of discard of all groundfish species, not just canary rockfish. For more information on this program as well as other fishery research and survey programs see the ODFW Marine Program website at: www.dfw.state.or.us/MRP/.

6.1.2.6 WDFW Groundfish At-Sea Data Collection Program

The WDFW At-Sea Data Collection Program was initiated in 2001 to allow fishery participants access to healthier groundfish stocks while meeting the rebuilding targets of depleted stocks and to collect bycatch data through an at-sea sampler program. The data collected in these programs could assist with future fishery management by producing valuable and accurate data on the amount, location, and species composition of the bycatch of rockfish associated with these fisheries, rather than using calculated bycatch assumptions. These data could also allow the Council to establish trip limits in the future that maximize fishing opportunities on healthy stocks while meeting conservation goals for depleted stocks.

In recent years, WDFW has implemented its At-Sea Data Collection Program through the use of Federal EFPs. In 2001, 2002, 2003, and 2004, WDFW sponsored and administered a trawl EFP for arrowtooth flounder and petrale sole, and in 2002, WDFW also sponsored a midwater trawl EFP for yellowtail rockfish. The primary objective for these experimental fisheries was to measure bycatch rates for depleted rockfish species associated with these trawl fisheries. Fishery participants were provided access to healthier groundfish stocks and were constrained by individual vessel bycatch caps. State-sponsored samplers were used to collect data on the amount of rockfish bycatch caught on a per tow basis and to ensure the vessel complied with the bycatch cap; therefore, vessels participating in the EFP were required to have 100% sampler coverage. In 2003 and 2004, WDFW sponsored a longline EFP for spiny dogfish that also required 100% sampler coverage to measure the bycatch rate of depleted rockfish species associated with directed dogfish fishing.

6.1.2.7. WDFW Ocean Sampling Program

In addition to the At-Sea Data Collection Program, WDFW collects at-sea data through the Ocean Sampling Program. The at-sea portion is not intended to be an observer program for the purposes of enumerating the bycatch alone, but is coupled with shore-based sampling of anglers to calculate an estimated discard weight. At-sea samplers record biological information from discarded species. Shore-based creel surveys of anglers provide the estimate of total number of discards. Combining these two data sources yields estimates of the weight of total fishery discard by species.

6.1.2.8 Tribal Observer Program

Tribal directed groundfish fisheries are subject to full rockfish retention. For some rockfish species where the tribes do not have formal allocations, trip limits proposed by the tribes are adopted by the Council to accommodate incidental catch in directed fisheries (i.e., Pacific halibut, sablefish, and yellowtail rockfish). These trip limits are intended to constrain direct catches while allowing for small incidental catches. Incidental catch and discard of depleted species is minimized through the use of full rockfish retention, shore based sampling, observer coverage, and shared information throughout the fleets regarding areas of known interactions with species of concern. Makah trawl vessels often participate in paired tows in close proximity where one vessel has observer coverage. If landings on the observed vessel indicate higher than anticipated catches of depleted species, the vessels relocate and inform the rest of the fleet of the results (Steve Joner, Makah Fisheries Management, pers. comm., February, 2004). Fleet communication in order to avoid depleted species is practiced by all tribal fleets.

6.1.3 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).

6.1.4 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 2004b).

6.1.5 The Stock Assessment Process

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.

NMFS is currently planning the next round of stock assessments for completion and review in 2007 for use in developing management measures and harvest specifications for the 2009–10 biennial management cycle. Rebuilding plans and stock assessments for depleted species are subject to review every two years. NMFS will also hold a series of workshops in 2006 focusing on data needs and available data sources for the list of stock assessments being considered for 2007. More information on the stock assessment process can be found in Appendix A, Section 1.1.1.1 of the 2005–06 groundfish harvest specifications FEIS (PFMC 2004b).

In 2004 and 2005 the Council reviewed its policy in regard to inseason management response to stock assessment results that become available during a biennial management cycle. The Council considered mechanisms for both liberalizing and constraining fisheries during a management cycle (mid-term) and took no action regarding adoption of a policy for mid-term adjustments in OY as a result of new stock assessment information. The Council remains in favor of existing language in Section 5.5.1 of the groundfish FMP which provides for adjustments only in the downward direction and only for depleted species.

6.1.6 Rebuilding Analyses

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). This guidance has been incorporated into a computer program for conducting rebuilding analyses developed by Dr. Andre Punt and the Marine Population Assessment & Management Group (MPAM) at the School of Aquatic & Fishery Sciences, University of Washington. Copies of the computer software and documentation can be found at the MPAM web page at: fish.washington.edu/research/MPAM/Rebuild.htm.

In a rebuilding analysis the probability the depleted stock will reach the target biomass defining a rebuilt stock (B_{MSY} or $B_{40\%}$) is determined in the absence of fishing (T_{MIN}) and the maximum permissible rebuilding time under National Standard Guidelines (T_{MAX}). The target rebuilding year (T_{TARGET}) is determined based on these limits and the probability of achieving the target biomass by T_{MAX} (denoted P_{MAX}). Probability statements are an estimate that something may happen (in this case, that stocks will reach a given size in a specified time period) and thus also the level of risk associated with a given action. Additional information on rebuilding analysis and interpretation of results can be found in Section 3.2.2.2 of Amendment 16-1 to the Pacific Coast Groundfish FMP (PFMC 2003a).

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 District Court on a challenge to the Council's darkblotched rockfish rebuilding plan. In accordance with that ruling, the Council decided to reconsider all adopted rebuilding plans to ensure they comply with the MSA as interpreted by the courts. In addition to the court ruling, Federal legislation has been introduced to reauthorize the MSA and NMFS is currently considering revisions to the National Standard Guidelines regarding the prevention of overfishing while achieving sustainable yield. Therefore, in the near future, the SSC is likely to review and revise the Terms of Reference for Rebuilding Analyses accordingly.

6.2 Enforcement

Enforcement of fishery regulations has become increasingly complex with the addition of large closed areas, smaller cumulative trip limits and bag limits, and depth-based closures for commercial and recreational fisheries. At the same time, decreased OYs and the need to rebuild depleted stocks has placed additional importance on controlling and monitoring fishery-related mortality. Enforcement agencies continue to use traditional methods to ensure compliance with groundfish fishery regulations including dockside sampling, at-sea patrols, and air surveillance. VMS dramatically enhances, rather than replaces, traditional enforcement techniques. Recent declines in enforcement agency budgets, combined with increased regulatory complexity, have stressed the ability to adequately monitor fisheries for regulatory compliance. In response, NMFS implemented a 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, and is currently required on all vessels participating in the groundfish fishery with a limited entry permit. In November 2005, the Council recommended expansion of VMS requirements 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. Additionally, to enhance enforcement of closed areas for the protection of groundfish essential fish habitat, the Council recommends requiring VMS on all non-groundfish trawl vessels including those targeting pink shrimp, California halibut, sea cucumber, and ridgeback prawn.

Implementation of expanded VMS requirements is recommended to coincide with implementation of regulations for the protection of groundfish habitat but, no sooner than January 1, 2007.

Detailed descriptions of VMS and the analyses of VMS monitoring alternatives are contained in an EA prepared by NMFS and presented to the Council in support of decisions to first implement and later expand the VMS monitoring program (NMFS 2003). Additional information on VMS, including links to the supporting NEPA documentation, can be found on the Council web site at: www.pcouncil.org/groundfish/gfvms.html#info.

6.3 Education and Outreach

California, Oregon, and Washington have actively engaged in education and outreach programs to help recreational fisherman learn ways to minimize bycatch and fishery impacts on depleted species. Efforts include publication of fish identification guides and posters and identification of areas to be avoided due to relatively high abundance of depleted species. Additionally, research programs have been implemented to develop release techniques which reduce mortality and, once developed, educate fisherman in the application of these techniques. Education can be an effective way to reduce bycatch thereby reducing the need for intensive inseason management and frequent fishery closures due to the constraints of depleted species.

6.4 Managing with Risk and Uncertainty

Uncertainty in fishery management exists for many reasons including imperfect sources of data from the past, inaccurate or inadequate monitoring of current fisheries, and unknown future environmental conditions. All of these factors contribute to the risks associated with the assessment of stock status, the estimation of impacts to fish stocks due to fishery management measures, and the projections of future stock health under varying long-term management alternatives. Appendix A of the 2005–06 groundfish harvest specification FEIS includes discussions of risk in fishery management (PFMC 2004b); a detailed discussion of short-term costs versus long-term risk may be found in Section 1.2.1. For more information on the assessment of risk in long-term stock population projections see Section 1.1.1.2.

7.0 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, coastal pelagic species, shrimp, and crab. All of these fisheries contribute to a wide range of commercial, recreational, and tribal activities that have economic, social, and cultural significance to those engaged in harvesting fish resources. 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 Groundfish EFH document (NMFS 2005),

The Bycatch EIS (NMFS 2004b)

The final EIS for the 2005-06 specifications document (PFMC 2004a)

The analyses and concepts developed for assessing the needs of fishing communities that were presented at the April 2006 Council meeting (2006)

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.

<u>Current FMP</u>

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-tribal 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 tribal commercial, ceremonial and subsistence fisheries for groundfish off the Washington coast according to their treaty rights. Participants in the tribal commercial fishery use similar gear to non-tribal commercial fishers who operate off Washington, and groundfish caught in the tribal commercial fishery is typically sold through the same markets as non-tribal commercial groundfish catch. There are set tribal allocations for sablefish and Pacific whiting, while the other groundfish species' allocations are determined through the Council process in coordination with the tribes, states, and NMFS. Management of tribal fisheries is conducted by the individual tribes in accordance with their tribal regulations.

In addition to commercial and tribal 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

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. The numerous user groups are listed in tables such as Table 2-5, which are otherwise frequently referred to as "Bycatch Scorecards."

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

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

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

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

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.

Therefore, in comparison to previous EISs undertaken for the Pacific Groundfish FMP, where appropriate this chapter will provide more detailed and focused socio-economic information and analyses relating to rebuilding species and fishing communities, in addition to the typical approaches undertaken.

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 shows sector trends in harvests from 1995 to 2004. These components are often summed in various ways depending on the management issue. For example, the non-tribal Pacific whiting fishery is comprised 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-tribal whiting sector and the tribal 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. For this period, whiting harvests by the at-sea catcher-processors and shoreside whiting limited entry trawl fisheries reached a peak in 2004. Tribal shoreside landing also reached a peak in 2004 of 8,698 mt, reflecting the recent introduction of a new shore-based tribal whiting fishery. Tribal whiting fisheries were first instituted in 1996 with advent of the at-sea tribal fishery. Harvests by the shoreside non-whiting limited entry trawl fleet and the recreational fleets reached their lowest levels in 2004. As Pacific whiting is a highly variable species, analysts often focus on the non-tribal commercial shoreside landings other than whiting. When this is done, landings shoreside by non-whiting non-tribal commercial sectors also reached a low in 2004, approximately 25,000 mt, compared to landings of 59,000 mt and 60,000 mt in 1995 and 1996, respectively. The decline in such landings mirrors the status of the groundfish stocks and Council efforts to rebuild overfished species.

Table 7-1. Total commercial, tribal, and recreational landings and deliveries by sector (mt).

Year	At-Sea Catcher-Processors	At Sea Mother-ships	Shoreside Whiting LE Trawl	Shoreside Non-whiting LE Trawl	Shoreside LE Line Gear	Shore-side LE Pot Gear	Shore-side Directed OA	Shore-side Incidental OA	Recreational	Shore-side Tribal	At-Sea Tribal	Total Ground-fish	Non-Tribal, Non-Whiting Shorebased
			Landings and Deliveries										
1995	61,589	40,175	75,472	48,269	3,000	780	3,769	810	2,473	833	0	237,171	61,574
1996	66,170	43,826	83,699	48,745	3,825	541	3,443	1,073	2,893	903	15,313	270,432	63,414
1997	71,175	50,546	87,814	43,508	3,780	440	3,256	835	2,722	846	25,080	290,002	57,263
1998	70,690	50,371	88,852	34,477	2,301	398	2,563	631	4,979	495	24,787	280,544	50,328
1999	68,357	47,870	84,141	33,797	2,581	719	1,499	666	2,854	778	26,550	269,810	44,969
2000	68,341	47,166	86,210	29,337	2,417	708	1,203	504	2,406	788	6,402	245,481	38,981
2001	59,006	35,798	73,572	23,192	1,959	565	1,223	378	2,526	825	6,330	205,372	32,368
2002	36,580	26,624	45,706	20,271	1,793	372	1,099	406	2,270	918	22,286	158,325	28,481
2003	41,315	26,027	51,313	20,628	1,872	611	1,219	281	3,931	5,452	19,674	172,324	32,474
2004	73,582	24,155	89,986	18,925	1,935	634	1,215	150	1,956	8,698	23,767	245,003	26,773
		Share of Total Landings and Deliveries											
1995	26%	17%	32%	20%	1%	0%	2%	0%	1%	0%	0%	100%	
1996	24%	16%	31%	18%	1%	0%	1%	0%	1%	0%	6%	100%	
1997	25%	17%	30%	15%	1%	0%	1%	0%	1%	0%	9%	100%	
1998	25%	18%	32%	12%	1%	0%	1%	0%	2%	0%	9%	100%	
1999	25%	18%	31%	13%	1%	0%	1%	0%	1%	0%	10%	100%	
2000	28%	19%	35%	12%	1%	0%	0%	0%	1%	0%	3%	100%	
2001	29%	17%	36%	11%	1%	0%	1%	0%	1%	0%	3%	100%	
2002	23%	17%	29%	13%	1%	0%	1%	0%	1%	1%	14%	100%	
2003	24%	15%	30%	12%	1%	0%	1%	0%	2%	3%	11%	100%	
2004	30%	10%	37%	8%	1%	0%	0%	0%	1%	4%	10%	100%	
		Share of Non-Whiting, Non-Tribal Landings and Deliveries											
1995	0	0	0	78%	5%	1%	6%	1%	4%	0	0		100%
1996	0	0	0	77%	6%	1%	5%	2%	5%	0	0		100%
1997	0	0	0	76%	7%	1%	6%	1%	5%	0	0		100%
1998	0	0	0	69%	5%	1%	5%	1%	10%	0	0		100%
1999	0	0	0	75%	6%	2%	3%	1%	6%	0	0		100%
2000	0	0	0	75%	6%	2%	3%	1%	6%	0	0		100%
2001	0	0	0	72%	6%	2%	4%	1%	8%	0	0		100%
2002	0	0	0	71%	6%	1%	4%	1%	8%	0	0		100%
2003	0	0	0	64%	6%	2%	4%	1%	12%	0	0		100%
2004	0	0	0	71%	7%	2%	5%	1%	7%	0	0		100%

Adapted from tables associated with the Allocation Committee's February 2006 Meeting.

Table 7-1 also shows the percentage shares of each sector of the total fishery. In terms of total non-whiting non-tribal harvests, there has been a small decline in non-whiting limited entry trawl share from past levels of greater than 75 percent to the current level of 71 percent. This 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 of 7 and 8 percent. (The sharp temporary increases in recreational harvests in 1998 and 2003 are 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 1981 through 2005 commercial landings by round weight, exvessel revenue in current dollars, and exvessel revenue in inflation-adjusted dollars for commercially important species on the West Coast. These tables echo the trends discussed above but from a more historical perspective. 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. "Americanization" ultimately replaced foreign processors with domestic ones.) 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 since then have declined by nearly one-half. 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 in all groundfish species categories declined steeply after 1998, when species began to be designated overfished. Rockfish landings fell by about three-quarters from 1998 to 2002.

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 observed run up in exvessel prices for sablefish between 1994 and 1997 at a time when total sablefish landings were fairly stable. Total exvessel value of groundfish landings declined 43 percent to about $58 million in 2003.

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. Low-value whiting is a much less prominent component of landings when measured this way. Measured in constant 2005 dollars, the change in the value of rockfish landings between 1998 and 2003 fell by more than two-thirds. The inflation-adjusted value of sablefish and flatfish landings remained fairly stable during this period. Measured in constant 2003 dollars, total groundfish landings value was greatest in the late 1980s, peaking in 1989 at almost $132 million. By 2003, the inflation adjusted value of total groundfish landings had fallen by more than one-half.

Whiting harvests reached an all time high in 2005 at about 260,000 tons whereas for the other groundfish species there are significant declines starting in 1998 with 2005 showing very slight increases in harvests compared to 2004. In terms of exvessel revenue, since the whiting fishery was at an all time high, total groundfish revenues showed a significant increase in 2005 to $73 million which is still below the 1981-1997 average of $115 million. (Note that whiting and the other categories include tribal harvests.) In terms of non-whiting groundfish revenues, 2005 showed a slight increase over 2004 to $43 million due to increased sablefish revenues but is still below the 1981-1997 inflation adjusted average of $91 million. (1981-1997 is used as a basis of comparison because the downward trends in lingcod and rockfish started their sharp declines in 1998, 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) coastwide, 1981-2005 (includes commercial tribal fisheries, based on PacFIN data and Council [1997]). (Page 1 of 2)

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	61,470	1,277	61,470	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	142,810	88,601	16,722	4,410	22,619	2,180	277,848	46,437	135,038	4,342	257	117	197	223
1999	441	139,940	83,637	20,213	6,660	16,408	1,627	268,926	45,349	128,986	12,404	185	93	632	220
2000	145	120,411	85,843	16,315	6,296	11,702	1,498	242,210	35,956	121,799	14,653	121	81	705	223
2001	156	99,875	73,475	13,863	5,646	7,806	1,427	202,248	28,898	102,373	17,595	92	95	161	331
2002	205	84,494	45,808	13,220	3,830	5,974	2,115	155,646	25,344	71,151	25,302	99	79	215	422
2003	166	86,212	55,336	14,160	5,451	4,136	2,154	167,615	26,067	81,402	13,874	3	73	225	399
2004	114.6	120,735	96,504	13,726	5,848	3,340	2,770	243,037	25,799	122,302	8,969	1.6	100.7	27.48	450.7
2005	139.4	151,002	108,746	14,957	6,344	3,365	1,455	286,008	26,260	135,006	10,860	0.4	122.4	25.46	447.4
1981-1998 Avg	1,999	117,589	44,741	22,631	9,323	30,523	2,123	223,936	61,938	109,046	17,859	85	60	168	299
1991-2005 Avg	1,140	127,556	71,889	18,660	6,893	20,632	2,370	249,139	49,694	121,583	16,187	105	85	200	268
1998-2005 Avg	234	118,185	79,744	15,397	5,561	9,419	1,903	230,442	32,514	112,257	13,500	95	95	273	340

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) coastwide, 1981-2005 (includes commercial tribal fisheries, based on PacFIN data and Council [1997]). (Page 2 of 2)

Year	California Halibut	Salmon	Sea Cucumber	California Sheephead	Gillnet Complex	CPS Squid	CPS Wetfish	HMS	Dungeness Crab	Other Crustaceans	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	413,791
2003	293	5,986	344	48	141	39,348	77,843	20,004	32,556	1,287	24,577	217,001	384,616
2004	457.7	5,662	261	39.6	174	40,068	103,288	15,117	27,542	631	17,218	210,457	453,494
2005	418.3	4,298	265	40.2	192	55,608	101,922	10,080	24,120	368	18,727	216,039	439,975
1981-2005 Avg	*272.72*	*4,864*	*185.2*	*39.912*	*664.44*	*43,168*	*60,742*	*37,081*	*14,466*	*1,520*	*31,194*	*211,830*	*438,291*
1991-2005 Avg	*309*	*3,586*	*283*	*67*	*321*	*58,494*	*70,600*	*18,122*	*17,450*	*1,454*	*18,762*	*204,894*	*449,918*
1998-2005 Avg	*343*	*4,029*	*316*	*64*	*263*	*63,372*	*92,993*	*16,850*	*18,938*	*1,276*	*15,720*	*225,841*	*448,567*

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) coastwide, 1981-2005 (includes commercial tribal fisheries, based on PacFIN data and Council [1997]). (Page 1 of 2)

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	57,092	39,705	47,429	7,623	2	101	27	2,636
2005	461	17,438	12,558	13,961	20,233	6,490	2,420	73,100	43,103	55,662	10,410	0	122	25	2,485
1981-2005 Avg	1,547	14,025	3,950	16,031	14,439	24,264	1,772	75,992	58,017	61,968	17,614	1,065	807	429	1,224
1991-2005 Avg	1,171	13,186	6,193	14,350	17,542	22,532	2,258	77,173	57,794	63,987	14,677	1,550	1,177	571	1,334
1998-2005 Avg	497	11,674	6,973	13,066	16,722	13,479	2,608	64,907	46,260	53,233	10,272	1,510	1,287	749	1,710

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) coastwide, 1981-2005 (includes commercial tribal fisheries, based on PacFIN data and Council [1997]). (Page 2 of 2)

Year	California Halibut	Salmon	Sea Cucumber	California Sheephead	Gillnet Complex	CPS Squid	CPS Wetfish	HMS	Dungeness Crab	Other Crustaceans	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	228,899	285,991
2005	2,844	24,092	665	361	815	31,556	12,090	23,148	81,147	1,019	30,560	208,297	281,397
1981-2005 Avg	1,457	20,043	283	269	1,403	12,475	7,729	51,140	48,317	6,149	30,712	200,178	276,170
1991-2005 Avg	1,826	13,544	460	448	1,040	17,983	8,264	31,414	61,614	6,795	31,085	192,220	269,393
1998-2005 Avg	2,119	16,076	593	464	1,045	21,455	10,480	30,744	72,355	6,307	22,487	196,725	261,632

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 2005 dollars) from West Coast (WA, OR, CA) ocean area fisheries (0-200 miles) coastwide, 1981-2005 (includes commercial tribal fisheries, based on PacFIN data and Council [1997]). (Page 1 of 2)

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	2,651	19,564	225	23,663	8,388	35,635	1,208	91,332	71,545	71,770	32,159	1,244	61	263	656
1982	3,353	19,048	292	31,674	16,509	42,516	1,116	114,506	95,167	95,458	22,925	1,302	140	252	695
1983	3,613	20,219	294	28,052	12,165	37,606	837	102,787	82,273	82,567	15,427	585	21	223	1,273
1984	3,368	18,102	626	25,229	10,307	34,096	982	92,710	73,982	74,608	6,979	335	2	504	1,704
1985	3,401	7,028	867	28,277	16,032	35,243	874	91,723	83,828	84,695	14,642	372	71	733	1,861
1986	1,976	15,867	676	26,071	16,436	38,415	717	100,160	83,617	84,293	46,345	177	175	350	3,724
1987	3,172	21,621	979	32,789	19,794	45,816	2,874	127,046	104,445	105,425	68,622	299	260	308	1,843
1988	3,093	32,480	1,644	30,100	18,091	42,442	3,244	131,094	96,970	98,614	42,161	347	643	223	1,601
1989	3,939	41,634	1,524	29,203	15,364	45,734	2,234	139,631	96,474	97,998	40,722	306	716	250	1,228
1990	3,228	31,836	1,479	24,322	13,619	45,811	1,386	121,681	88,366	89,845	37,466	224	1,552	142	1,276
1991	3,467	33,068	3,381	29,977	20,219	40,808	2,355	133,274	96,825	100,206	33,026	313	1,678	209	1,520
1992	2,243	24,920	8,162	22,817	18,908	43,848	2,549	123,447	90,365	98,527	37,853	601	1,218	182	1,438
1993	2,523	9,666	3,886	20,051	13,682	44,466	2,425	96,699	83,146	87,032	22,516	834	2,112	191	1,329
1994	3,235	17,277	6,552	17,461	18,665	47,846	2,703	113,741	89,910	96,462	25,821	2,289	1,336	283	1,213
1995	2,215	13,416	10,293	20,224	31,112	52,092	2,265	131,619	107,909	118,204	23,806	2,498	882	626	890
1996	2,341	17,492	6,567	20,055	33,299	43,467	2,494	125,715	101,657	108,224	23,365	3,315	1,085	999	982
1997	2,171	23,949	10,183	17,870	34,782	34,789	2,550	126,293	92,161	102,344	18,994	4,643	1,541	861	1,112
1998	869	16,390	5,866	15,150	13,777	30,262	3,567	85,881	63,624	69,491	6,116	4,476	2,251	923	961
1999	836	13,711	8,036	15,998	20,003	23,972	2,979	85,534	63,789	71,823	14,996	3,137	1,844	1,807	1,125
2000	391	12,346	9,039	15,857	23,053	19,733	2,993	83,412	62,027	71,067	14,689	2,475	1,854	2,034	1,371
2001	436	11,908	6,476	14,232	19,731	14,512	2,205	69,501	51,116	57,593	11,597	1,919	2,146	599	1,661
2002	562	10,128	5,042	13,136	13,116	12,290	2,904	57,180	42,009	47,052	17,057	1,949	1,768	703	2,019
2003	446	11,321	5,983	14,231	19,972	8,312	2,850	63,115	45,810	51,794	8,304	66	1,629	732	2,494
2004	449	10,037	8,022	13,286	17,628	7,096	3,228	59,297	41,238	49,261	7,917	2	105	28	2,738
2005	461	17,438	12,558	13,961	20,233	6,490	2,420	73,100	43,103	55,662	10,410	0	122	25	2,485
1981-2005 Avg	2,178	18,819	4,746	21,748	18,595	33,332	2,238	101,619	78,054	82,801	24,157	1,348	1,008	538	1,568
1991-2005 Avg	1,510	16,204	7,336	17,621	21,212	28,666	2,699	95,187	71,646	78,983	18,431	1,901	1,438	680	1,556
1998-2005 Avg	556	12,910	7,628	14,481	18,439	15,334	2,893	72,127	51,590	59,218	11,386	1,753	1,465	856	1,857

NOTE: Inflation adjustment used is 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 2005 dollars) from West Coast (WA, OR, CA) ocean area fisheries (0-200 miles) coastwide, 1981-2005 (includes commercial tribal fisheries, based on PacFIN data and Council [1997]). (Page 2 of 2)

Year	California Halibut	Salmon	Sea Cucumber	California Sheephead	Gillnet Complex	CPS Squid	CPS Wetfish	HMS	Dungeness Crab	Other Crustaceans	Other Species	Total Non-groundfish	Total
1981	904	50,683	0	0	3,321	8,104	22,625	318,720	29,127	5,425	46,025	519,313	610,645
1982	885	60,067	40	0	3,046	5,750	15,472	215,942	29,150	6,333	43,672	405,670	520,177
1983	1,469	14,378	41	0	1,836	1,326	8,636	186,540	37,056	6,053	45,836	320,701	423,489
1984	1,383	16,574	15	0	2,154	771	10,566	146,646	33,613	10,339	27,000	258,585	351,294
1985	898	31,670	0	0	4,050	6,169	7,406	63,831	37,375	6,343	34,768	210,190	301,912
1986	1,294	37,685	24	0	3,715	6,773	7,267	67,310	33,977	7,943	35,004	251,763	351,926
1987	1,573	67,942	34	0	3,365	5,840	8,122	72,602	37,950	7,636	42,926	319,324	446,370
1988	1,803	98,495	46	0	2,802	11,388	9,352	85,496	62,972	8,334	50,490	376,157	507,251
1989	1,907	38,073	0	0	2,731	9,907	8,567	56,844	56,775	8,977	58,029	285,029	424,661
1990	1,389	30,966	51	0	2,325	6,693	7,641	34,786	64,281	10,132	67,533	266,458	388,139
1991	1,759	20,040	264	0	2,492	8,587	9,966	24,304	30,259	9,679	73,226	217,320	350,594
1992	2,001	12,858	0	0	1,302	3,463	8,696	36,305	53,928	9,306	66,028	235,177	358,625
1993	1,566	12,208	483	0	1,236	13,934	5,227	42,552	58,416	8,155	52,128	222,887	319,583
1994	1,492	9,700	566	1,002	723	19,198	5,187	50,079	70,301	7,672	47,969	244,827	358,565
1995	2,061	20,324	547	923	1,049	29,404	7,065	35,719	83,548	9,959	51,043	270,343	401,960
1996	2,235	12,006	699	892	1,263	28,170	7,010	58,617	95,603	10,404	50,474	297,117	422,836
1997	2,720	12,608	289	1,073	1,641	25,835	10,304	50,550	64,696	13,135	43,421	253,425	379,717
1998	2,551	6,915	552	839	1,080	1,975	8,305	48,758	56,030	10,482	13,821	166,031	251,911
1999	2,433	11,331	489	529	1,733	39,069	8,664	38,620	78,636	7,213	20,891	232,515	318,053
2000	1,530	15,815	686	673	1,452	30,711	13,537	37,363	69,935	9,297	22,966	226,388	309,801
2001	1,741	11,919	655	580	1,234	19,003	13,884	35,498	57,802	9,594	20,157	189,989	259,489
2002	2,208	14,455	880	434	1,670	20,281	13,265	24,469	64,247	9,170	16,750	191,327	248,508
2003	2,079	22,640	746	413	715	24,981	9,101	36,378	122,414	8,574	40,483	281,749	344,864
2004	3,239	31,861	562	342	660	20,543	13,371	30,576	104,201	1,793	30,591	237,738	297,035
2005	2,844	24,092	665	361	815	31,556	12,090	23,148	81,147	1,019	30,560	208,297	281,397
1981-2005 Avg	1,839	27,412	333	322	1,936	15,177	10,053	72,866	60,538	8,119	41,272	267,533	369,152
1991-2005 Avg	2,164	15,918	539	537	1,271	21,114	9,711	38,196	72,744	8,363	38,701	231,675	326,863
1998-2005 Avg	2,328	17,378	654	521	1,170	23,515	11,527	34,351	79,302	7,143	24,527	216,754	288,882

NOTE: Inflation adjustment used is 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 the other West Coast fisheries harvests and revenues.

Total West Coast harvests reached 440,000 mt in 2005, worth $281 million. Of these amounts, groundfish fisheries accounted for 50 percent of the harvests and 25 percent of the revenues. In terms of total exvessel revenues, Dungeness crab was the only fishery that had higher revenues in 2005. Note that squid was the only major fishery that had a significant increase as the Dungeness crab, salmon, and HMS fisheries all had significant declines in 2005 compared to 2004. In total, West Coast non-groundfish revenues declined approximately 12 percent from 2004 levels. Declines in non-groundfish fisheries make groundfish communities, which already face declining groundfish revenues, more vulnerable and often lead to increased effort in groundfish fisheries. As described below, many of these non-groundfish fisheries are part of the groundfish open access fleets. (As most of these fisheries are "shoreside fisheries," see 7.1.2.1 for additional discussion.)

Bycatch and Fisheries

Table 7-3 shows the various bycatch associated with each 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
2. limited entry bottom trawl –shelf
3. limited entry midwater trawl – Pacific whiting
4. limited entry fixed gear – sablefish
5. limited entry fixed gear – nearshore
6. limited entry fixed gear – dogfish
7. open access fixed gear – sablefish
8. open access fixed gear – nearshore
9. open access fixed gear – dogfish
10. California recreational-bottomfish
11. Oregon recreational-bottomfish
12. Washington recreational-bottomfish
13. Washington recreational-halibut
14. Oregon recreational-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 Pacific ocean perch. In the area between 40˚10' N latitude and 38˚ N latitude, darkblotched rockfish are relatively less likely to be caught, Pacific ocean perch is nearly non-existent, and the area, 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 touched 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.)

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-tribal commercial sectors, including discussions of participation, landings, revenues, seasonality, and major fishing communities. Tribal 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.

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 Tribal Fisheries

7.1.2.1 Overview: Total Non-Tribal Shoreside All Fisheries

7.1.2.1.1 Participation

Active participation in West Coast shore-based commercial fisheries has generally declined over the years 2000 to 2005 (Table 7-5). In 2005, 1,292 vessels landed West Coast groundfish, 261 landed coastal pelagic species, 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. (The estimates, because they are based on fish tickets, exclude estimates of the tribal fleet and at-sea fleet which are discussed below.)

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

7.1.2.1.2 Landings and Revenues

Commercial fisheries make up the largest portion of West Coast landed catch by weight. Coastal pelagic species, followed by groundfish, crab, and highly migratory species have made up the largest commercial landings by weight since 2000 (Table 7-6). Crab, followed by groundfish, coastal pelagic species, and highly migratory species comprise the highest-value groups from 2000–2005 (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 over 95 percent of total groundfish harvest by weight but only 64 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 value per unit weight calculations for this sector.

7.1.2.1.3 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, Washington, Eureka and Crescent City, California, Brookings, Oregon, and Bellingham Bay and Neah Bay, 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.

		Year				
Species Group	Data type	2001	2002	2003	2004	2005
Coastal Pelagic Species	Landed weight (lbs)	431,365,373	403,146,822	276,183,979	316,067,022	347,255,384
	Exvessel Revenue ($)	32,466,769	32,734,497	35,180,414	32,653,726	43,651,323
Crab	Landed weight (lbs)	26,646,332	37166,847	76,025,265	63,368,168	54,848,429
	Exvessel Revenue ($)	54,022,945	62,591,244	119,970,195	104,609,854	83,451,056
Groundfish	Landed weight (lbs)	226,350,318	164,017,318	180,989,727	267,801,292	296,121,120
	Exvessel Revenue ($)	52,005,278	43,443,802	49,057,826	47,832,317	56,208,733
Highly Migratory Species	Landed weight (lbs)	27,377,162	23,269,259	38,156,859	32,908,310	21,830,731
	Exvessel Revenue ($)	24,268,210	17,256,706	28,248,409	29,446,061	23,158,656
Other	Landed weight (lbs)	19,729,492	21,157,102	17,278,995	18,076,461	17,848,978
	Exvessel Revenue ($)	24,072,979	23,576,471	20,980,130	21,913,540	21,054,424
Salmon	Landed weight (lbs)	6,458,731	9,795,556	11,522,470	10,857,893	8,244,773
	Exvessel Revenue ($)	10,606,112	14,358,711	21,011,634	30,902,881	24,159,157
Shellfish	Landed weight (lbs)	18,552,635	27,117,624	28,540,501	30,588,533	31,709,371
	Exvessel Revenue ($)	44,101,283	61,294,746	65,420,466	87,913,770	79,461,336
Shrimp	Landed weight (lbs)	40,995,148	57,850,787	32,162,900	21,351,766	25,120,667
	Exvessel Revenue ($)	16,803,835	21,475,074	11,490,842	11,041,571	14,066,750
Total Landed weight (lbs)		797,475,191	743,521,315	660,860,696	761,019,445	802,979,453
Total Exvessel Revenue ($)		258,347,409	276,731,251	351,359,914	366,313,719	345,211,435

Source: PacFIN ftl table. August 2004

Note: Data shown is for PFMC management areas and does not include inside waters such as Puget Sound and Columbia River.

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 ($)	58,190,196	74,343,110	75,474,308	96,787,328	87,069,866
Net	Landed weight (lbs)	434,945,382	406,344,617	278,973,327	318,813,541	350,683,566
	Exvessel Revenue ($)	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 for example.
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
Non-Trawl	Landed Weight (mt)	4,163	3,561	3,051	3,347	3,456	3,949
	Landed Revenue (1000's $)	16,997	14,326	12,039	14,626	14,086	16,909
Trawl	Landed Weight (mt)	117,152	98,388	70,513	73,296	109,482	116,677
	Landed Revenue (1000's $)	42,402	34,294	28,962	30,204	29,345	33,946
Trawl Portion	Landed Weight (mt)	0.97	0.97	0.96	0.96	0.97	0.97
	Landed Revenue (1000's $)	0.71	0.71	0.71	0.67	0.68	0.67

Source: PacFIN ftl data. May 2006
Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

7.1.2.2 Limited Entry Groundfish Trawl Sector

7.1.2.2.1 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, that ascend 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 ocean 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. 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 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 conserve and manage depleted groundfish species. Vessels that participated in the buyback program were sold, scrapped, or converted to nonfishing 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.

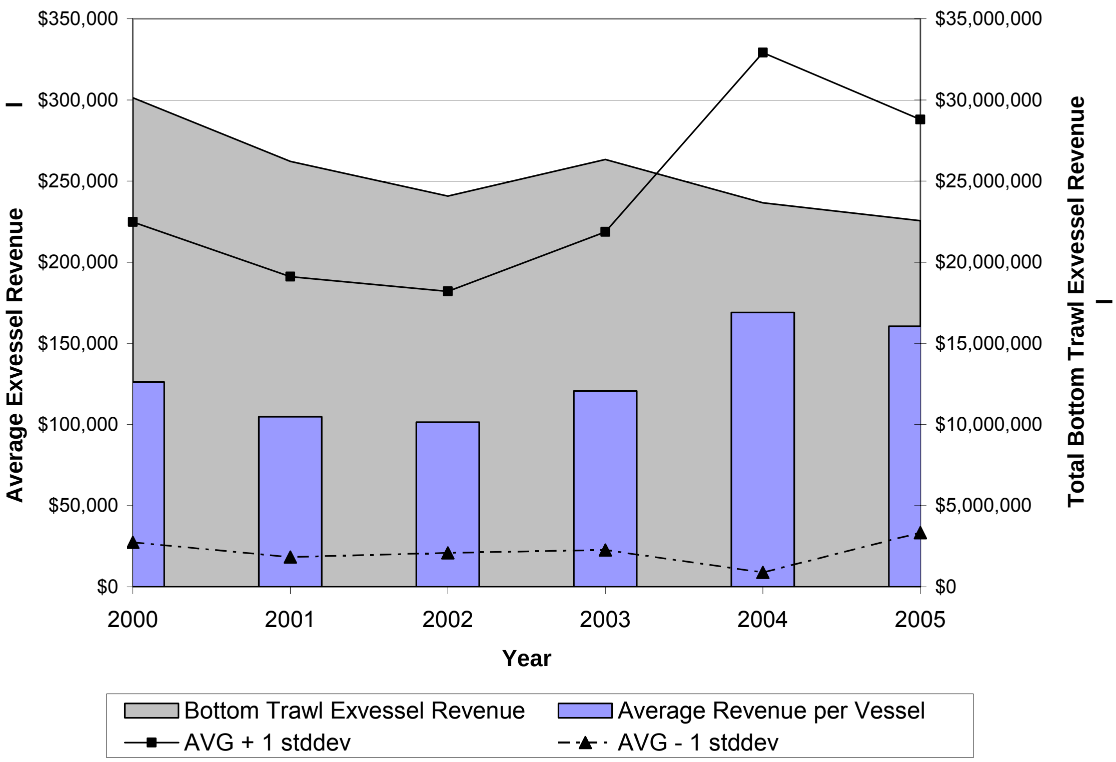


Figure 7-1. Annual limited entry trawl vessel revenues per year (excluding catch of Pacific whiting).

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
ASTORIA	54	48	41	44	32
AVILA	13	15	16	13	7
BELLINGHAM BAY	7	16	6	9	6
BROOKINGS	11	11	11	13	8
CHARLESTON (COOS BAY)	30	30	25	28	21
CRESCENT CITY	26	21	24	19	4
EUREKA	27	32	30	28	15
FIELDS LANDING	15	14			
FORT BRAGG	17	19	29	14	11
MONTEREY	5	4	5	5	3
MORRO BAY	17	10	11	10	10
MOSS LANDING	16	15	14	16	16
NEAH BAY	11	11	5	8	5
NEWPORT	41	41	31	33	27
PORT ANGELES	7	8	10		5
PRINCETON / HALF MOON BAY	14	14	12	11	12
SAN FRANCISCO	26	18	17	12	10
SANTA BARBARA	5	14	14	8	4
SANTA CRUZ	6	5	6	6	4
VENTURA	5	7	10	8	3
WESTPORT	19	11	10	9	9

Note: ports with fewer than three trawl vessels in any year were excluded for confidentiality purposes
Source: PacFIN ft and ftl tables.

7.1.2.2.2 Landings and Revenues from Groundfish Trawl Vessels

Trawlers catch a wide range of species. By weight, the following species account for the bulk of 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
CA	Non-whiting	Landed weight (mt)	9,764	7,929	8,026	7,330	6,101	5,760
		Exvessel Rev (1000's $)	11,859	9,546	10,068	8,618	7,090	7,021
	Pacific Whiting	Landed weight (mt)	4,986	2,306	2,773	1,695	4,742	3,062
		Exvessel Rev (1000's $)	765	171	274	166	641	338
OR	Non-whiting	Landed weight (mt)	15,952	12,152	8,410	10,499	10,245	10,786
		Exvessel Rev (1000's $)	17,974	14,687	10,150	12,897	11,833	12,441
	Pacific Whiting	Landed weight (mt)	68,702	53,376	32,305	36,581	59,075	61,463
		Exvessel Rev (1000's $)	6,081	4,132	3,219	3,642	4,641	7,107
WA	Non-whiting	Landed weight (mt)	5,593	4,896	8,370	4,258	3,481	3,315
		Exvessel Rev (1000's $)	4,601	4,319	4,189	3,598	3,148	3,191
	Pacific Whiting	Landed weight (mt)	12,156	17,730	10,630	12,934	25,838	32,291
		Exvessel Rev (1000's $)	1,122	1,439	1,061	1,283	1,993	3,848

Source: PacFIN ftl data. May 2006

Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

Table 7-12. Shoreside non-tribal trawl groundfish landings and exvessel revenue by state, year, and trawl type.

			Year					
Trawl Type	State	Data	2000	2001	2002	2003	2004	2005
Bottom Trawl	CA	Landed wt (mt)	8,910	7,442	7,928	7,320	6,062	5,727
		Exvessel Rev (1000's $)	10,954	9,034	9,960	8,611	7,054	6,993
	OR	Landed wt (mt)	11,341	10,012	7,942	10,459	10,081	10,613
		Exvessel Rev (1000's $)	13,503	12,545	9,661	12,811	11,585	12,250
	WA	Landed wt (mt)	4,497	3,777	4,330	4,121	3,347	2,919
		Exvessel Rev (1000's $)	3,552	3,402	3,422	3,561	3,062	3,054
Midwater Trawl	CA	Landed wt (mt)	5,839	2,792	2,870	1,705	4,781	3,095
		Exvessel Rev (1000's $)	1,670	683	381	173	676	366
	OR	Landed wt (mt)	73,313	55,516	32,772	36,621	59,239	61,636
		Exvessel Rev (1000's $)	10,552	6,274	3,709	3,728	4,889	7,298
	WA	Landed wt (mt)	13,252	18,848	14,670	13,071	25,972	32,688
		Exvessel Rev (1000's $)	2,171	2,355	1,828	1,321	2,078	3,985
Total Landed wt (mt)			117,152	98,388	70,513	73,296	109,482	116,677
Total Exvessel Rev (1000's $)			42,402	34,294	28,962	30,204	29,345	33,946

Source: PacFIN FTL table. May 2006

Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

Table 7-13. Shoreside groundfish landings and revenue by trawl and non-trawl vessels.

Gear Group	Data	2000	2001	2002	2003	2004	2005
Non-Trawl	Landed Weight (mt)	4,163	3,561	3,051	3,347	3,456	3,949
	Landed Revenue (1000's $)	16,997	14,326	12,039	14,626	14,086	16,909
Trawl	Landed Weight (mt)	117,152	98,388	70,513	73,296	109,482	116,677
	Landed Revenue (1000's $)	42,402	34,294	28,962	30,204	29,345	33,946
Trawl Portion	Landed Weight (mt)	0.97	0.97	0.96	0.96	0.97	0.97
	Landed Revenue (1000's $)	0.71	0.71	0.71	0.67	0.68	0.67

Source: PacFIN ftl data. May 2006
Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

7.1.2.2.3 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 7-14 shows the depth-based annual distribution of catch made by non-shrimp trawl vessels and

Table 7-15 shows the monthly distribution of catch as recorded in trawl logbook data within PacFIN. These data include bottom trawl and midwater trawl gear.

Table 7-14. Depth-based distribution of landed groundfish catch by limited entry trawl vessels using midwater or bottom trawl gear (pounds by year and depth range).

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 7-15. Monthly distribution of groundfish landed catch by limited entry trawl vessels using midwater or bottom trawl gear (pounds by month and year).

	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

Because of the buyback program, some ports appear to have lost relatively more groundfish catch than other ports. Not surprisingly, those ports that lost relatively more trawl vessels also appear to have lost relatively more catch of groundfish (Table 7-16).

7.1.2.2.4 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 2000–2003 period (Table 7-17). Westport and Ilwaco, Washington, Eureka and Crescent City, California, Brookings, Oregon, and Bellingham Bay and Neah Bay, Washington comprise the remaining top 10 largest ports for trawl vessel landings.

Table 7-16. Landed weight (in pounds) of groundfish made by trawl vessels by port and year.

PORT	2000	2001	2002	2003	2004
ASTORIA	15,733,074	12,128,458	8,265,559	9,742,986	11,691,379
AVILA	834,680	616,016	1,563,590	1,542,126	982,240
BELLINGHAM BAY	5,567,902	4,250,213	5,239,046	4,971,017	3,356,161
BROOKINGS	2,564,206	1,942,570	1,263,150	1,973,492	1,070,491
CHARLESTON (COOS BAY)	8,753,192	6,613,222	4,692,898	6,261,152	5,307,643
CRESCENT CITY	2,867,758	2,613,821	2,789,286	1,903,833	1,089,460
EUREKA	4,113,867	4,065,846	3,905,964	4,373,074	3,696,474
FIELDS LANDING	2,448,302	1,241,606			
FORT BRAGG	4,055,532	3,429,009	4,506,717	3,028,961	2,902,846
MONTEREY	862,084	692,836	573,330	547,952	409,290
MORRO BAY	285,861	195,718	167,050	248,413	777,682
MOSS LANDING	1,350,408	1,321,558	1,447,451	2,039,384	1,138,278
NEAH BAY	2,332,979	1,422,344	36,017	1,906,337	616,595
NEWPORT	7,918,289	5,823,743	4,023,203	4,997,183	4,414,402
PORT ANGELES	170,573	80,998	2,550,679		396,169
PRINCETON / HALF MOON BAY	1,537,386	1,210,273	927,221	651,677	561,930
SAN FRANCISCO	2,067,686	1,677,797	1,294,075	1,311,881	1,820,147
SANTA BARBARA	10,314	6,514	12,914	965	8,356
SANTA CRUZ	100,694	58,211	25,959	10,172	4,524
VENTURA	1,785	4,680	3,131	683	344
WESTPORT	1,803,584	1,873,952	9,075,180	1,032,300	1,006,859

Note: ports with fewer than three trawl vessels in any year were excluded for confidentiality purposes
Source: PacFIN ft and ftl tables

Table 7-17. Largest ports for limited entry trawl vessel groundfish landings and exvessel revenue (2000–2003).

Rank	Rank by Weight	Rank by Exvessel Revenue
1	NEWPORT	ASTORIA
2	ASTORIA	NEWPORT
3	WESTPORT	CHARLESTON (COOS BAY)
4	CHARLESTON (COOS BAY)	WESTPORT
5	ILWACO	BROOKINGS
6	EUREKA	BELLINGHAM BAY
7	CRESCENT CITY	NEAH BAY
8	BROOKINGS	PRINCETON / HALF MOON BAY
9	BELLINGHAM BAY	EUREKA
10	NEAH BAY	BLAINE
11	FIELDS LANDING	CRESCENT CITY
12	PRINCETON / HALF MOON BAY	ILWACO
13	BLAINE	SAN FRANCISCO
14	SAN FRANCISCO	FIELDS LANDING
15	PORT ANGELES	GARIBALDI (TILLAMOOK)

Source: PacFIN FTL table. July 2004

7.1.2.3 At-Sea Limited Entry Sector

7.1.2.3.1 Participation

In addition to the shore-based limited entry trawl fishery, an at-sea limited entry trawl fishery exists off the coast of Washington, Oregon, and California. The 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 market place. 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 to 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 to 5 motherships operate in the fishery, with one mothership also servicing the tribal fleet; ach vessel is typically serviced by 3 to 4 catcher vessels. Motherships are vessels that process, but do not harvest, whiting.

According to PacFIN data, 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.

According to PacFIN data, 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. Harvests of non-whiting groundfish are largely composed of harvests of yellowtail rockfish, widow rockfish and species within the Minor Rockfish North complex.

7.1.2.3.2 Harvests and Revenue

Depending on the OY, at-sea harvests by non-tribal motherships and catcher-processors have ranged since 1998 from 63,000 mt to the 128,000 mt; the latter harvest level was attained in 2005 (Table 7-18), worth $14 million (Table 7-19). 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 catch 1998-2005 reported by non-tribal Pacific whiting at-sea processing vessels (in mt).

	1998	1999	2000	2001	2002	2003	2004	2005
Pacific whiting	120,452	115,259	114,655	94,451	62,935	67,236	97,277	127,461
Pacific cod	0	0.04	0.19	0	0	0.25	0.02	0.01
Lingcod	0.11	0.06	0.41	0.66	0.27	0.49	1.18	2.42
Sablefish	27.83	2.1	47.13	21.5	21.02	16.95	28.71	15.13
Arrowtooth	1.04	3.21	8.61	3.76	2.17	2.86	1.12	1.26
Dover sole	0.01	0	0.27	1.53	0.65	0.85	0.14	0.38
English sole	0	0.02	0.22	0.1	0.11	0.02	0.02	0.06
Petrale sole	0	0	0	0	0	0	0	0
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
All other flatfish spp. (except halibut)	0.01	0.01	1.32	7.05	0.15	0.18	0.02	0.01
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
Chilipepper	0.01	0.54	4.83	3.57	4.9	1.26	1.97	1.15
Darkblotched		12.07	3.13	4.31	7.38	11.02		
POP	21.28	14.15	9.61	19.74	3.62	5.16	1.05	1.64
Shortbelly	0.02	0	0.86	27.33	0.6	0.51	0.02	2.69
Thornyhead	2.51	0.02	19.07	15.21	11.91	15.65	5.64	7.09
Widow rockfish	292.76	148.95	220.62	168.91	135.6	12.25	19.8	78.65
Yellowtail	376.98	684.13	555.56	124.99	14.28	2.32	18.49	72.96
Yelloweye		0	0	0	0			
Other rockfish spp.	62.36	33.15	120.34	66.15	20.54	24.74	25.83	59.22
Other groundfish	218.07	254.05	92.46	89.18	38.82	14.33	349.89	94.81
TOTAL GROUNDFISH	121,689	116,401	115,746	95,033	63,207	67,345	97,738	127,813
CPS SPECIES								
Pacific mackerel	458.78	1.47	15.52	47.29	0.04	0	0	0.03
Jack mackerel	229.14	53.84	52.98	107.43	6.85	12.38	58.07	4.44
Pacific sardine	1.94	0.18	0.06	0.23	0.01	0	0	0.04

Table 7-19. Non-tribal harvests and revenues.

2005 Mt of Whiting and selected rockfish in non-tribal at sea sectors

ROCKFISH SPECIES	MOTHERSHIP	CATCHER/PROCESSOR	TOTAL
Bocaccio			
POP	0.86	0.78	1.64
Thornyheads	0.74	6.34	7.09
Canary rockfish	0.7	0.34	1.04
Yellowtail rockfish	25.52	47.44	72.96
Widow rockfish	35.5	43.14	78.65
Chilipepper rockfish	0.89	0.26	1.15
Shortbelly rockfish	2.68	0.01	2.69
Darkblotched rockfish	5.08	5.95	11.02
Other rockfish	18.81	40.42	59.22
mt whiting	48,571.23	78,889.57	127,460.80
Sum	48,662.01	79,034.25	127,696.26
mt rockfish/mt whiting	0.0019	0.0018	0.0018

2005 Exvessel value of whiting and selected rockfish in non-tribal at sea sectors (assume whiting and rockfish PPP are $0.51)

ROCKFISH SPECIES	MOTHERSHIP	CATCHER/PROCESSOR	TOTAL
Bocaccio			
POP	97	88	184
Thornyheads	83	713	797
Canary rockfish	79	38	117
Yellowtail rockfish	2,869	5,334	8,203
Widow rockfish	3,991	4,850	8,843
Chilipepper rockfish	100	29	129
Shortbelly rockfish	301	1	302
Darkblotched rockfish	571	669	1,239
Other rockfish	2,115	4,545	6,658
whiting value	5,461,136	8,869,998	14,331,134
Sum	5,471,343	8,886,265	14,357,608

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

7.1.2.3.3 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.

7.1.2.3.4 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

7.1.2.4.1 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 Fishermen drop to the ocean floor baited traps connected to a surface pole or buoy with a vertical line. 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 feet to 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 been plagued by overcapacity, although a series of management initiatives have largely addressed the problem. In the early to mid 1990s the fishery was a “derby” managed by very short seasons of two weeks or less. Two Groundfish FMP amendments 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.

7.1.2.4.2 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 (hooke and line and pot gear).

			Year					
State	Species Aggregation	Data Type	2000	2001	2002	2003	2004	2005
CA	Non-Sablefish Groundfish	Landed Weight (mt)	253	247	239	276	260	290
		Exvessel $ (1000's)	1,089	974	938	1,264	1,362	1,315
	Sablefish	Landed Weight (mt)	549	436	352	390	396	393
		Exvessel $ (1000's)	1,867	1,448	1,146	1,509	1,325	1,391
OR	Non-Sablefish Groundfish	Landed Weight (mt)	74	103	51	38	33	34
		Exvessel $ (1000's)	243	367	200	117	90	77
	Sablefish	Landed Weight (mt)	984	703	435	603	849	864
		Exvessel $ (1000's)	4,875	3,426	2,279	3,339	3,430	4,085
WA	Non-Sablefish Groundfish	Landed Weight (mt)	384	260	450	228	183	293
		Exvessel $ (1000's)	240	162	221	120	109	175
	Sablefish	Landed Weight (mt)	382	346	285	481	496	612
		Exvessel $ (1000's)	2,477	2,139	1,874	3,195	2,753	3,596

Source: PacFIN FTL table. May 2006
Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

7.1.2.4.3 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.

	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 for example.

7.1.2.4.4 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 2000–2003. 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 54 percent of total landings, while the top five ports for revenue make up approximately 49 percent of total exvessel revenues for limited entry fixed gear vessels.

Table 7-24. Largest ports for limited entry fixed gear landings and exvessel revenue (2000-2003).

Rank	Top Ports for Exvessel Revenue	Top Ports for Landings
1	NEWPORT	BELLINGHAM BAY
2	BELLINGHAM BAY	NEWPORT
3	ASTORIA	MOSS LANDING
4	CHARLESTON (COOS BAY)	ASTORIA
5	MOSS LANDING	PORT ORFORD
6	WESTPORT	CHARLESTON (COOS BAY)
7	PORT ORFORD	WESTPORT
8	PORT ANGELES	PORT ANGELES
9	EUREKA	EUREKA
10	CRESCENT CITY	CRESCENT CITY
11	OCEANSIDE	SAN FRANCISCO
12	FORT BRAGG	FORT BRAGG
13	SAN FRANCISCO	OCEANSIDE
14	FLORENCE	FLORENCE
15	SEATTLE	NEWPORT BEACH

Source: PacFIN FTL table. July 2004

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 (Open Access Incidental Fisheries) catch groundfish using a variety of gears. The open access appellation can be confusing because vessels in this sector may hold limited entry permits for other, nongroundfish fisheries issued by the Federal or state governments. However, groundfish catches by these vessels are regulated under the Groundfish FMP. For example, open access vessels must comply with cumulative trip limits established for the open access sector and are subject to the other operational restrictions imposed in the regulations, including general compliance with the RCA restrictions.

7.1.2.5.1 Open Access Directed Fisheries

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 2004b).

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.

7.1.2.5.2 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, coastal pelagic species, 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 open access incidental 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 on 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 greater than $5,000 total exvessel revenue.

Table 7-25. Number of open access vessels by level of dependency and vessel length (based on data from November 2000 - October 2001).

	<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/ 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- 2003 period taken from the VMS EA.

Table 7-26. Open access groundfish landings by gear group, 2000-2003 (based on 8/24/04 PacFIN data).

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
2,002	2	1	5,352	2,676
2,003	0	0	0	0
Average	2	2	19,784	7,873
Pot - groundfish directed c				
2,000	28	164	834,087	29,789
2,001	34	145	720,680	21,196
2,002	35	124	573,289	16,380
2,003	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). (Page 2 of 2)

Open Access Gear Group	Number of Vessels Landing Groundfish	Landed Groundfish Weight (mt)	Exvessel Revenue Groundfish ($)	Exvessel Revenue per Vessel ($)
Trawl - CA halibut				
2,000	24	22	38,697	1,612
2,001	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				
2,000	< 285	10	32,419	114
2,001	< 270	7	31,471	117
2002	< 250	5	31,333	125
2,003	< 245	6	40,284	164
Average	< 263	7	33,877	129
Line gear - Salmon troll (coastwide)				
2,000	304	17	37,806	124
2001	229	14	27,860	122
2,002	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

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 target groundfish at some point during the year.

7.1.2.5.3 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. Open access groundfish landings and exvessel revenue by year, state, and species.

			Year			
State	Species Aggregation	Data Type	2000	2001	2002	2003
CA	Flatfish and Skates	Landed Weight (lbs)	93,158	48,856	42,579	15,140
		Exvessel Revenue ($)	87,688	63,929	61,621	20,649
	Rockfish a/	Landed Weight (lbs)	705,190	652,021	486,113	461,812
		Exvessel Revenue ($)	1,789,851	1,750,273	1,259,855	1,027,475
	Other Groundfish	Landed Weight (lbs)	300,719	253,393	185,577	169,155
		Exvessel Revenue ($)	1,070,487	775,543	533,652	506,268
	Sablefish	Landed Weight (lbs)	657,104	558,217	541,963	675,694
		Exvessel Revenue ($)	928,945	766,276	691,173	877,637
OR	Flatfish and Skates	Landed Weight (lbs)	310	22,435	1,034	1,750
		Exvessel Revenue ($)	69	12,341	159	391
	Rockfish a/	Landed Weight (lbs)	241,363	455,647	309,452	260,633
		Exvessel Revenue ($)	292,445	428,552	478,855	329,766
	Other Groundfish	Landed Weight (lbs)	123,930	176,758	242,546	150,631
		Exvessel Revenue ($)	329,379	462,625	678,185	399,524
	Sablefish	Landed Weight (lbs)	88,627	129,954	96,044	280,209
		Exvessel Revenue ($)	166,725	247,306	188,163	528,151
WA	Flatfish and Skates	Landed Weight (lbs)	2,899	6,052	3,045	23,268
		Exvessel Revenue ($)	814	1,453	1,067	4,533
	Rockfish a/	Landed Weight (lbs)	172,836	338,792	670,658	662,355
		Exvessel Revenue ($)	80,701	164,664	323,228	319,673
	Other Groundfish	Landed Weight (lbs)	31,187	26,426	36,572	369,093
		Exvessel Revenue ($)	15,785	15,262	20,284	172,052
	Sablefish	Landed Weight (lbs)	73,567	89,021	99,063	181,340
		Exvessel Revenue ($)	206,543	220,195	259,410	493,547
Total Landed Weight (lbs)			2,490,890	2,757,572	2,714,646	3,251,080
Total Exvessel Revenue ($)			4,969,432	4,908,419	4,495,652	4,679,666

a/ the "Rockfish" aggregation includes thornyheads and scorpionfish
Source: PacFIN VSMRFD files. July 2004
Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

Table 7-28. Open access groundfish landings and exvessel revenue by state, year, and gear group.

			Year					
ST	Gear Group	Data Type	2000	2001	2002	2003	2004	2005
CA	Dredge	Landings (lbs)			C		C	
		Exvessel Rev ($)			C		C	
	Hook & Line	Landings (lbs)	1,218,626	1,053,789	865,280	818,292	1,032,803	1,086,931
		Exvessel Rev ($)	2,871,120	2,521,246	1,864,774	1,644,510	2,426,583	2,553,372
	Misc.	Landings (lbs)	2,140	148	229	63	C	752
		Exvessel Rev ($)	3,151	448	1,154	65	C	414
	Net	Landings (lbs)	100,870	128,117	98,048	106,461	137,342	122,878
		Exvessel Rev ($)	85,625	106,763	88,543	97,987	121,674	82,465
	Pot	Landings (lbs)	361,750	305,553	263,532	387,890	428,590	647,384
		Exvessel Rev ($)	852,555	704,248	557,881	677,169	702,521	955,741
	Shrimp Trawl	Landings (lbs)	18,084	8,932	8,508	4,532	37,830	71,780
		Exvessel Rev ($)	18,753	10,806	11,885	7,045	51,856	74,067
	Non-Shrimp Trawl	Landings (lbs)	54,701	15,949	19,232	4,563	29,299	32,500
		Exvessel Rev ($)	45,766	12,511	20,727	5,253	46,843	53,764
OR	Hook & Line	Landings (lbs)	421,803	563,759	615,247	642,047	623,011	920,239
		Exvessel Rev ($)	749,701	995,381	1,280,502	1,160,157	1,076,475	1,668,813
	Net	Landings (lbs)	C	C	C	C		
		Exvessel Rev ($)	C	C	C	C		
	Pot	Landings (lbs)	10,449	28,488	24,453	41,978	20,547	105,306
		Exvessel Rev ($)	19,093	54,702	57,569	89,877	41,758	163,988
	Shrimp Trawl	Landings (lbs)	21,978	19,527	9,376	8,904	3,749	140
		Exvessel Rev ($)	19,824	15,193	7,291	7,785	1,277	57
	Non-Shrimp Trawl	Landings (lbs)		173,020				
		Exvessel Rev ($)		85,548				
WA	Hook & Line	Landings (lbs)	182,386	206,037	184,726	376,393	470,624	334,782
		Exvessel Rev ($)	258,062	278,436	303,130	538,521	464617	540,182
	Net	Landings (lbs)	C	C	C	C		
		Exvessel Rev ($)	C	C	C	C		
	Pot	Landings (lbs)	864	477		11,132	10,080	106,979
		Exvessel Rev ($)	1,817	1,284		28,035	15,924	169,302
	Shrimp Trawl	Landings (lbs)	23,355	17,145	20,332	25,063	125	97
		Exvessel Rev ($)	11,537	9,774	12,577	12,905	49	54
	Non-Shrimp Trawl	Landings (lbs)	73,597	236,614	604,280	823,468	22,909	121,131
		Exvessel Rev ($)	32,382	112,078	288,282	410,344	17,207	6,491
Total Landed Weight (lbs)			2,490,891	2,757,572	2,714,645	3,251,081	2,816,909	3,550,899
Total Exvessel Revenue ($)			4,969,431	4,908,420	4,495,652	4,679,666	4,950,860	3,546,036

Source: PacFIN VSMRFD and Ext_trips_pfmc files. July 2004 and May 2006
Note: C represents data restricted due to confidentiality
Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

7.1.2.5.4 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 tend 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.

7.1.2.5.5 Major Ports

Table 7-30 shows that the top open access ports are Moss Landing, Port Orford, Morro Bay, Fort Bragg and Gold Beach.

Table 7-30. Top ports for open access groundfish landings and revenue (2000-2003).

Rank	Top 15 Ports for Landed Revenue	Top 15 Ports for Landed Weight
1	MORRO BAY	MOSS LANDING
2	PORT ORFORD	NEAH BAY
3	MOSS LANDING	FORT BRAGG
4	FORT BRAGG	PORT ORFORD
5	GOLD BEACH	PORT ANGELES
6	AVILA	MORRO BAY
7	SANTA BARBARA	GOLD BEACH
8	PORT ANGELES	WESTPORT
9	CRESCENT CITY	EUREKA
10	NEAH BAY	CRESCENT CITY
11	SAN FRANCISCO	ASTORIA
12	MONTEREY	SAN FRANCISCO
13	ASTORIA	AVILA
14	EUREKA	CHARLESTON (COOS BAY)
15	WESTPORT	BROOKINGS

Source: PacFIN VSMRFD files. July 2004

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.

7.1.2.6.1 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 fish 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: 1995 to 2005 (in round weight pounds). (Page 1 of 2)

Species	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
ARROWTOOTH FLOUNDER	240	3		255	13,195	331	961	7,137	49,700	180,500	349,100
DOVER SOLE	1,764	2,441	1,268	4,509	11,594	2,030	4,619	35,417	72,500	184,200	319,600
ENGLISH SOLE		4	118	1,847	593	996	7,103	88,684	149,300	178,700	144,700
PETRALE SOLE		5	12	3,249	545	80	1,954	45,479	185,700	185,400	65,400
REX SOLE					26	151	1,358	6,632	10,900	15,100	30,200
ROCK SOLE				2,396	16		22	5,833	5,200	5,400	5,100
UNSP. FLATFISH				38	775		437	8,406	6,400	14,800	64,400
UNSPECIFIED SANDDAB							1,599	19,655	1,700	800	2,600
SAND SOLE		12	40				269	2,748	62	2,000	1,000
STARRY FLOUNDER		22	54				3	301	20	5,000	2,800
BUTTER SOLE								605			
Flatfish Total	2,004	2,487	1,492	12,294	26,744	3,588	18,325	220,897	481,482	771,900	984,900
BOCACCIO				2	38	145	449				
NOM. CANARY ROCKFISH	59	171	26	609	1,033	539	4,064	7,071	3,200	6,800	9,500
CANARY ROCKFISH				277	252	330	1,380				
NOM. DARKBLOTCHED ROCKFISH									32	300	200
DARKBLOTCHED ROCKFISH				0	36	76	226	3,273			
GREENSTRIPED ROCKFISH				1	51	16	0				
PACIFIC OCEAN PERCH				0	110	20	16				
REDBANDED ROCKFISH				1	128	492	0				
REDSTRIPE ROCKFISH				1	63	131	1,510				
ROUGHEYE ROCKFISH				1	80	76	1,529				
ROSETHORN ROCKFISH				0	0		0				
SHARPCHIN ROCKFISH				1	9	10	85				
SILVERGREY ROCKFISH				0	36	4	12				
UNSP. POP GROUP		3			104			472	200	8,500	7,500
UNSP. ROCKFISH	114,684	79,545	65,121	65,245	59,875	45,953					
WIDOW ROCKFISH				54	411	2,010	16,265				
NOM. WIDOW ROCKFISH					53	3	51	27,969	20,600	47,300	63,000
NOM. YELLOWEYE ROCKFISH									600	1,700	1,800
YELLOWEYE ROCKFISH					68	3	2	0			

Table 7-33. West Coast groundfish catch (at-sea and shoreside) in ocean areas by tribal fleet: 1995 to 2005 (in round weight pounds). (Page 2 of 2)

Species	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
NOM. YELLOWTAIL ROCKFISH	519	1,297	2,471	10,448	28,671	9,585	7,598	572,996	602,200	775,300	1,189,100
YELLOWTAIL ROCKFISH				3,263	6,498	68,463	210,006	0			
Unsp. Shelf Rockfish						3,099	20,503	23,629	6,500	9,900	20,500
Unsp. Near-Shore Rockfish						10	58	116	73	200	500
Unsp. Slope Rockfish						19,891	54,920	32,941	42,100	50,300	63,000
BLACKGILL ROCKFISH							19				
SHORTRAKER ROCKFISH							289				
Rockfish Total	115,262	81,016	67,618	79,903	97,516	150,856	318,982	668,467	675,504	900,300	1,355,100
SPINY DOGFISH		5,521			881	6,251		2,607	8,400	88,300	13,100
LINGCOD	2,873	2,732	1,648	5,247	7,051	6,817	9,429	24,854	49,200	52,500	65,800
PACIFIC COD	2,814	1,540	2,166	4,873	2,677	4,573	8,712	128,530	471,500	678,300	272,600
SABLEFISH	1,696,098	1,881,702	1,775,108	980,719	1,566,260	1,555,808	1,451,522	959,982	1,328,100	1,563,500	1,538,500
UNSPECIFIED SKATE	2,517	1,689	1,017	2,031	2,169	1,920	1,407	18,635	47,200	19,400	51,200
NOMINAL SHORTSPINE THORNYHEAD	15,697	16,010	16,892	7,606	13,251	8,987	10,945	10,499	12,700	14,200	23,800
SHORTSPINE THORNYHEAD				471	240		27				
NOMINAL LONGSPINE THORNYHEAD	1,305	538	139	28					300		400
WALLEYE POLLOCK									257,600	101,200	43,200
Other Groundfish Total	1,721,304	1,909,732	1,796,970	1,000,975	1,592,529	1,584,356	1,482,042	1,145,107	2,175,000	2,517,400	2,008,600
PACIFIC WHITING		33,069,648	54,763,337	54,033,600	56,768,061	13,781,257	13,404,001	45,867,384	51,706,688	63,157,381	75,743,442
All Groundfish Species Total	1,838,570	35,062,883	56,629,417	55,126,772	58,484,850	15,520,057	15,223,350	47,901,855	55,038,674	67,346,981	80,092,042

Table 7-34. West Coast groundfish catch (at-sea and shoreside) in ocean areas by tribal fleet: 1995 to 2005 (exvessel revenue dollars). (Page 1 of 2)

Species	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Arrowtooth Flounder	24	1		26	1,319	33	111	715	5,336	17,738	36,375
Dover Sole	570	768	393	1,478	3,817	663	1,498	11,335	23,215	60,293	112,660
English Sole		1	106	613	220	309	2,726	29,289	49,788	59,394	46,979
Petrale Sole		8	8	3,249	545	84	1,692	46,509	191,963	191,978	66,263
Rex Sole					8	51	471	2,316	3,765	5,250	12,641
Rock Sole				791	5		7	2,033	1,716	1,823	1,744
Unsp. Flatfish				13	271		145	2,773	2,106	4,927	21,296
Unspecified Sanddab							372	5,110	455	263	667
Sand Sole		9	30				204	2,084	47	1,489	630
Starry Flounder		7	16				1	98		1,591	854
Butter Sole								206			
Flatfish Total	594	794	553	6,170	6,185	1,140	7,227	102,468	278,391	344,746	300,109
Bocaccio				1	13	64	207				
Nom. Canary Rockfish	20	60	12	230	372	196	1,901	3,329	1,512	3,238	4,239
Canary Rockfish				97	89	145	655				
Nom. Darkblotched									12	142	62
Darkblotched Rockfish				0	12	33	104	1,477			
Greenstriped Rockfish				0	18	7	0				
Pacific Ocean Perch				0	38	9	7	0			
Redbanded Rockfish				0	44	216	0				
Redstripe Rockfish				0	22	58	689				
Rougheye Rockfish				0	27	33	705				
Rosethorn Rockfish				0	0		0				
Sharpchin Rockfish				0	3	4	39				
Silvergrey Rockfish				0	12	2	5				
Unsp. Pop Group		1			36			212	89	3,852	3,445
Unsp. Rockfish	48,130	32,345	26,723	26,575	25,334	20,737					
Widow Rockfish				19	143	883	7,801	0			
Nom. Widow Rockfish					19	1	16	13,425	9,880	22,618	29,949
Yelloweye Rockfish					24	2	0	0			
Nom. Yelloweye Rockfish									885	1,790	1,876

Table 7-34. West Coast groundfish catch (at-sea and shoreside) in ocean areas by tribal fleet: 1995 to 2005 (exvessel revenue dollars). (Page 2 of 2)

Species	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Nom. Yellowtail Rockfish	189	438	864	3,542	10,256	3,429	3,379	274,509	288,611	368,860	569,781
Yellowtail Rockfish				1,142	2,275	30,124	99,901				
Unsp. Shelf Rockfish						1,758	13,068	9,794	2,623	3,907	8,323
Unsp. Near-shore Rockfish						4	25	14,434	35	103	248
Unsp. Slope Rockfish						8,238	22,558	55	18,626	22,479	27,835
Blackgill Rockfish							9				
Shortraker Rockfish							134				
Rockfish Total	48,339	32,844	27,599	31,606	38,737	65,943	151,203	317,235	322,273	426,989	645,758
Spiny Dogfish		544			177	830		405	1,138	14,994	2,120
Lingcod	1,404	1,255	731	3,007	4,169	4,065	6,075	18,176	34,555	34,335	44,537
Pacific Cod	1,086	587	818	1,924	1,096	1,987	3,792	63,961	235,122	307,518	123,505
Sablefish	3,046,910	3,003,716	3,162,376	1,280,233	2,045,434	2,544,542	2,411,517	1,512,595	2,187,655	2,476,945	2,440,889
Unspecified Skate	588	120	68	136	145	129	143	2,563	6,303	2,014	6,896
Nom. Shrtsp. Thnyhd.	12,581	15,340	14,828	7,310	10,751	7,199	8,414	8,232	10,601	11,408	15,647
Shortspine Thornyhead				425	215		20				
Nom. Longsp. Thnyhd.	1,057	515	125	25					228		258
Walleye Pollock									136,612	14,021	6,277
Other Groundfish Total	3,063,626	3,022,077	3,178,946	1,293,060	2,061,987	2,558,752	2,429,961	1,605,932	2,612,214	2,861,235	2,640,129
Pacific Whiting		1,651,982	2,735,683	2,699,229	2,838,403	551,250	536,160	2,065,122	2,585,334	1,894,721	3,787,172
All Groundfish Species Total	3,112,559	4,707,697	5,942,781	4,030,065	4,945,312	3,177,085	3,124,551	4,090,757	5,798,212	5,527,691	7,373,168

As the Makah tribe has the largest tribal fleet, what follows is a detailed description of Makah groundfish fisheries and management practices. Currently, the Makah fleet is composed 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.

7.1.2.6.2 Tribal Harvests and Revenues

Tables 7-33 and 7-34 shows recorded landings of groundfish species by treaty tribes from 1995 to 2003, as developed by the Northwest Indian Fisheries Commission. Since 1996, Pacific whiting have comprised the vast majority of tribal landings, even though in 2000 and 2001 whiting landings were relatively low due to reduced coastwide allocations. 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 rockfish to bring total tribal groundfish revenues to a level of $7.5 million in 2005.

7.1.2.6.3 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.

7.1.2.6.4 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 the new method for estimating total marine recreational finfish catch and effort in California. 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 direct comparability of pre-2004 data with data collected under the new system is still being evaluated. So the discussion below replicates the discussion of recreational fisheries and 1996-2003 trends found in the 2005-2006 Specifications EIS (PFMC 2004b), as it is still the best available overview of West Coast recreational fisheries. This discussion is then followed by presentation of 2004-2005 recreational data provided by the states through 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 were projected to make 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 EIS. Estimates of private boats are unavailable. In terms of proportion, Table 7-38 shows the distribution of trips by boat mode and region in 2003. Approximately 80 percent of the trips taken are from private vessels. Almost 90 percent of all trips taken and one-half of the charter vessel trips were associated with California.

Recreational fishing in the open ocean has generally been declining slightly since 1996 (

Table 7-39); however, charter effort has decreased while private has effort increased during that period. Part of this increase likely resulted from longer salmon seasons associated with increased abundance. Some effort shift from salmon to groundfish for example likely occurred prior to 1996 when salmon seasons were shortened.

Table 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 2004b)

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/Mr 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. Total estimated 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 2004b)

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/	2003b/
Total Angler Trips								
Washington	51	50	44	49	40	61	56	61
Oregon	54	65	57	60	87	70	62	75
North and Central CA	90	139	158	162	206	221	142	148
Southern CA	982	812	674	609	876	577	438	574
Total	1,177	1,066	933	880	1,218	927	843	858

Source: 2005-2006 Specifications EIS (PFMC 2004b)

a/ The 2001 and 2002 estimates are not directly comparable to previous years due to differences in estimation methodology

b/ Preliminary

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 2004-2005 State Recreational Estimates

Through the Council's GMT process, total angler trips by mode and by target were developed by each of the States for years 2004 and 2005. In terms of total trips, there was a decline in coastwide trips from 1.6 million trips to 1.2 million trips, with all states and modes in decline, particularly the California charter boat mode. (As indicated above, the latter values may be underestimates.)

The following estimates of trips in which groundfish were a target were provided through the GMT process (Table 7-41). Unlike total angler trips, total groundfish trips increased by 20 percent in 2005 over 2004. Except for Coos Bay which showed a decline in charter boat trips, this pattern is consistent across all states, areas and ports, and by mode. These estimates suggest that anywhere from 25 percent (2004) to 40 percent (2005) of West Coast angler trips are trips targeted on groundfish. 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 overall enjoyment and perceived value of the trip.

Table 7-40. Trends in recreational angling, total trips (in thousands) – all fisheries including groundfish.

		2004	2005
Washington	Private	134	112
	Charter	63	60
	Total	197	172
Oregon	Private	160	115
	Charter	58	35
	Total	218	150
California	Private	536	520
	Charter	689	354
	Total	1225	874
Total	Private	830	747
	Charter	810	449
	Total	1640	1196

Table 7-41. Estimates of groundfish trips (in number of trips).

		2004 Charter	2004 Private	2004 Total	2005 Charter	2005 Private	2005 Total
Washington							
	North Washington Coast	187	8,147	8,334	648	12,702	13,350
	South and Central Coast	11,588	2,007	13,595	13,114	2,207	15,321
	Total	11,775	10,154	21,929	13,762	14,909	28,671
Oregon							
	Astoria-Tillamook	4,677	2,508	7,185	5,139	6,169	11,308
	Newport	17,936	4,198	22,134	22,333	7,157	29,490
	Coos Bay	4,322	3,159	7,481	4,172	5,355	9,527
	Brookings	4,191	11,667	15,858	4,596	16,506	21,102
	Total	31,126	21,532	52,658	36,240	35,187	71,427
California	North Coast	4,909	29,898	34,807	1,265	57,161	58,426
	North Central Coast	32,478	54,512	86,990	29,066	94,930	123,996
	South Central Coast	41,119	44,765	85,884	27,201	65,291	92,492
	South Coast	112,493	34,457	146,950	85,874	46,684	132,558
	Total	190,999	163,632	354,631	143,406	264,066	407,472
Grand Total		233,900	195,318	429,218	193,408	314,162	507,570

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 plants (The Research Group 2003), but other plants have remained inactive. This has led to trucking groundfish from certain 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 2002 Oregon had the largest amount of groundfish landings (56 percent), followed by Washington (28 percent), and California (16 percent). Oregon also had the largest amount of exvessel revenue (40 percent), followed by California (32 percent) and Washington (22 percent), respectively. Oregon accounts for the majority of Pacific whiting landings, which creates a large difference between the share of landed catch and exvessel revenue because Pacific whiting has a relatively low price per pound. 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 may receive 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 West Coast fisheries may focus on relatively smaller throughput of groundfish.

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 West Coast has also generally declined in recent years. When buyers are classified on a species basis— e.g. buyers who purchased groundfish— slight evidence of a decline in California and Washington is evident (Table 7-42). When buyers are classified on a groundfish gear basis—e.g. how many buyers purchased sablefish from fixed gear-sablefish fishermen—evidence of decline is stronger (Table 7-43). Because of the multi-species involvement of most buyers, it is hard to develop unique counts of buyers by either of these two methods 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 7-42. Count of buyers purchasing fish caught in Council waters by year, species, type, and state (not unique records).

State	Species Group	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
CALIFORNIA	Coastal Pelagic	180	166	154	188	209	149	174	127	124	108	159
	Crab	301	236	242	262	294	271	298	307	300	357	473
	Groundfish	529	436	403	444	460	440	412	386	335	310	441
	Highly Migratory	217	185	189	267	269	265	233	241	226	203	231
	Other	582	472	448	498	538	557	558	515	533	515	690
	Salmon	240	240	238	231	264	243	277	225	273	275	343
	Shellfish	94	65	61	42	4	8	6	10	2	2	5
	Shrimp	186	137	153	174	168	157	154	126	136	107	117
OREGON	Coastal Pelagic	13	15	13	15	15	15	14	15	16	16	17
	Crab	90	89	76	72	74	76	67	78	81	84	77
	Groundfish	75	74	78	80	74	72	84	75	79	82	83
	Highly Migratory	93	72	87	99	146	110	96	114	125	143	119
	Other	73	69	80	80	97	86	89	92	103	97	94
	Salmon	69	74	89	83	81	85	104	134	143	154	121
	Shellfish	39	29	13	12	14	19	19	14	46	28	29
	Shrimp	40	40	37	38	39	35	36	37	31	27	25
WASHINGTON	Coastal Pelagic	23	20	19	19	16	11	12	17	16	15	12
	Crab	125	129	123	120	144	129	125	125	158	168	156
	Groundfish	73	51	56	51	50	39	43	42	40	45	42
	Highly Migratory	33	30	30	30	57	38	37	39	55	53	45
	Other	129	105	104	102	115	103	109	102	98	106	106
	Salmon	188	190	184	178	173	161	189	218	219	213	202
	Shellfish	228	246	226	208	207	181	167	180	177	170	194
	Shrimp	60	56	60	71	77	74	75	72	72	80	72

Source: PacFIN ftl and ft tables. December 2005

Note: records are not unique buyers and should not be summed

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**

7.1.4.1.1 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 & Hamiliton, 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,

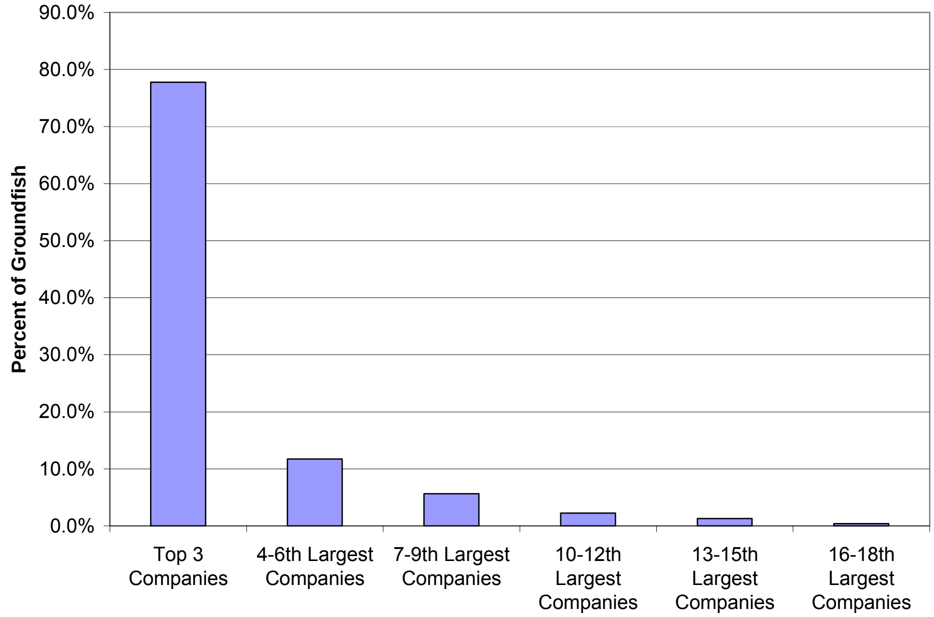
Washington and Oregon." (Note—In early May 2006 the proposed purchase of Ocean Beauty Seafoods was called off.)

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 West Coast in 2004 and 2005.

7.1.4.1.2 Processing Labor, Processing Capital and the Groundfish Fishery

Processing Labor

Employment and wage information from the Bureau of Labor Statistics shows that seafood processing along the West Coast generates approximately 380 to 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 represents the largest proportion 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 occurring in West Coast fisheries.

In support of this EIS, the Report: "Trends in Fishing and Seafood Processing Related Employment Statistics" (Appendix A) was developed in an attempt to investigate all available federal data on seafood processing and on employment. Its conclusions also support the analysis above. This report also has shed some light on seasonality of employment, age and gender of seafood workers. For the seafood processing industry, the 35 to 44 age group is the predominant workforce in all three states, representing 30 to 35 percent of workers employed. The next largest group is the 45 to 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 (information from private entities).

		State			
	Year	Washington	Oregon	California	Sum
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
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
Total wages from seafood product preparation and packaging	2001	$293,322,000	$ 21,478,000	$66,624,000	$ 381,424,000
	2002	$293,013,000	$ 21,178,000	$65,529,000	$ 379,720,000
	2003	$300,751,000	$ 21,115,000	$78,654,000	$ 400,520,000
	2004	$308,261,000	$ 21,507,000	$87,722,000	$ 417,490,000
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	
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	

Source: Bureau of Labor Statistics. December 2005. Quarterly Census of Employment and Wages. Personal Communication. http://www.bls.gov/data/

Workers within the unspecialized category are typically in higher supply and are relatively easy to hire if there happens to be a shortage of workers in that category. 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 determined that there is not a single month when there is not at least one major buyer that is not making a major purchase of groundfish.

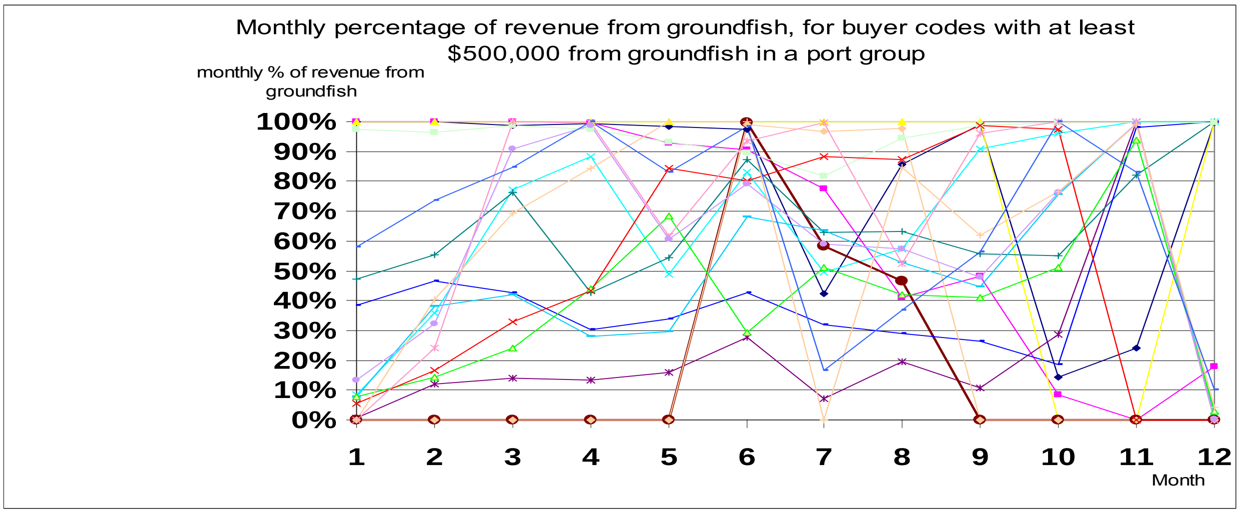


Figure 7-3. Seasonality of groundfish purchases by major buyers. (Note: Each line represents an individual buyer).

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 (The Research Group 2003). This is verified by the 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

Unless otherwise noted (marked with a "*"), discussion below is taken from the 2005-2006 Groundfish Specifications EIS.

7.1.4.2.1 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.

7.1.4.2.2 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 to 1997 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.

7.1.4.2.3 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
Flatfish—prices declined in 2004 and 2005 but not to the 1999 level
Rockfish—after a major increase in 2004, price fell significantly in 2005
Total Groundfish—prices in 2004 and 2005 similar but not as low as that in1999
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

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.

7.1.4.2.4 Exprocessor 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 2004b). 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. Preliminary 2003 estimates of producer price indices for fish and meat products were higher than seen in recent years, possibly due to the continuing improvement in the world economic outlook.

7.1.4.2.5 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 2004b).

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	Flatfish	Sablefish	Rockfish	Total Groundfish	Revenue/hour	Fuel
	$/lb	$/lb	$/lb	$/lb	$/lb	$/hr	$/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				Bottom Trawl	
	Whiting	Flatfish	Sablefish	Rockfish	Total Groundfish	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)

7.1.4.2.6 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 nonfishing 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, Options 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) option value placed on knowing a fish population, habitat, or ecosystem has been protected and is available for use, regardless of whether the resources are actually used; and (3) 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 Magnuson Stevens Act 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.

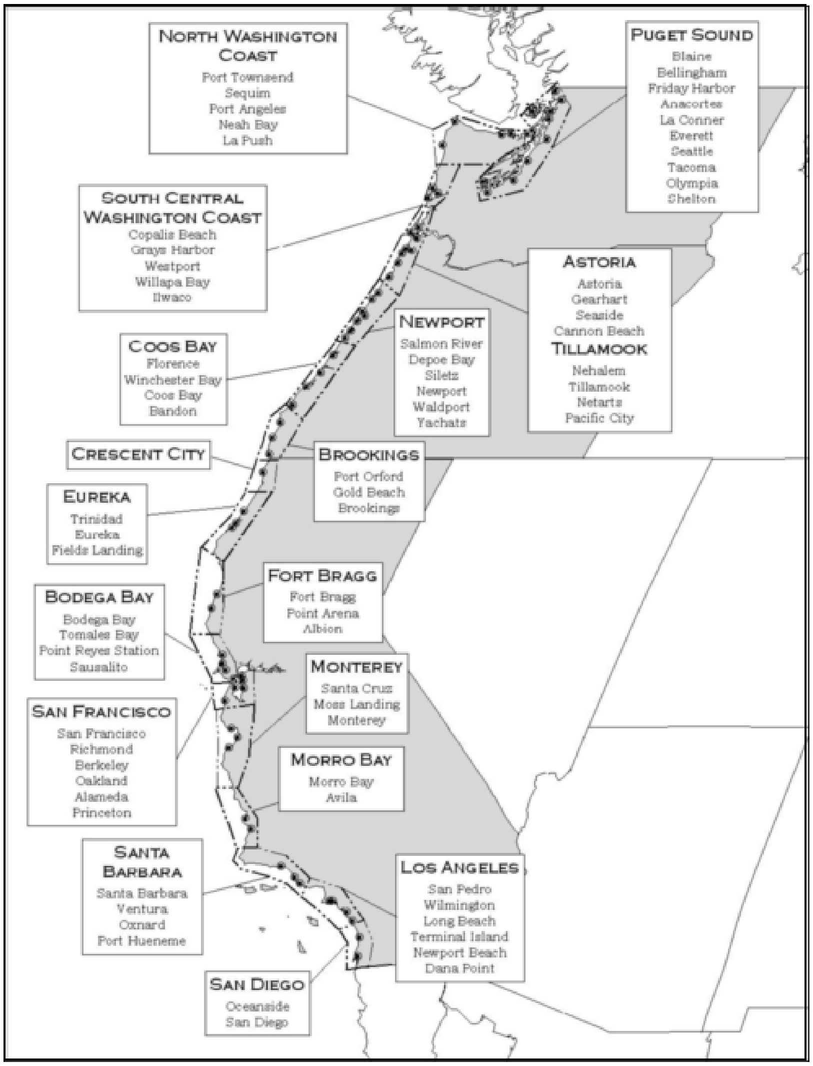


Figure 7-4. West Coast fishing communities.

Table 7-47. Port group county community relationships. (Page 1 of 2)

Port Group Area	County	Name
Washington		
Puget Sound	Whatcom	Blaine
	Whatcom	Bellingham Bay
	San Juan	Friday Harbor
	Skagit	Anacortes
	Skagit	La Conner
	Snohomish	Other North Puget Sound Ports
	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. (Page 2 of 2)

Port Group Area	County	Name
California Recreational Groupings		
North Coast: Humboldt and Del Norte Counties		
North-Central: Sonoma, Mendocino , San Mateo to Marin		
South-Central Coast: San Luis Obispo through Santa Cruz		
South Coast: Ventura 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" (Appendix A). The reader also is directed to Tables 7-4a and 7-4b. For additional reference, section 8.1.6 of the 2005-2006 EIS and its associated Chapter 8 of Appendix A contain information on fishing communities. For a much more expansive discussion of fishing communities, the reader is referred to the NMFS Northwest Fisheries Science Center website, which contains detailed descriptions of West Coast fishing communities: http://www.nwfsc.noaa.gov/research/divisions/sd/communityprofiles/index.cfm. The reader is also referred to the Environmental Justice discussion below, which identifies communities of concern with respect to minority and low income populations.

In addition to this data, PacFIN data tables developed by NMFS SWFSC that describe by port and groundfish sector the number of dealers, vessels, revenues, landings, and vessel trips (Appendix A section A.3). To synthesize the information found in all of the tables described above, the key analysis done for this EIS is the "Fishing Community Engagement, Dependence, Resilience and Identification of Potentially Vulnerable Communities" study (Appendix A section A.4). The key results of this study follow.

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 communities and counties to the degree that a community or county was:

"engaged"—level of involvement in fishing
"dependent"—involved in the groundfish fishery
"resilient"—able to adapt to change
"vulnerable"—"highly dependent" and "having low resilience"
"most vulnerable" – "highest dependence" and "least resilient"

The methodology and results are presented in section A.4, which contains the following tables:

Table A.4-1. Socioeconomic and cultural indicators
Table A.4-2. Determining dependence
Table A.4-3. Methodologies used in past research to identify dependence
Table A.4-4. Determining resilience
Table A.4-5. Linking dependence and resilience to identify vulnerable areas
Table A.4-6. Distressed areas
Table A.4-7. Commercial indicators and rankings city
Table A.4-8. Commercial indicators and rankings by county
Table A.4-9. Commercial fishing engagement scores by city
Table A.4-10. Commercial fishing engagement scores by county
Table A.4-11. Groundfish dependency scores by city
Table A.4-12. Groundfish dependency scores by county
Table A.4-13. California charter vessels ranked by region
Table A.4-14. California recreational indicator values and rankings by region
Table A.4-15. Oregon and Washington recreational indicator values and rankings by city
Table A.4-16. California recreational engagement scores by region

Below are the conclusions of the study.

7.1.5.2.1 Vulnerable Commercial Communities and Counties

With regard to engagement in commercial fishing, twenty-nine cities are 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" is, the more engaged the community. However, high "resiliency scores" imply the opposite. High "resiliency scores" imply low resiliency 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, thirty-two 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 highly engaged and highly dependent (see Table A.4-22).

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 regard 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 (see Table A.4-23).

7.1.5.2.2 Recreational Fishery

Ten cities are identified as vulnerable areas with regard to recreational fishing in Oregon and Washington. These cities are bolded in Table A.4-22 under the recreational column. 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 recreational vulnerable cities include Gold Beach, La Push, Neah Bay, Newport, Pacific City, Westport, and Winchester. Newport has very high recreational engagement (score of five) but also high resilience (score of one). La Push, Neah Bay and Winchester 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, compared to city and county level data available for the resiliency indicators. However, the study identifies some California communities as potentially vulnerable areas based on commercial engagement in and dependency on the groundfish fishery. Table A.4-16 shows that San Luis Obispo through Santa Cruz counties and San Diego through Los Angeles counties are most engaged in recreational fishing and dependent on the groundfish recreational fishery. Los Angeles, San Luis Obispo and Santa Barbara counties are all ranked as least resilient (Table A.4-23).

7.1.5.2.3 Summary

In summary, thirty-eight cities and eighteen counties are identified as commercial and/or recreational vulnerable areas (areas with high engagement or dependence on commercial or recreational fisheries and low resilience to change). Tables A.4-22 and A.4-23 display the results of the analysis. To qualify as a vulnerable area, a city or county must be listed in the top one-third of ranked indicator values for at least one engagement or dependency indicator and one resiliency indicator. When stricter ranking requirements are applied so that a community has to be ranked in the top one-third of an indicator twice under engagement and/or dependence and resilience, a smaller pool of cities and counties qualify. These seventeen 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 fifteen 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 vulnerable. These cities and counties are labeled "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 repeats the discussion found in The final EIS for the 2005-06 specification document (PFMC 2004b).

7.1.5.3.1 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 2004b) 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 alternatives, 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 are thus 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)[27/].

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 will not be available in time for use in this analysis, nor will 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. A simple analysis of expected change in vessel cost structure associated with implementation of selective flatfish trawl fishery is included. Changes in operational flexibility resulting from regulatory constraints will be addressed qualitatively as an indicator of impacts on production costs. Effects on human health and safety will be discussed primarily in terms of the effect of revenue changes on vessel maintenance and the effect of changes in the RCA on travel distances to fishing ports.

The 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

[27]/ FEAM includes estimates of industry (commercial vessels, processors and recreational angling businesses) cost and output parameters that have been adopted from informal surveys over the past 20 years. The Council's economic modeling methodologies are discussed in Appendix D of 2005-2006 EIS.

[28]/ 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).

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. 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 2005-2006 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 total 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.

7.2.5.1.1 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 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

[29/] Arguments that might be used to estimate willingness to pay include, among others, attractiveness of the location and distance traveled by the fisher.

revenue of the recreational fishing-related businesses as a direct loss in local income, analysis of net 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.

7.2.5.1.2 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. Also considered are the proposed closure periods compared with the seasonal effort pattern observed, and the effect of inshore closed area shifts under the alternatives.

It should be noted that these estimates probably do not adequately project the effect of management changes on the distribution of effort, nor do they incorporate the impact of other changes on demand for recreational fishing experience. However this is the best available approach for evaluating impacts given the data limitations.

7.2.5.1.3 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.

7.2.5.1.4 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 a given 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 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 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 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. In evaluating the alternatives, two different approaches are undertaken. The first approach attempts to develop exvessel impact estimates on a on a finer scale with respect to gear groups and fisheries than the second approach. The second approach provides information on personal income and other variables. The first approach uses 2005 as a reference point. Whereas the second approach uses the No-Action Alternative as a reference point. Both approaches also discuss recreational fisheries

First Approach –A: Commercial sectors are nearshore groundfish, limited entry trawl, whiting, fixed gear sablefish north of the Conception area, fixed gear south of Pt. Conception, and Total.

Second Approach –B: Commercial sectors are Limited Entry trawl (including or excluding whiting), tribal shoreside, tribal at sea, open access groundfish, and total limited entry sablefish.

The methodology and groupings of tribal and commercial sectors differs slightly between each approach, but recreational fisheries are analyzed the same way. Approach A provides estimates of exvessel values and recreational trips. Approach B provides commercial estimates and projections by alternatives on landing, revenues, and personal income and recreational estimates and projections of trips, angler expenditures, and personal income. Approach A provides information on a regional basis; Approach B provides information on a port and community basis. Approach A analyzes the five rebuilding alternatives discussed in Chapter 2 and brought before the Council in April. Approach B focuses on only the three action alternatives, the no action alternative, and provides estimates of 2005 and 2006 activity. Approach A does not address 2006 or the no-action alternative; however, it does address the "No Fishing" option.

For this document, both analyses will be used. Because it addresses the link between management and economic impact, Approach A analyses will be used to walk through the alternatives. This discussion will then be followed by a summary of the Approach's B's estimates.

Since both approaches discuss the action alternatives, Table 7-49 has been developed to provide the reader with a quick reference to the major changes in OYs from 2005-2006 levels under the action alternatives.

Table 7-49. Optimum yields for rebuilding species and representative target species by action alternative.

	2005 & 2006 OY		OY Alternative			Change from 2006 OY			% change from 2006 OY		
SPECIES	2005	2006	Action 1	Action 2	Action 3	Action 1	Action 2	Action 3	Action 1	Action 2	Action 3
OVERFISHED SPECIES											
PACIFIC OCEAN PERCH	447	447	44	100	100	-403	-347	-347	-90%	-78%	-78%
WIDOW ROCKFISH	285	289	120	368	368	-169	79	79	-58%	27%	27%
CANARY ROCKFISH	47	47	32	44	44	-15	-3	-3	-32%	-6%	-6%
BOCACCIO	307	309	40	218	218	-269	-91	-91	-87%	-29%	-29%
COWCOD	4.2	4.2	4	8	8	-0.2	3.8	3.8	-5%	90%	90%
DARKBLOTCHED	269	200	130	229	229	-70	29	29	-35%	15%	15%
YELLOWEYE	26	27	12.6	23	23	-14.4	-4	-4	-53%	-15%	-15%
TARGET SPECIES											
PACIFIC WHITING (US)	269,069	269,069	150,000	220,000	260,000	-119,069	-49,069	-9,069	-44%	-18%	-3%
LINGCOD - coastwide	2,414	2,414	6,280	6,280	6,280	3,866	3,866	3,866	160%	160%	160%
SABLEFISH (coastwide)	7,761	7,634	5,934	5,934	5,934	-1,700	-1,700	-1,700	-22%	-22%	-22%
YELLOWTAIL ROCKFISH	3,896	3,681	4,548	4,548	4,548	867	867	867	24%	24%	24%
SHORTSPINE THD	999	1,018	2,055	2,055	2,055	1,037	1,037	1,037	102%	102%	102%
NEARSHORE SPECIES	122	122	142	142	142	20	20	20	16%	16%	16%
DOVER SOLE	7,476	7,564	16,500	16,500	16,500	8,936	8,936	8,936	118%	118%	118%
ENGLISH SOLE	3,100	3,100	6,237	6,237	6,237	3,137	3,137	3,137	101%	101%	101%
PETRALE SOLE (coastwide)	2,762	2,762	2,499	2,499	2,499	-263	-263	-263	-10%	-10%	-10%
STARRY FLOUNDER	1,221	1,395	890	890	890	-505	-505	-505	-36%	-36%	-36%

7.2.8 Economic Impact of Management Measures Designed to Achieve the OY Alternatives—Discussion of Approach A

This section discusses the economic impact of management measures that were designed and analyzed with the intention of achieving the OYs described in chapter 2 of this EIS. The alternatives discussed in chapter 2 show a set of alternatives originally considered during the winter of 2006 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 (see section 2.1.1.1). These analyses led to the selection of the final Council-preferred alternative for 2007-2008 ABCs and OYs for target and rebuilding species along with accompanying fishery management measures. The initial set of OY alternatives pertaining to overfished species described in chapter 2 are referred to here as "rebuilding alternatives", the second set of alternatives that were selected by the council for further analysis during the April 2006 meeting are referred to as "preferred high/low OY alternatives" (for depleted species) or "action alternatives" (for management measures), and the third alternative ultimately adopted by the Council is referred to as the "final Council-preferred alternative".

7.2.8.1 Overview

The OY alternatives for target and rebuilding species differ from 2005 and 2006 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.

For the 2007 and 2008 season, the OYs of several key target species will differ relative to the 2005 and 2006 seasons. The OYs for Dover sole, English sole, and shortspine thornyhead will increase substantially based on the Council's final preferred alternative for abundant target species. In response, management measures could be crafted which 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 target species will have a decrease in the OY compared to the 2005-2006 OYs. Petrale sole and sablefish, for example, will have a 22% and 10% reduction in OY under the final Council-preferred alternatives, respectively, and these OYs are expected to constrain the take of other target species to some degree.

The 2007-2008 OYs for rebuilding species will differ from 2006, though the degree of difference depends on the alternative. Under Action Alternative 1, all OYs are reduced compared to 2006 levels. Under Action Alternatives 2 and 3, the OYs of most overfished species are reduced compared to 2006 levels, but the OYs for widow, cowcod, and darkblotched rockfish would increase. However, the OY for darkblotched rockfish is equivalent to 2006 levels when the OY is measured relative to the spawning potential ratio, and analysis shows that this OY is expected to constrain some fisheries more than the 2006 OY based on expectations that the darkblotched rockfish bycatch rate will also increase. The final Council-preferred alternative has lower OYs compared to the 2005 and 2006 OYs for almost every species except for darkblotched rockfish and widow rockfish. These OYs (darkblotched and widow rockfish) are set higher based on increasing abundance of both species, increases in the incidental catch rate of both species, and the anticipation that these increases will continue into the future.

Table 7-49 provides information on the difference and change in OYs for rebuilding species and some of the key target species. This information is useful for showing why exvessel revenue can change under some of the alternatives, the cause of those changes, and providing insight into some of the management responses anticipated to stay within the OYs that are ultimately adopted by the Council.

A summary comparison of exvessel revenue calculations by sector and recreational effort projections provides a glance at the economic impacts of each alternative. Table 7-50 shows that compared to 2005, coastwide exvessel revenues generated by commercial vessels in directed groundfish sectors show the least amount of change under the final Council-preferred alternative, followed by Action Alternative 3. Action Alternative 1 shows the largest degree of difference, and Action Alternative 2 is in between. The impacts of the five rebuilding alternatives originally analyzed range from exvessel revenues that are slightly higher than 2005, to revenues that are slightly lower than expected under Action Alternative 1. On a sector specific basis, all action alternatives negatively impact the fixed gear sablefish sector because the OY for sablefish is lower in 2007 and 2008 than it was in 2005 and 2006. The nearshore groundfish sector is most impacted by Action Alternative 1, least impacted by Action Alternative 3 and the final Council-preferred alternative, and more moderately impacted by Action Alternative 2. The limited entry bottom trawl sector is most impacted by Action Alternative 1, has slightly higher revenues than 2005 under Action Alternative 2, and highest revenues under Action Alternative 3 and the final Council-preferred alternative. The limited entry whiting sector is most negatively impacted by Action Alternative 1, but Action Alternative 3 allows this sector to attain higher revenues than 2005 if the high whiting OY catch levels are attained[30]. Action Alternative 2 constrains the whiting sector to revenues that are somewhat less than status quo. Fixed gear fisheries south of Pt. Conception are negatively impacted by Action Alternative 1, but remain at status quo exvessel revenue levels for Action Alternatives 2 and 3 and the final Council-preferred alternative.

Table 7-50. Coastwide exvessel revenue by directed non-tribal groundfish sector and alternative (thousands of US dollars).

		CP	Action Alternatives			Rebuilding Alternatives				
Sector	2005	Council Preferred	Action 1	Action 2	Action 3	Reb Alt 1	Reb Alt 2	Reb Alt 3	Reb Alt 4	Reb Alt 5
Nearshore Groundfish	2,847	2,847	2,257	2,791	2,847	2,295	2,791	2,847	2,295	2,295
LE Bottom Trawl	21,969	23,599	12,982	22,868	23,145	24,165	23,491	27,660	25,288	13,758
LE Whiting	29,562	30,146	17,293	23,135	30,146	17,293	30,146	30,146	17,293	17,293
FG Sablefish N CP	14,387	8,723	8,723	8,723	8,723	8,723	8,723	8,723	8,723	8,723
FG South 34 27	2,137	2,137	1,517	2,137	2,137	2,137	2,137	2,137	2,137	1,517
Total	68,765	67,452	42,772	59,654	66,998	54,613	67,288	71,513	55,736	43,586
% of 2005	100%	98%	62%	87%	97%	79%	98%	104%	81%	63%

In terms of recreational effort, Table 7-51 shows that Action Alternative 3 results in the highest amount of recreational effort followed by the final Council-preferred alternative, Action Alternative 2, and Action Alternative 1 respectively. Both Action Alternative 3 and the final Council-preferred alternative result in more angler trips than in 2005. Although not shown in the table, the increase in angler trips under these two alternatives occurs off the coast of California, while the number of angler trips off Washington and Oregon remain similar to 2005 levels under Action Alternative 3 and the final Council-preferred alternative.

[30] The Pacific whiting ABC and OY levels are estimated and adopted by the Council in the spring of each year.

Table 7-51. Coastwide recreational effort estimates by target and action alternative (in number of angler trips).

		CP	Action Alternatives			Rebuilding Alternatives				
Target	2005	Council Preferred	Action 1	Action 2	Action 3	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Ground-fish	507,570	540,762	325,127	395,025	556,893	418,408	504,200	519,956	414,950	322,675
Halibut	31,359	30,980	25,563	26,246	30,980	32,254	30,980	32,254	26,246	25,563
Total Bottom-fish	538,929	571,742	350,690	421,271	587,873	450,662	535,180	552,210	441,196	348,238
Ground-Fish	% of 2005	107%	64%	78%	110%	82%	99%	102%	82%	64%
Halibut		99%	82%	84%	99%	103%	99%	103%	84%	82%
Total Bottom-fish	% of 2005	106%	65%	78%	109%	84%	99%	102%	82%	65%

7.2.8.2 Final Council-Preferred Alternative

The final Council-preferred alternative generates slightly lower exvessel revenue on a coastwide basis when compared to 2005 and originally scheduled 2006 regulations, but the distribution of these impacts is different across sectors. In terms of recreational effort, the number of angler trips is higher under the final Council-preferred alternative when compared to 2005 and 2006, but most of this increase occurs off California. The number of angler trips off Oregon and Washington are similar to 2005 and 2006.

An economic impact of this 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 differ from predictions, there is often a response during the fishing season to constrain one or more sectors 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 those deviations will occur and to what degree they 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 Pacific ocean perch 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.

While analysis of the action alternatives showed smaller impacts to darkblotched rockfish, widow rockfish, and Pacific ocean perch per economic impact, observation of the 2006 season showed that the incidental catch rate of these species was increasing faster than anticipated, and setting the OY at levels near predictions shown in the action alternatives would likely result in an inseason response during the 2007 and 2008 season that would have negative economic consequences. The fact that the trend in incidental catch rates is increasing and is measurable means that the Council's GMT is able to anticipate increases in the incidental catch rate during the 2007 and 2008 fishing year, and catch rate predictions for these rebuilding were increased as a result.

In addition to anticipating increases in the incidental catch rate, the final Council-preferred alternative creates a buffer between predicted total mortality and the OY for darkblotched, Pacific ocean perch, and widow rockfish. While point estimate predictions show that the fishery could achieve predicted economic impacts with lower OYs for those species, point estimates do not take into account likely deviations between predictions of catch and actual catch. If actual catch is higher than predicted catch, some constraining inseason management response is necessary and this has the potential to increase economic impacts. The final Council-preferred alternative accommodates the likelihood that actual catch will deviate from predicted catch by establishing a buffer on these species, and in doing so, reduces the amount of uncertainty surrounding the economic impact predictions.

7.2.8.2.1 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 Pacific ocean perch. 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 driven by those species.

Under the final Council-preferred alternative, the limited entry bottom trawl sector is predicted to generate slightly more exvessel revenue than it had in 2005 and from what is projected from the originally scheduled 2006 regulations, but this is primarily driven by increases in the abundance of Dover sole and shortspine thornyhead 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 2005 and 2006. Namely, the deepwater portion of the fishery is scheduled to fish outside 250 fm in areas north of 40°10' N latitude for several periods of the year, whereas originally scheduled 2005 and 2006 regulations allowed vessels to fish between 200 fm and 250 fm in the same area for most of the year. This change represents a decrease in the amount of fishable area and an increase in the cost of fishing because more fuel is required to travel to, and fish at, those deeper depths. Though the bycatch of rebuilding species that are found in deeper waters is expected to be minimized, based on the increasing trend of incidental darkblotched rockfish and Pacific Ocean perch encounters, the higher OY for darkblotched rockfish (compared to the 2006 OY) is not expected to translate into more fishing opportunity.

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/February 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 (see section 7.1.4.1.2 for further information on the importance of a year round fishery to the processing sector). In 2004 and 2005 the November/December petrale sole 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 Council's final preferred alternative sets rebuilding species OYs at levels designed to accommodate a winter petrale season. In particular, the darkblotched rockfish 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 sole season.

Table 7-52. Limited Entry bottom trawl exvessel revenue by region and period under the final Council-preferred alternative (US dollars).

	Two Month Period						
Region	1	2	3	4	5	6	Total
N WA	248,511	247,520	430,302	585,992	271,283	227,046	2,010,655
S WA / N OR	1,358,776	1,469,564	1,758,913	1,678,039	1,381,018	1,081,191	8,727,500
S OR / N CA	1,060,028	1,098,509	1,260,806	1,507,131	1,348,148	1,146,934	7,421,557
OTHER CA	408,154	556,565	1,183,058	1,305,948	1,045,451	766,949	5,266,126
UNKN	20,036	31,732	55,736	32,996	21,853	11,056	173,409
Total	3,095,505	3,403,891	4,688,816	5,110,106	4,067,752	3,233,176	23,599,247

7.2.8.2.2 Impacts to the Limited Entry Whiting Trawl Fishery

The limited entry whiting fishery is able to attain revenues that are similar to revenues generated in 2005 and scheduled for 2006. Rebuilding species that largely constrain the whiting fishery include widow and canary rockfish. While the 2007 and 2008 final Council-preferred widow rockfish OY alternative is 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 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 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 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 region and period under the final Council-preferred alternative.

		Two Month Period						
Sector	Region	1	2	3	4	5	6	Total
At Sea	N WA			2,934,442	11,479,234	2,452,763		15,112,714
Shore-based	N WA	-	-	6,752	21,283	6,737	-	34,771
	S WA / N OR	-	169,903	3,214,833	7,003,624	59,194	-	10,447,554
	S OR / N CA	2,944	115,838	619,366	1,239,219	15,907	-	1,993,274
	OTHER CA	-	-	-	-	-	-	-
	UNKN	-	-	-	-	-	-	-
	Total	2,944	285,741	6,775,392	19,743,359	2,534,601	-	27,588,313

7.2.8.4.3 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.

In areas north of 40°10' N latitude, the shoreward RCA boundary is established at 30 fm (status quo). Target species harvest levels would be set at levels consistent with adopted ABC/OY levels for those species and the interaction that fisheries for those species have with incidental catches of depleted rockfish. From 40°10' N latitude south to 34°27' N latitude, the shoreward non-trawl RCA boundary is adjusted from 30 fm during periods 1, 2, 5, and 6 and 20 fm during periods 3 and 4 (status quo) to 30 fm during all periods. Target species harvests would be set at levels consistent with adopted ABC/OY levels for those species and the impact those target species harvest levels imply for incidental catches of depleted rockfish.

7.2.8.2.4 Impacts to Fixed Gear Sablefish Sectors North of 36° N Latitude

Management measures imposed on the fixed gear sablefish sectors that are designed to reduce the catch of overfished species largely center on the impacts to yelloweye rockfish and, to a lesser extent, canary rockfish. Management measures designed to reduce the bycatch of these species in the fixed gear sablefish sectors are limited to depth restrictions of varying extent depending on the alternative. Sablefish catch levels that are lower than the OY are not considered in the management measures because under all alternatives the sablefish OY is much lower than 2005 and 2006 levels, and this implies reductions in the bycatch of overfished species. The reduction in the sablefish OY occurs as a result of the 2005 sablefish stock assessment (see section 2.1.2).

The fixed gear sablefish sectors generate less exvessel revenue under the final Council-preferred alternative ($8.7 million) than 2005 and 2006, because the OY for sablefish is reduced in 2007 and 2008. The decrease in the sablefish OY results in less effort being expended by sablefish fishers, and this reduces the incidental catch of several depleted groundfish species.

7.2.8.2.5 Impacts to Groundfish Fixed Gear Sectors South of 34° 27 N Latitude

Fixed gear fisheries south of Pt. Conception have less restrictive area management under the final Council-preferred alternative, as the size of the CCA is smaller than in 2005 and 2006. An increased in accessible fishing areas is expected to result in easier attainment of target slope species catch limits. Catch limits are scheduled to remain the same as in 2006. While changes in exvessel revenue under this alternative are not predicted to differ to any appreciable degree from status quo, costs may be lower under this alternative because vessels will be able to fish areas of higher CPUE or areas closer to their home port, which should decrease travel cost and the amount of time needed to attain catch limits.

7.2.8.2.6 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 2007 yelloweye rockfish OY under the final Council-preferred alternative represents a decrease from status quo levels, and the 2008 yelloweye rockfish OY represents an even further reduction. Management measures designed to achieve catch levels that meet this reduction in the yelloweye rockfish OY are also sufficient to achieve the necessary reductions in the canary rockfish OY. Proposed management measures to achieve the reductions in the bycatch of yelloweye rockfish include the option of restricting recreational fisheries to depths of only 10 to 20 fm inseason, imposing new closed areas to specifically protect yelloweye rockfish, reducing bag limits for target species inseason, and/or early closure of the recreational fishing season.

Under the final Council-preferred alternative, the number of recreational angler trips is expected to be slightly higher than in 2005 and originally scheduled 2006 regulations. The increase in angler trips occurs in waters off the state of California. The number of angler trips off Oregon and Washington is expected to be very near status quo levels.

7.2.8.2 Action Alternative 1

Action Alternative 1 reduces overfished species OYs compared to status quo catch levels, and as a result, revenues generated by commercial and recreational fisheries are reduced compared to 2005 levels (Tables 7-50 and 7-51). Under this alternative, many of the target species OYs are not attained, and fishing area is decreased for all sectors as the size of groundfish conservation areas is expanded to encompass more area where overfished species are found. While groundfish conservation areas are a useful tool for protecting overfished species while allowing fishing opportunity where those same overfished species are less abundant, in many cases, having less fishing area makes it more difficult to access target species and may increase the cost of traveling to areas that remain open.

7.2.8.2.1 Impacts to Limited Entry Bottom Trawl

The impacts to the non-whiting limited entry trawl sector under Action Alternative 1 are largely driven by the OYs for canary rockfish, bocaccio rockfish, darkblotched rockfish, cowcod, and Pacific ocean perch. While the OYs for yelloweye and widow rockfish are also reduced under Action Alternative 1, 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 driven by those species.

Regulations for the non-whiting limited entry trawl sector include an expansion of the trawl RCA compared to status quo, and a decrease in cumulative limits for target species compared to status quo. Of particular note, this alternative puts in place a 250 fm seaward boundary in the northern areas (north of 40°10' N latitude) for the entire year, a 200 fm seaward boundary in the area between 40°10' N latitude and 38° N latitude for the entire year, and a 60 fm shoreward boundary for areas south of 40°10' N latitude for most of the year. This is a noticeable reduction in fishing area compared to 2006 configurations.

Due to the constraints of the co-occurring overfished species, cumulative limits under this alternative are reduced for all of the major target species including Dover sole, sablefish, thornyheads, other flatfish, arrowtooth flounder, and petrale sole. As a result, none of the OYs for major target species are attained under this alternative.

The combined effect of area closures and reductions in cumulative limits results in a decrease in exvessel revenues from the No Action Alternative. Exvessel revenues to this sector are approximately 59 percent of 2005 levels, representing a decrease of approximately 41 percent. Table 7-54 shows projected revenues by two month period.

Table 7-54. Limited entry bottom trawl exvessel revenue by region and period under Action Alternative 1 (US dollars).

	Two Month Period						
Region	1	2	3	4	5	6	Total
N WA	186,926	141,610	280,051	371,155	165,609	173,610	1,318,961
S WA / N OR	923,242	719,192	847,808	840,507	764,800	763,553	4,859,101
S OR / N CA	716,436	439,000	559,494	668,514	648,570	796,771	3,828,784
OTHER CAL	285,045	335,361	577,726	640,449	522,079	534,977	2,895,636
UNKN	11,383	16,251	19,195	11,748	13,553	7,362	79,490
Total	2,123,031	1,651,413	2,284,274	2,532,372	2,114,611	2,276,272	12,981,972

7.2.8.2.2 Impacts to the Limited Entry Whiting Trawl Fishery

The impacts to the limited entry whiting trawl sector under Action Alternative 1 are largely driven by the OYs for canary rockfish, widow rockfish, and to a lesser extent, darkblotched rockfish and Pacific ocean perch. Other species are not caught in the whiting sectors to the same degree as other sectors, so management measures necessary to protect species such as bocaccio, yelloweye rockfish, and cowcod do not influence the whiting fishery to the same degree as other sectors.

While many sectors benefit from the use of groundfish conservation areas, or more specifically the RCAs, it is estimated that the whiting sector would not benefit as much from imposing an RCA in the same manner as the bottom trawl sector. Depth closures necessary to achieve reductions in the catch of canary rockfish, widow rockfish, darkblotched rockfish, and POP are generally the same depths where Pacific whiting are found and caught effectively. Closing these areas would also eliminate the ability to target whiting effectively, except in the years of largest whiting abundance when the population is spread more densely over a wider range of depths. Therefore, the most effective means of reducing the bycatch of overfished species in this sector is likely to be a decrease in the amount of whiting catch allowed to the commercial sectors. Assuming the whiting sector is allowed to take the same percentage of the canary rockfish, widow rockfish, darkblotched rockfish, and POP OYs as under the 2005 and 2006 fisheries, it is estimated that the commercial catch amounts and exvessel value of Pacific whiting would decrease by 42.5 percent (Table 7-50). Table 7-55 shows projected revenues by two month period.

Table 7-55. Limited entry whiting trawl exvessel revenue by region and period under Action Alternative 1 (US dollars).

		Two Month Period						
Sector	Region	1	2	3	4	5	6	Total
At-Sea	N WA			2,627,167	5,652,569	55,976		8,335,712
Shore-based	N WA	-	-	3,154	9,942	3,147	-	16,243
	S WA / N OR	-	79,368	1,501,769	3,271,655	27,652	-	4,880,443
	S OR / N CA	1,375	54,112	289,329	578,886	7,431	-	931,133
	C AND S CAL	-	-	-	-	-	-	-
	OTHER	-	-	-	-	-	-	-
	Total	1,375	133,481	4,421,418	9,513,051	94,206	-	14,163,532

7.2.8.2.3 Impacts to Nearshore Groundfish Fisheries

Economic impacts to the nearshore groundfish sector are largely driven by canary and yelloweye rockfish. In areas south of 40°10' N latitude, observer data has not shown an interaction with yelloweye rockfish, so in these areas, canary rockfish is the driving constraint. Action Alternative 1 brings the nearshore groundfish sectors in to depths less than 20 fm for the entire year. Depth restrictions are regarded as a useful tool for managing the catch of overfished species in the nearshore groundfish sectors while allowing fishing of healthy target species, however, imposing more restrictive depth-based management is expected to result in some reduction in the catch of target species as some nearshore target species are not as available at depths less than 20 fm. Although some reduction in the catch of target species is expected from a 20 fm restriction, additional reductions on some of the lesser valued target species were analyzed under this alternative to achieve the necessary reductions in the bycatch of canary and yelloweye rockfish. Analysis of Action Alternative 1 shows that exvessel revenues are expected to decline by approximately $450,000 from 2005 levels for this sector, which represents a decrease of approximately 16.5% (Table 4-50).

Table 7-56. Nearshore groundfish exvessel revenue by region under Action Alternative 1 (US dollars).

Region	2005 Revenue	Exvessel Revenue
North of 40°10' N latitude	1,379,012	797,058
South of 40°10' N latitude	1,327,490	1,460,764
Total	2,706,502	2,257,822

7.2.8.2.4 Impacts to Fixed Gear Sablefish Sectors North of 36° N Latitude

Economic impacts to the fixed gear sablefish sectors are largely driven by yelloweye rockfish and, to a lesser extent, canary rockfish. Management measures designed to reduce the bycatch of these species in the fixed gear sablefish sectors are limited to depth restrictions of varying degrees depending on the alternative. Changes in the catch of sablefish which are lower than the OY are not considered in the management measures which pertain to reductions in the catch of overfished species because under all alternatives the sablefish OY is reduced compared to 2005 and 2006 levels, and this reduction achieves reductions in the bycatch of overfished species on its own. The reduction in the sablefish OY is the result of the 2005 sablefish stock assessment determining that the stock is within the precautionary zone, which triggers more a more conservative harvest policy (see section 2.1.2).

While exvessel revenues are expected to be the same across all action alternatives ($8.7 million), Action Alternative 1 is expected to have a substantial impact to vessels that home port near the northern Washington coast and Puget Sound. Under Action Alternative 1, the fixed gear sablefish sectors would be restricted to fishing deeper than depths of 150 fm, and off the northern Washington coast, the 150 fm line closes off most of the fishing grounds currently used by those vessels. Imposing a 150 fm line would require vessels that home port in the northern Washington ports and Puget Sound ports to travel much further distances to reach fishing grounds. This may result in increased travel cost, or some vessels may choose to change their homeport, thereby affecting processors and support businesses, their current home ports along the northern Washington coast and Puget Sound.

7.2.8.2.5 Impacts to Groundfish Fixed Gear Sectors South of 34° 27' North Latitude

The economic impact to fixed gear fisheries operating south of Pt. Conception are largely influenced by the OYs for bocaccio and cowcod. Depth restrictions are viewed as an effective mechanism for achieving reductions in the bycatch of overfished species in this area (primarily bocaccio and cowcod), however depth restrictions are likely to reduce the catch of target species as well since vessels in this area occasionally target species that are found in areas proposed to be closed under Action Alternative 1. Under status quo management measures, vessels can fish at depths less than 60 fm or more than 150 fm. Under Action Alternative 1, vessels would be restricted to fishing shallower than 40 fm or deeper than 180 fm. Based on the relative abundance of the main target species in the area across those depths, imposing a shoreward boundary of 40 fm and a seaward boundary of 180 fm is expected to reduce exvessel revenues by approximately $620,000, or approximately 29 percent compared to 2005 revenues (Table 7-50).

7.2.8.2.6 Impacts to Recreational Sectors

The impacts to recreational sectors under Action Alternative 1 are driven by the OY for yelloweye rockfish and canary rockfish. The yelloweye rockfish OY under this alternative represents a substantial decrease in the OY from status quo levels, and management measures designed to achieve catch levels that meet this reduction in the OY are sufficient to achieve the necessary reductions in the canary rockfish OY. Management measures used to achieve the reductions in the bycatch of yelloweye rockfish include restricting recreational fisheries to 10 and 20 fm, reduced bag limits for target species, and shorter seasons. The coastwide impact of these management measures results in a 35 percent decline in recreational bottomfish fishing effort (Table 7-51). Section 7.2.10.1 discusses the impact of various yelloweye rockfish OY alternatives (including that of 12.6 mt, the OY corresponding to Action Alternative 1) on the recreational sector in greater detail.

7.2.8.3 Action Alternative 2

Action Alternative 2 brings overfished species OYs to levels that are near status quo catch amounts for many overfished species except for yelloweye rockfish. When applying the portion of the OY currently being caught to the predicted biomass of overfished species in 2007 and 2008, the OYs for some overfished species under Action Alternative 2 are even closer to status quo catch levels. While OYs for overfished species are near status quo, negative economic impacts are less than Action Alternative 1 and greater than Action Alternative 3. The result is a larger portion of many of the overfished species OYs that is not attributed to any particular sector[31].

While many of the OYs for overfished species are not attained under this alternative, coastwide exvessel revenues are estimated to be higher for many sectors of the fishery as the population of target species such as Dover sole and petrale sole increase and become more widely found in the fishery.

7.2.8.3.1 Impacts to the Limited Entry Bottom Trawl Fishery

The impacts to the non-whiting limited entry trawl sector under Action Alternative 2 are largely driven by the OYs for canary rockfish, bocaccio rockfish, darkblotched rockfish, cowcod, and Pacific ocean perch.

Regulations for the non-whiting limited entry trawl sector under this alternative mostly include an expansion of the trawl RCA compared to status quo. While catch levels of several overfished species are predicted to be close to status quo in this sector, it is predicted that the bycatch of several overfished species, darkblotched rockfish in particular, will increase over time and that the rate of increase is sufficient to warrant increasing restrictions on the fishery to stay within the OYs. Exvessel revenues for the bottom trawl sector are predicted to be marginally higher compared to status quo, however, the distribution of impacts is likely to be different than status quo. Under this alternative the RCA boundaries are set at deeper depths for some periods of the year when compared to status quo, and this may have adverse impacts on vessels that are less able to fish at deeper depths. Some vessels may be unable to fish in these areas, vessels may need to travel further to fishing grounds, or additional vessels may choose to fish in the nearshore areas, thus impacting small trawl vessels that routinely fish nearer to the shore. Table 7-57 provides projections of revenues by region and two month period.

Table 7-57. Limited entry bottom trawl exvessel revenue by region and period under Action Alternative 2 (US dollars).

	Two Month Period						
REGION	1	2	3	4	5	6	Total
N WA	312,015	258,993	411,390	557,333	271,916	248,962	2,060,608
S WA / N OR	1,543,505	1,362,544	1,613,443	1,510,891	1,373,308	1,130,079	8,533,769
S OR / N CA	1,137,883	947,487	1,191,618	1,357,948	1,322,423	1,116,958	7,074,318
OTHER CAL	400,163	540,126	1,122,040	1,253,585	992,839	735,142	5,043,895
UNKN	18,007	24,488	53,113	27,074	21,469	10,875	155,026
Total	3,411,571	3,133,638	4,391,603	4,706,831	3,981,956	3,242,017	22,867,616

7.2.8.3.2 Impacts to the Limited Entry Whiting Trawl Fishery

The impacts to the limited entry whiting trawl sector under Action Alternative 2 are largely driven by the OYs for canary rockfish and widow rockfish. While many sectors benefit from the use of groundfish conservation areas, or more specifically, the RCAs, it is estimated that the whiting sector would not benefit as much from imposing an RCA in the same manner as the bottom trawl sector. Depth closures necessary to achieve reductions in the catch of canary rockfish, widow rockfish, darkblotched rockfish, and POP are generally the same depths where Pacific whiting are found and caught effectively. Closing

[31] See Chapter 2 scorecards which estimate catch of overfished species by sector and alternative.

these areas would also eliminate the ability to target whiting effectively, except in the years of largest whiting abundance when the population is spread more densely over a wider range of depths. Therefore, the most effective means of reducing the bycatch of overfished species in this sector is likely to be a decrease in the amount of whiting catch allowed to the commercial sectors. Assuming the whiting sector is allowed to take the same percentage of the canary rockfish, widow rockfish, darkblotched rockfish, and POP OYs as under the 2005 and 2006 fisheries, it is estimated that the commercial catch amounts and exvessel value of Pacific whiting would decrease by 22 percent. Table 7-58 shows projected revenues by two month period.

Table 7-58. Limited entry whiting trawl exvessel revenue by region and period under Action Alternative 2 (US dollars).

		Two Month Period						
Sector	Region	1	2	3	4	5	6	Total
At Sea	N WA			3,614,319	11,457,946	65,099		11,554,788
Shore-based	N WA	-	-	4,377	13,798	4,367	-	22,542
	N OR	-	110,146	2,084,141	4,540,372	38,375	-	6,773,034
	S OR N CAL	1,909	75,097	401,528	803,372	10,312	-	1,292,217
	OTHER CAL	-	-	-	-	-	-	-
	UNKN	-	-	-	-	-	-	-
	Total	1,909	185,243	6,104,365	16,815,488	118,154	-	19,642,582

7.2.8.3.3 Impacts to Nearshore Groundfish Fisheries

Economic impacts to the nearshore groundfish sector are largely driven by canary and yelloweye rockfish. In areas south of 40°10' N latitude, observer data has not shown an interaction with yelloweye rockfish, so in these areas, canary rockfish is the driving constraint. Action Alternative 2 brings the nearshore groundfish sectors in to depths less than 20 fm for the entire year. Depth restrictions are regarded as a useful tool for managing the catch of overfished species in the nearshore groundfish sectors while allowing fishing of healthy target species, however, imposing a more restrictive depth-based management is expected to result in some reduction in the catch of target species as some nearshore target species are not as available at depths less than 20 fm. While some reduction in target species catch is expected under this alternative, the catch of other target species that are available at these depths can be increased under this alternative compared to status quo and the impact of increasing the catch of these target species is a slight increase in exvessel revenues. Analysis of Action Alternative 2 shows that exvessel revenues are expected to increase by approximately $90,000 from 2005 levels, but revenues are expected to decrease in the northern areas and increase in the southern areas (Table 7-59).

Table 7-59. Nearshore groundfish exvessel revenue by region under Action Alternative 2 (US dollars).

Region	2005 Revenue	Exvessel Revenue
North of 40 10	1,379,012	1,072,911
South of 40 10	1,327,490	1,718,545
Total	2,706,502	2,791,457

7.2.8.3.4 Impacts to Fixed Gear Sablefish Sectors North of 36° N Latitude

Economic impacts to the fixed gear sablefish sectors are largely driven by yelloweye rockfish and, to a lesser extent, canary rockfish. Management measures designed to reduce the bycatch of these species in the fixed gear sablefish sectors are limited to depth restrictions of varying degrees depending on the alternative. Changes in the catch of sablefish which are lower than the OY are not considered in the management measures which pertain to reductions in the catch of overfished species because under all alternatives the sablefish OY is reduced compared to 2005 and 2006 levels, and this reduction achieves reductions in the bycatch of overfished species on its own. The reduction in the sablefish OY is the result of the 2005 sablefish stock assessment, and the Council's policies regarding species that fall within the precautionary zone (sablefish is a precautionary zone species).

While exvessel revenues are expected to be the same across all action alternatives ($8.7 million, Table 7-50), Action Alternative 2 could have a relatively large impact to vessels that home port near the northern Washington coast and Puget Sound. Under Action Alternative 2, the fixed gear sablefish sectors would be restricted to fishing deeper than depths of 125 fm in areas north of 40°10' N latitude, and off the northern Washington coast, the 125 fm line may close off much of the fishing area currently used by those vessels. Imposing a 125 fm line could require vessels that home port in the northern Washington ports and Puget Sound ports to travel much further distances to reach fishing grounds. This may result in increased travel cost, or some vessels may choose to change their homeport, thereby affecting processors and support businesses relying on vessels in their current home ports along the northern Washington coast and Puget Sound.

7.2.8.3.5 Impacts to Groundfish Fixed Gear Sectors South of 34° 27' N Latitude

The economic impact to fixed gear fisheries operating south of Pt. Conception are largely influenced by the OYs for bocaccio and cowcod. While the fixed gear sectors south of Pt. Conception encounter bocaccio and cowcod, reductions in the catch of these species necessary to stay within the OY are achieved by management measures in other sectors, and therefore, status quo management for fixed gear vessels in the area south of Pt. Conception is sufficient to stay within the OY of overfished species.

7.2.8.3.6 Impacts to Recreational Sectors

The impacts to recreational sectors under Action Alternative 2 are driven by the OYs for yelloweye rockfish and canary rockfish. The yelloweye rockfish OY under this alternative is based on a strategy which "ramps down" catch levels from current amounts in order to give managers and industry time to adapt and develop more refined tools for decreasing the catch of yelloweye while allowing some access to healthier target species. It is anticipated that management measures designed to reduce the bycatch of yelloweye rockfish will also result in reductions of canary rockfish, and therefore, management measures which are motivated by reductions in the yelloweye OY are expected to be sufficient to achieve the necessary reductions in the canary rockfish OY. Management measures used to achieve the reductions in the bycatch of yelloweye rockfish include restricting recreational fisheries to varying depth restrictions, imposing site-specific area closures where industry and available data suggests yelloweye rockfish are found, and bag limits for target species that do not allow attainment of target species OYs. The coastwide impact of these management measures results in a 22 percent decline in recreational bottomfish fishing effort.

7.2.8.4 Action Alternative 3

Action Alternative 3 brings overfished species OYs to levels that are near status quo catch amounts for many overfished species except for yelloweye rockfish. When applying the portion of the OY currently being caught by status quo catch levels to the predicted biomass of overfished species in 2007 and 2008, the OYs for some overfished species under Action Alternative 3 are even closer to status quo catch levels than Action Alternative 2. The overall economic impact of Action Alternative 3 is that many sectors are expected to be managed at levels that are similar to status quo.

7.2.8.4.1 Impacts to the Limited Entry Bottom Trawl Fishery

The impacts to the non-whiting limited entry trawl sector under Action Alternative 3 are largely driven by the OYs for canary rockfish, bocaccio, darkblotched rockfish, cowcod, and Pacific ocean perch. Under this alternative, the OY for petrale sole (a target species) is also expected to be attained, the OY for sablefish is expected to be nearly attained (due in large part to a decrease in the OY for sablefish), and the catch of Dover sole is expected to be higher than status quo because of the increasing abundance of this species.

Regulations for the non-whiting limited entry trawl sector under this alternative mostly include an expansion of the trawl RCA compared to status quo. While catch levels of overfished species are predicted to be close to status quo in this sector for many overfished species, it is predicted that the bycatch of several overfished species, darkblotched rockfish in particular, will increase over time and that the rate of increase is sufficient to warrant increasing restrictions on the fishery to stay within the OY. Exvessel revenues for the bottom trawl sector are predicted to be marginally higher compared to Action Alternative 2, and higher still than status quo, however, the distribution of impacts is likely to be different than status quo. Under this alternative the RCA boundaries are set at deeper depths for some periods of the year when compared to status quo, and this has impacts on vessels that are less able to fish at deeper depths because some vessels may be unable to fish in these areas, vessels may need to travel further to fishing grounds, or additional vessels may choose to fish in the nearshore areas, thus impacting vessels that routinely fish nearer to the shore. Table 7-60 shows projected revenues by two month period.

Table 7-60. Limited entry bottom trawl exvessel revenue by region and period under Action Alternative 3 (US dollars).

	Two Month Period						
Region	1	2	3	4	5	6	Total
N WA	312,015	260,130	433,394	583,330	271,916	248,962	2,109,747
S WA / N OR	1,543,505	1,362,544	1,698,945	1,571,126	1,373,419	1,130,079	8,679,618
S OR / N CA	1,137,883	947,487	1,231,536	1,392,844	1,322,423	1,116,958	7,149,132
OTHER CA	400,163	540,126	1,122,110	1,253,694	992,839	735,142	5,044,074
UNKN	18,007	24,488	56,072	31,563	21,469	10,875	162,474
Total	3,411,571	3,134,775	4,542,057	4,832,557	3,982,067	3,242,017	23,145,044

7.2.8.4.2 Impacts to the Limited Entry Whiting Trawl Fishery

The impacts to the limited entry whiting trawl sector under Action Alternative 3 are largely driven by the OYs for canary rockfish and widow rockfish, but equally driven by the ability of the whiting sectors to catch an amount of Pacific whiting that corresponds to the available OY of canary and widow rockfish. That is, under this alternative, the catch of whiting is expected to be largely unconstrained by overfished species, assuming there are no "disaster tow events" in which a single tow of a trawl net catches a large amount of an overfished species. Assuming the whiting sector is allowed to take the same percentage of the widow rockfish, canary rockfish, darkblotched rockfish, and POP OYs as under the 2005 and 2006 fisheries, it is estimated that the commercial catch amounts and exvessel value of Pacific whiting would be the same as status quo, or approximately $30 million. Table 7-61 shows projected revenues by two month period.

Table 7-61. Limited entry whiting trawl exvessel revenue by region and period under Action Alternative 3 (US dollars).

		Two Month Period						
Sector	Region	1	2	3	4	5	6	Total
At Sea	N WA			2,934,442	11,479,234	2,452,763		15,112,714
Shore-based	N WA	-	-	6,752	21,283	6,737	-	34,771
	S WA / N OR	-	169,903	3,214,833	7,003,624	59,194	-	10,447,554
	S OR / N CA	2,944	115,838	619,366	1,239,219	15,907	-	1,993,274
	OTHER CA	-	-	-	-	-	-	-
	UNKN	-	-	-	-	-	-	-
	Total	2,944	285,741	6,775,392	19,743,359	2,534,601	-	27,588,313

7.2.8.4.3 Impacts to Nearshore Groundfish Fisheries

Economic impacts to the nearshore groundfish sector are largely driven by canary and yelloweye rockfish. In areas south of 40°10' N latitude, observer data has not shown an interaction with yelloweye rockfish, so in these areas, canary rockfish is the driving constraint. Management measures in the nearshore fisheries under this alternative are designed to be equivalent to status quo, and therefore, exvessel revenues are expected to be the same as status quo.

7.2.8.4.4 Impacts to Fixed Gear Sablefish Sectors North of 36° N Latitude

Management measures imposed on the fixed gear sablefish sectors that are designed to reduce the catch of overfished species largely center on the impacts to yelloweye rockfish and, to a lesser extent, canary rockfish. Management measures designed to reduce the bycatch of these species in the fixed gear sablefish sectors are limited to depth restrictions of varying degrees depending on the alternative. Changes in the catch of sablefish which are lower than the OY are not considered in the management measures which pertain to reductions in the catch of overfished species because under all alternatives the sablefish OY is reduced compared to 2005 and 2006 levels, and this reduction achieves reductions in the bycatch of overfished species on its own. The reduction in the sablefish OY is the result of the 2005 sablefish stock assessment, and the Council's policies regarding species that fall within the precautionary zone (sablefish is a precautionary zone species).

While exvessel revenues for this sector are expected to be the same across all action alternatives ($8.7 million), Action Alternative 3 has the same RCA boundaries for the sablefish sectors as under status quo. Reductions in exvessel revenue for these sectors are not driven by overfished species concerns, but are instead driven by the reduction in the OY of sablefish.

7.2.8.4.5 Impacts to Groundfish Fixed Gear Sectors South of 34° 27' N Latitude

The economic impact to fixed gear fisheries operating south of Pt. Conception are highly influenced by the OYs for bocaccio and cowcod. While the fixed gear sectors south of Pt. Conception encounter bocaccio and cowcod, reductions in the catch of these species necessary to stay within the OY are achieved by management measures in other sectors, and therefore, status quo management for fixed gear vessels in the area south of Pt. Conception is sufficient to stay within the OYs of overfished species.

7.2.8.4.6 Impacts to Recreational Sectors

The impacts to recreational sectors under Action Alternative 3 are driven by the OY for yelloweye rockfish and canary rockfish. The yelloweye rockfish OY under this alternative is based on a strategy which “ramps down” catch levels from current amounts in order to give managers and industry time to adapt and develop more refined tools for decreasing the catch of yelloweye while allowing some access to healthier target species. It is anticipated that management measures designed to reduce the bycatch of yelloweye rockfish will also result in reductions of canary rockfish, and therefore, management measures which are motivated by reductions in the yelloweye OY are expected to be sufficient to achieve the necessary reductions in the canary rockfish OY. Management measures used to achieve the reductions in the bycatch of yelloweye rockfish include restricting recreational fisheries to varying depth restrictions, imposing site-specific area closures where industry and available data suggests yelloweye are found, and bag limits for target species which don’t allow attainment of target species OYs. The coastwide impact of these management measures results in a 9 percent increase in recreational bottomfish fishing effort (Table 7-51), though only recreational fisheries off California experience an increase in effort. Washington and Oregon are expected to achieve no change in effort under Action Alternative 3 when compared to status quo.

7.2.9 Net Economic Impact of Alternatives – Approach B

7.2.9.1 Commercial Fisheries Impacts

The discussion in this section revolves around the various tables provided. Table 7-62a shows projected exvessel revenue for different groupings of commercial fisheries under the alternatives, and the change in exvessel revenue relative to the No Action Alternative. The table shows significant differences between the alternatives. For example, Action Alternative 3 has the smallest difference in exvessel revenues from No Action (for non-tribal groundfish including at-sea vessels) with a 2.7 percent decline, while a 10 percent decline is associated with Action Alternative 2, and a 37 percent decline is associated with Action Alternative.

Table 7-62b shows the equivalent estimates for same groupings in terms of landed weight (thousand mt) rather than revenue, while Table 7-62c makes the same comparisons using personal income impacts as the impact variable. It should be noted that “Total West Coast Landings (includes at-sea and tribal)” is an estimate for all West Coast fisheries including groundfish.

The following tables are provided related to analysis of impacts to the commercial fishery following Approach B:

- 7-62a Exvessel revenue projections by major sector
- 7-62b Commercial harvest projection by major sector
- 7-62c Commercial income impacts by major sector

Table 7-62a. Exvessel revenue from shoreside landings and at-sea deliveries in Council-managed commercial fisheries in 2005 and projected annual exvessel revenue under the action alternatives.

						Council Preferred Alternative		
Ex-vessel Revenue (million $)	**2005**	**No Action**	**Alt 1**	**Alt 2**	**Alt 3**	**Low Whiting OY**	**Medium Whiting OY**	**High Whiting OY**
Total West Coast Exvessel Revenue (including at-sea and tribal)	279.4	279.5	254.4	270.2	277.4	265.5	271.1	277.8
Non-Tribal Groundfish Exvessel Revenue (including at-sea)	64.4	64.2	40.6	56.1	62.5	51.7	57.0	62.9
Total LE Trawl Groundfish Exvessel Revenue (including at-sea)	47.5	47.2	27.2	42.4	48.5	37.7	43.0	48.9
Shoreside LE Trawl Groundfish Exvessel Revenue Including Whiting	33.5	32.5	19.4	31.5	34.3	29.9	32.2	34.7
Shoreside LE Trawl Groundfish Exvessel Revenue Excluding Whiting	22.2	21.1	13.4	23.2	23.4	23.8	23.8	23.8
LE Trawl Whiting Exvessel Revenue (shoreside and at-sea)	25.2	26.1	13.8	19.2	25.1	13.8	19.2	25.1
LE Fixed Gear Groundfish Exvessel Revenue	10.7	10.7	8.2	8.4	8.4	8.4	8.4	8.4
Open Access Groundfish Exvessel Revenue	6.3	6.3	5.1	5.4	5.6	5.6	5.6	5.6
Tribal Groundfish Shoreside Exvessel Revenue (including whiting)	4.8	5.2	4.5	4.5	4.8	4.5	4.5	4.8
Tribal Groundfish At-Sea Exvessel Revenue (whiting)	2.6	2.6	1.8	2.0	2.6	1.8	2.0	2.6
Change compared to No Action (million $)								
Total West Coast Exvessel Revenue (including at-sea and tribal)			- 25.1	- 9.3	- 2.1	- 14.0	- 8.4	- 1.7
Non-Tribal Groundfish Exvessel Revenue (including at-sea)			- 23.7	- 8.1	- 1.7	- 12.6	- 7.2	- 1.3
Total LE Trawl Groundfish Exvessel Revenue (including at-sea)			- 20.0	- 4.8	+ 1.3	- 9.5	- 4.2	+ 1.7
Shoreside LE Trawl Groundfish Exvessel Revenue Including Whiting			- 13.1	- 0.9	+ 1.9	- 2.6	- 0.3	+ 2.3
Shoreside LE Trawl Groundfish Exvessel Revenue Excluding Whiting			- 7.7	+ 2.1	+ 2.3	+ 2.7	+ 2.7	+ 2.7
LE Trawl Whiting Exvessel Revenue (shoreside and at-sea)			- 12.3	- 6.9	- 1.0	- 12.3	- 6.9	- 1.0
LE Fixed Gear Groundfish Exvessel Revenue			- 2.5	- 2.3	- 2.3	- 2.3	- 2.3	- 2.3
Open Access Groundfish Exvessel Revenue			- 1.2	- 1.0	- 0.8	- 0.8	- 0.8	- 0.8
Tribal Groundfish Shoreside Exvessel Revenue (including whiting)			- 0.7	- 0.7	- 0.4	- 0.7	- 0.7	- 0.4
Tribal Groundfish At-Sea Exvessel Revenue (whiting)			- 0.7	- 0.5	+ 0.0	- 0.7	- 0.5	+ 0.0
Change compared to No Action (%)								
Total West Coast Exvessel Revenue (including at-sea and tribal)			-9.0%	-3.3%	-0.8%	-5.0%	-3.0%	-0.6%
Non-Tribal Groundfish Exvessel Revenue (including at-sea)			-36.9%	-12.6%	-2.7%	-19.6%	-11.2%	-2.0%
Total LE Trawl Groundfish Exvessel Revenue (including at-sea)			-42.4%	-10.3%	+2.7%	-20.2%	-8.9%	+3.6%
Shoreside LE Trawl Groundfish Exvessel Revenue Including Whiting			-40.3%	-2.9%	+5.8%	-8.0%	-0.8%	+7.1%
Shoreside LE Trawl Groundfish Exvessel Revenue Excluding Whiting			-36.6%	+9.9%	+11.0%	+13.0%	+13.0%	+13.0%
LE Trawl Whiting Exvessel Revenue (shoreside and at-sea)			-47.0%	-26.5%	-3.9%	-47.0%	-26.5%	-3.9%
LE Fixed Gear Groundfish Exvessel Revenue			-23.3%	-21.3%	-21.2%	-21.2%	-21.2%	-21.2%
Open Access Groundfish Exvessel Revenue			-18.7%	-15.3%	-12.0%	-12.0%	-12.0%	-12.0%
Tribal Groundfish Shoreside Exvessel Revenue (including whiting)			-14.2%	-12.5%	-7.5%	-14.2%	-12.5%	-7.5%
Tribal Groundfish At-Sea Exvessel Revenue (whiting)			-28.3%	-21.2%	+0.0%	-28.3%	-21.2%	+0.0%

Table 7-62b. Shoreside landings and at-sea deliveries from Council-managed commercial fisheries in 2005 and projected annual harvests under the action alternatives.

						Council Preferred Alternative		
Landings and Deliveries (thousand mt)	**2005**	**No Action**	**Alt 1**	**Alt 2**	**Alt 3**	**Low Whiting OY**	**Medium Whiting OY**	**High Whiting OY**
Total West Coast Landings (includes at-sea and tribal)	503.0	510.0	382.8	443.3	503.5	394.5	444.5	504.4
Non-Tribal Groundfish Landings and Deliveries (includes at-sea)	247.9	254.9	137.4	195.4	248.2	149.1	196.6	249.1
Total LE Trawl Groundfish Landings and Deliveries (includes at-sea)	243.4	250.4	133.8	191.7	244.5	145.5	192.9	245.4
Shoreside LE Trawl Groundfish Landings Including Whiting	115.6	115.3	62.0	92.4	114.7	99.8	107.5	116.1
Shoreside LE Trawl Groundfish Landings Excluding Whiting	19.3	18.4	10.9	21.3	21.6	22.5	22.5	22.5
LE Trawl Whiting Landings and Deliveries (shoreside and at-sea)	224.2	232.0	122.9	170.4	222.9	122.9	170.4	222.9
LE Fixed Gear Groundfish Landings	2.8	2.9	2.3	2.3	2.3	2.3	2.3	2.3
Open Access Groundfish Landings	1.6	1.6	1.3	1.4	1.4	1.4	1.4	1.4
Tribal Groundfish Shoreside Landings (including whiting)	13.7	13.9	10.8	11.6	14.1	10.8	11.6	14.1
Tribal Groundfish At-Sea Deliveries (whiting)	23.6	23.3	16.7	18.4	23.3	16.7	18.4	23.3
Change compared to No Action (thousand mt)								
Total West Coast Landings (includes at-sea and tribal)			- 127.1	- 66.7	- 6.5	- 115.4	- 65.5	- 5.6
Non-Tribal Groundfish Landings and Deliveries (includes at-sea)			- 117.5	- 59.5	- 6.7	- 105.8	- 58.3	- 5.8
Total LE Trawl Groundfish Landings and Deliveries (includes at-sea)			- 116.6	- 58.7	- 5.9	- 104.9	- 57.5	- 5.0
Shoreside LE Trawl Groundfish Landings Including Whiting			- 53.3	- 23.0	- 0.6	- 15.6	- 7.8	+ 0.8
Shoreside LE Trawl Groundfish Landings Excluding Whiting			- 7.5	+ 2.9	+ 3.2	+ 4.1	+ 4.1	+ 4.1
LE Trawl Whiting Landings and Deliveries (shoreside and at-sea)			- 109.0	- 61.5	- 9.1	- 109.0	- 61.5	- 9.1
LE Fixed Gear Groundfish Landings			- 0.6	- 0.6	- 0.6	- 0.6	- 0.6	- 0.6
Open Access Groundfish Landings			- 0.3	- 0.3	- 0.2	- 0.3	- 0.2	- 0.2
Tribal Groundfish Shoreside Landings (including whiting)			- 3.1	- 2.3	+ 0.2	- 3.1	- 2.3	+ 0.2
Tribal Groundfish At-Sea Deliveries (whiting)			- 6.6	- 5.0	+ 0.0	- 6.6	- 5.0	+ 0.0
Change compared to No Action (%)								
Total West Coast Landings (includes at-sea and tribal)			-24.9%	-13.1%	-1.3%	-22.6%	-12.8%	-1.1%
Non-Tribal Groundfish Landings and Deliveries (includes at-sea)			-46.1%	-23.3%	-2.6%	-41.5%	-22.9%	-2.3%
Total LE Trawl Groundfish Landings and Deliveries (includes at-sea)			-46.5%	-23.4%	-2.4%	-41.9%	-22.9%	-2.0%
Shoreside LE Trawl Groundfish Landings Including Whiting			-46.2%	-19.9%	-0.5%	-13.5%	-6.8%	0.7%
Shoreside LE Trawl Groundfish Landings Excluding Whiting			-40.9%	15.6%	17.2%	22.2%	22.2%	22.2%
LE Trawl Whiting Landings and Deliveries (shoreside and at-sea)			-47.0%	-26.5%	-3.9%	-47.0%	-26.5%	-3.9%
LE Fixed Gear Groundfish Landings			-21.1%	-19.8%	-19.5%	-19.5%	-19.5%	-19.5%
Open Access Groundfish Landings			-18.8%	-16.7%	-14.6%	-16.0%	-15.4%	-14.6%
Tribal Groundfish Shoreside Landings (including whiting)			-22.1%	-16.2%	1.6%	-22.1%	-16.2%	1.6%
Tribal Groundfish At-Sea Deliveries (whiting)			-28.3%	-21.2%	0.0%	-28.3%	-21.2%	0.0%

Table 7-62c. Estimated income impacts from shoreside landings and at-sea deliveries in Council-managed commercial fisheries in 2005 and projected annual income impacts under the action alternatives. (Income impacts are derived from harvesting, processing, and support activities connected with Council-managed ocean area commercial fisheries.)

						Council Preferred Alternative		
Income Impacts (million $)	**2005**	**No Action**	**Alt 1**	**Alt 2**	**Alt 3**	**Low Whiting OY**	**Medium Whiting OY**	**High Whiting OY**
Total West Coast Income Impacts (including at sea and tribal)	624.1	625.2	567.0	602.0	621.8	587.3	603.8	622.9
Non-Tribal Groundfish Income Impacts (including at-sea)	139.4	140.0	83.8	118.4	136.9	104.2	120.2	137.9
Total LE Trawl Groundfish Income Impacts (including at sea)	115.0	115.5	64.6	98.6	116.7	84.1	100.1	117.8
Shoreside LE Trawl Groundfish Income Impacts Including Whiting	81.4	79.9	45.8	72.5	82.6	65.3	74.0	83.7
Shoreside LE Trawl Groundfish Income Impacts Excluding whiting	38.9	37.2	23.1	41.1	41.5	42.6	42.6	42.6
LE Trawl Whiting Income Impacts (shoreside and at-sea)	76.1	78.3	41.5	57.5	75.2	41.5	57.5	75.2
LE Fixed Gear Groundfish Income Impacts	15.3	15.4	11.9	12.2	12.2	12.2	12.2	12.2
Open Access Groundfish Income Impacts	9.1	9.1	7.3	7.6	7.9	7.9	7.9	7.9
Tribal Groundfish Shoreside Income Impacts (including whiting)	11.8	12.3	10.2	10.7	12.0	10.2	10.7	12.0
Tribal Groundfish At-Sea Income Impacts (whiting)	8.0	7.9	5.6	6.2	7.9	5.6	6.2	7.9
Change compared to No Action (million $)								
Total West Coast Income Impacts (including at sea and tribal)			- 58.2	- 23.3	- 3.4	- 37.9	- 21.4	- 2.4
Non-Tribal Groundfish Income Impacts (including at-sea)			- 56.1	- 21.6	- 3.1	- 35.8	- 19.7	- 2.0
Total LE Trawl Groundfish Income Impacts (including at sea)			- 50.9	- 16.9	+ 1.3	- 31.4	- 15.4	+ 2.3
Shoreside LE Trawl Groundfish Income Impacts Including Whiting			- 34.2	- 7.5	+ 2.6	- 14.7	- 5.9	+ 3.7
Shoreside LE Trawl Groundfish Income Impacts Excluding whiting			- 14.1	+ 3.9	+ 4.3	+ 5.4	+ 5.4	+ 5.4
LE Trawl Whiting Income Impacts (shoreside and at-sea)			- 36.8	- 20.8	- 3.1	- 36.8	- 20.8	- 3.1
LE Fixed Gear Groundfish Income Impacts			- 3.5	- 3.2	- 3.2	- 3.2	- 3.2	- 3.2
Open Access Groundfish Income Impacts			- 1.7	- 1.4	- 1.1	- 1.2	- 1.1	- 1.1
Tribal Groundfish Shoreside Income Impacts (including whiting)			- 2.1	- 1.7	- 0.3	- 2.1	- 1.7	- 0.3
Tribal Groundfish At-Sea Income Impacts (whiting)			- 2.2	- 1.7	- 0.0	- 2.2	- 1.7	- 0.0
Change compared to No Action (%)								
Total West Coast Income Impacts (including at sea and tribal)			-9.3%	-3.7%	-0.5%	-6.1%	-3.4%	-0.4%
Non-Tribal Groundfish Income Impacts (including at-sea)			-40.1%	-15.4%	-2.2%	-25.5%	-14.1%	-1.4%
Total LE Trawl Groundfish Income Impacts (including at sea)			-44.0%	-14.6%	+1.1%	-27.2%	-13.3%	+2.0%
Shoreside LE Trawl Groundfish Income Impacts Including Whiting			-42.7%	-9.4%	+3.3%	-18.4%	-7.4%	+4.7%
Shoreside LE Trawl Groundfish Income Impacts Excluding whiting			-37.8%	+10.4%	+11.6%	+14.5%	+14.5%	+14.5%
LE Trawl Whiting Income Impacts (shoreside and at-sea)			-47.0%	-26.5%	-3.9%	-47.0%	-26.5%	-3.9%
LE Fixed Gear Groundfish Income Impacts			-23.0%	-21.0%	-20.9%	-20.9%	-20.9%	-20.9%
Open Access Groundfish Income Impacts			-19.0%	-15.7%	-12.5%	-12.7%	-12.6%	-12.5%
Tribal Groundfish Shoreside Income Impacts (including whiting)			-17.2%	-13.6%	-2.7%	-17.2%	-13.6%	-2.7%
Tribal Groundfish At-Sea Income Impacts (whiting)			-28.3%	-21.2%	-0.0%	-28.3%	-21.2%	-0.0%

Table 7-63a. Exvessel revenue in 2005 and projected annual exvessel revenue impacts from commercial fishing activities by port area under the 2007-2008 action alternatives s ($ million). (Page 1 of 2)

	WASHINGTON					OREGON				
Alternative / Fishery	Puget Sound	North Washington Coast	South and Central Washington Coast	Unidentified Washington	WA TOTAL	Astoria-Tillamook	Newport	Coos Bay	Brookings	OR TOTAL
2005										
Shoreside LE Trawl	2.19	0.50	4.26	-	6.95	8.61	6.90	3.05	0.85	19.41
At Sea Whiting	-	-	-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	2.02	0.61	1.12	-	3.76	0.84	1.54	1.22	0.58	4.18
Open Access	0.02	0.12	0.53	-	0.67	0.29	0.07	0.34	1.21	1.90
Tribal Groundfish	0.24	2.73	1.28	0.60	4.84	-	-	-	-	0.00
Tribal Non-Groundfish	0.71	3.00	0.23	6.53	10.47	-	-	-	-	0.00
Non Groundfish	3.73	2.13	43.42	0.01	49.29	21.94	15.66	14.12	7.49	59.22
TOTAL	8.91	9.09	50.84	7.15	75.98	31.68	24.17	18.73	10.13	84.71
No Action (2006)										
Shoreside LE Trawl	1.87	0.45	4.23	-	6.56	8.28	6.88	2.95	0.83	18.94
At Sea Whiting	-		-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	2.04	0.61	1.13	-	3.78	0.85	1.55	1.23	0.58	4.21
Open Access	0.02	0.12	0.53	-	0.67	0.29	0.07	0.35	1.20	1.90
Tribal Groundfish	0.25	3.05	1.27	0.62	5.19	-	-	-	-	0.00
Tribal Non-Groundfish	0.71	3.00	0.23	6.53	10.47	-	-	-	-	0.00
Non Groundfish	3.73	2.13	43.42	0.01	49.29	21.94	15.66	14.12	7.49	59.22
TOTAL	8.63	9.37	50.81	7.16	75.97	31.35	24.16	18.64	10.12	84.27
Alternative 1										
Shoreside LE Trawl	1.25	0.30	2.29	-	3.83	4.97	3.85	1.80	0.51	11.12
At Sea Whiting	-		-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	1.56	0.46	0.85	-	2.87	0.64	1.16	0.92	0.45	3.17
Open Access	0.02	0.09	0.40	-	0.51	0.24	0.06	0.27	0.98	1.54
Tribal Groundfish	0.24	2.77	0.97	0.48	4.45	-	-	-	-	0.00
Tribal Non-Groundfish	0.71	3.00	0.23	6.53	10.47	-	-	-	-	0.00
Non Groundfish	3.73	2.13	43.42	0.01	49.29	21.94	15.66	14.12	7.49	59.22
TOTAL	7.50	8.74	48.15	7.03	71.43	27.78	20.73	17.11	9.43	75.06
Alternative 2										
Shoreside LE Trawl	1.98	0.44	3.26	-	5.68	8.35	5.76	3.15	0.94	18.21
At Sea Whiting	-	-	-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	1.56	0.46	0.85	-	2.88	0.64	1.16	0.92	0.45	3.18
Open Access	0.02	0.09	0.40	-	0.51	0.24	0.06	0.27	1.03	1.59
Tribal Groundfish	0.24	2.77	1.05	0.48	4.54	-	-	-	-	0.00
Tribal Non-Groundfish	0.71	3.00	0.23	6.53	10.47	-	-	-	-	0.00
Non Groundfish	3.73	2.13	43.42	0.01	49.29	21.94	15.66	14.12	7.49	59.22
TOTAL	8.24	8.89	49.21	7.03	73.37	31.17	22.64	18.47	9.92	82.19
Alternative 3										
Shoreside LE Trawl	2.00	0.45	4.14	-	6.60	8.89	6.85	3.27	0.95	19.96
At Sea Whiting	-	-	-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	1.56	0.46	0.85	-	2.88	0.64	1.16	0.92	0.45	3.18
Open Access	0.02	0.09	0.40	-	0.51	0.24	0.06	0.27	1.08	1.64
Tribal Groundfish	0.24	2.77	1.32	0.48	4.80	-	-	-	-	0.00
Tribal Non-Groundfish	0.71	3.00	0.23	6.53	10.47	-	-	-	-	0.00
Non Groundfish	3.73	2.13	43.42	0.01	49.29	21.94	15.66	14.12	7.49	59.22
TOTAL	8.27	8.90	50.36	7.03	74.56	31.71	23.74	18.58	9.98	84.00
Preferred Alternative (Low Whiting OY)										
Shoreside LE Trawl	1.95	0.45	2.47	-	4.87	8.01	4.87	3.15	1.01	17.05
At Sea Whiting	-	-	-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	1.56	0.46	0.85	-	2.88	0.64	1.16	0.92	0.45	3.18
Open Access	0.02	0.09	0.40	-	0.51	0.24	0.06	0.27	1.08	1.64
Tribal Groundfish	0.24	2.77	0.97	0.48	4.45	-	-	-	-	0.00
Tribal Non-Groundfish	0.71	3.00	0.23	6.53	10.47	-	-	-	-	0.00
Non Groundfish	3.73	2.13	43.42	0.01	49.29	21.94	15.66	14.12	7.49	59.22
TOTAL	8.21	8.90	48.34	7.03	72.48	30.83	21.75	18.47	10.04	81.09
Preferred Alternative (Medium Whiting OY)										
Shoreside LE Trawl	1.95	0.45	3.27	-	5.66	8.43	5.83	3.24	1.01	18.51
At Sea Whiting	-	-	-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	1.56	0.46	0.85	-	2.88	0.64	1.16	0.92	0.45	3.18
Open Access	0.02	0.09	0.40	-	0.51	0.24	0.06	0.27	1.08	1.64
Tribal Groundfish	0.24	2.77	1.05	0.48	4.54	-	-	-	-	0.00
Tribal Non-Groundfish	0.71	3.00	0.23	6.53	10.47	-	-	-	-	0.00
Non Groundfish	3.73	2.13	43.42	0.01	49.29	21.94	15.66	14.12	7.49	59.22
TOTAL	8.21	8.90	49.22	7.03	73.36	31.25	22.72	18.55	10.04	82.55
Preferred Alternative (High Whiting OY)										
Shoreside LE Trawl	1.95	0.45	4.14	-	6.53	8.89	6.90	3.33	1.01	20.13
At Sea Whiting	-	-	-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	1.56	0.46	0.85	-	2.88	0.64	1.16	0.92	0.45	3.18
Open Access	0.02	0.09	0.40	-	0.51	0.24	0.06	0.27	1.08	1.64
Tribal Groundfish	0.24	2.77	1.32	0.48	4.80	-	-	-	-	0.00
Tribal Non-Groundfish	0.71	3.00	0.23	6.53	10.47	-	-	-	-	0.00
Non Groundfish	3.73	2.13	43.42	0.01	49.29	21.94	15.66	14.12	7.49	59.22
TOTAL	8.21	8.90	50.36	7.03	74.50	31.71	23.78	18.64	10.04	84.17

Table 7-63a. Exvessel revenue in 2005 and projected annual exvessel revenue impacts from commercial fishing activities by port area under the 2007-2008 action alternatives ($ million). (Page 2 of 2)

	CALIFORNIA											
Alternative / Fishery	Crescent City	Eureka	Fort Bragg	Bodega Bay-San Francisco	Monterey	Morro Bay	Santa Barbara	Los Angeles	San Diego	CA TOTAL	At Sea	WEST COAST TOTAL
2005												
Shoreside LE Trawl	0.73	2.55	1.78	0.80	0.79	0.50	-	-	-	7.15	-	33.51
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	13.95	13.95
LE Fixed Gear	0.22	0.31	0.24	0.20	0.42	-	0.26	0.74	0.32	2.72	-	10.65
Open Access	0.37	0.25	0.97	0.26	0.53	0.95	0.14	0.09	0.18	3.74	-	6.32
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	2.59	7.44
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	10.47
Non Groundfish	2.91	2.44	2.29	18.27	6.55	1.48	22.27	27.66	4.60	88.47	-	196.98
TOTAL	4.22	5.55	5.28	19.54	8.28	2.93	22.68	28.49	5.11	102.08	16.55	279.32
No Action (2006)												
Shoreside LE Trawl	0.70	2.43	1.83	0.71	0.83	0.47	-	-	-	6.96	-	32.46
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	14.74	14.74
LE Fixed Gear	0.22	0.31	0.24	0.20	0.42	-	0.26	0.74	0.32	2.72	-	10.72
Open Access	0.37	0.25	0.98	0.26	0.53	0.95	0.14	0.09	0.18	3.75	-	6.33
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	2.57	7.76
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	10.47
Non Groundfish	2.91	2.44	2.29	18.27	6.55	1.48	22.27	27.66	4.60	88.47	-	196.98
TOTAL	4.20	5.44	5.33	19.44	8.32	2.90	22.68	28.49	5.10	101.90	17.31	279.45
Alternative 1												
Shoreside LE Trawl	0.42	1.55	1.11	0.47	0.58	0.31	-	-	-	4.43	-	19.39
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	7.81	7.81
LE Fixed Gear	0.18	0.24	0.18	0.16	0.35	-	0.21	0.59	0.25	2.18	-	8.22
Open Access	0.33	0.20	0.76	0.22	0.44	0.78	0.13	0.09	0.15	3.09	-	5.14
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	1.84	6.29
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	10.47
Non Groundfish	2.91	2.44	2.29	18.27	6.55	1.48	22.27	27.66	4.60	88.47	-	196.98
TOTAL	3.84	4.42	4.34	19.13	7.91	2.57	22.61	28.34	5.01	98.17	9.66	254.30
Alternative 2												
Shoreside LE Trawl	0.78	2.60	2.12	0.74	0.91	0.50	-	-	-	7.64	-	31.52
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	10.83	10.83
LE Fixed Gear	0.18	0.24	0.18	0.16	0.35	-	0.24	0.71	0.30	2.38	-	8.43
Open Access	0.35	0.20	0.78	0.24	0.45	0.86	0.14	0.09	0.16	3.26	-	5.36
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	2.02	6.56
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	10.47
Non Groundfish	2.91	2.44	2.29	18.27	6.55	1.48	22.27	27.66	4.60	88.47	-	196.98
TOTAL	4.21	5.47	5.37	19.41	8.26	2.85	22.66	28.46	5.06	101.73	12.86	270.15
Alternative 3												
Shoreside LE Trawl	0.78	2.69	2.14	0.75	0.91	0.51	-	-	-	7.77	-	34.32
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	14.17	14.17
LE Fixed Gear	0.18	0.24	0.18	0.17	0.35	-	0.24	0.71	0.30	2.38	-	8.44
Open Access	0.37	0.20	0.80	0.25	0.46	0.95	0.14	0.09	0.16	3.42	-	5.57
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	2.57	7.37
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	10.47
Non Groundfish	2.91	2.44	2.29	18.27	6.55	1.48	22.27	27.66	4.60	88.47	-	196.98
TOTAL	4.24	5.56	5.40	19.43	8.27	2.94	22.66	28.46	5.06	102.03	16.74	277.33
Preferred Alternative (Low Whiting OY)												
Shoreside LE Trawl	0.82	2.59	2.31	0.76	0.94	0.52	-	-	-	7.94	-	29.86
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	7.81	7.81
LE Fixed Gear	0.18	0.24	0.18	0.17	0.35	-	0.24	0.71	0.30	2.38	-	8.44
Open Access	0.37	0.20	0.80	0.25	0.46	0.95	0.14	0.09	0.16	3.42	-	5.57
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	1.84	6.29
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	10.47
Non Groundfish	2.91	2.44	2.29	18.27	6.55	1.48	22.27	27.66	4.60	88.47	-	196.98
TOTAL	4.28	5.47	5.57	19.44	8.31	2.95	22.66	28.46	5.06	102.20	9.66	265.42
Preferred Alternative (Medium Whiting OY)												
Shoreside LE Trawl	0.82	2.66	2.31	0.76	0.95	0.52	-	-	-	8.01	-	32.18
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	10.83	10.83
LE Fixed Gear	0.18	0.24	0.18	0.17	0.35	-	0.24	0.71	0.30	2.38	-	8.44
Open Access	0.37	0.20	0.80	0.25	0.46	0.95	0.14	0.09	0.16	3.42	-	5.57
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	2.02	6.56
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	10.47
Non Groundfish	2.91	2.44	2.29	18.27	6.55	1.48	22.27	27.66	4.60	88.47	-	196.98
TOTAL	4.28	5.54	5.57	19.44	8.31	2.95	22.66	28.46	5.06	102.27	12.86	271.04
Preferred Alternative (High Whiting OY)												
Shoreside LE Trawl	0.82	2.74	2.31	0.76	0.95	0.52	-	-	-	8.09	-	34.75
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	14.17	14.17
LE Fixed Gear	0.18	0.24	0.18	0.17	0.35	-	0.24	0.71	0.30	2.38	-	8.44
Open Access	0.37	0.20	0.80	0.25	0.46	0.95	0.14	0.09	0.16	3.42	-	5.57
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	2.57	7.37
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	10.47
Non Groundfish	2.91	2.44	2.29	18.27	6.55	1.48	22.27	27.66	4.60	88.47	-	196.98
TOTAL	4.28	5.61	5.57	19.44	8.31	2.95	22.66	28.46	5.06	102.35	16.74	277.75

Table 7-63b. Change from No Action in projected exvessel revenue impacts from commercial fishing activities by port area under the 2007-2008 action alternatives ($ million). (Page 1 of 2)

	WASHINGTON					OREGON				
Alternative / Fishery	Puget Sound	North Washington Coast	South and Central Washington Coast	Unidentified Washington	WA TOTAL	Astoria-Tillamook	Newport	Coos Bay	Brookings	OR TOTAL
No Action (2006)										
Shoreside LE Trawl	*1.87*	*0.45*	*4.23*	-	*6.56*	*8.28*	*6.88*	*2.95*	*0.83*	*18.94*
At Sea Whiting	-	-	-	-	*0.00*	-	-	-	-	*0.00*
LE Fixed Gear	*2.04*	*0.61*	*1.13*	-	*3.78*	*0.85*	*1.55*	*1.23*	*0.58*	*4.21*
Open Access	*0.02*	*0.12*	*0.53*	-	*0.67*	*0.29*	*0.07*	*0.35*	*1.20*	*1.90*
Tribal Groundfish	*0.25*	*3.05*	*1.27*	*0.62*	*5.19*	-	-	-	-	*0.00*
Tribal Non-Groundfish	*0.71*	*3.00*	*0.23*	*6.53*	*10.47*	-	-	-	-	*0.00*
Non Groundfish	*3.73*	*2.13*	*43.42*	*0.01*	*49.29*	*21.94*	*15.66*	*14.12*	*7.49*	*59.22*
TOTAL	*8.63*	*9.37*	*50.81*	*7.16*	*75.97*	*31.35*	*24.16*	*18.64*	*10.12*	*84.27*
Alternative 1										
Shoreside LE Trawl	-0.63	-0.15	-1.95	-	-2.73	-3.31	-3.03	-1.15	-0.32	-7.82
At Sea Whiting	-	-	-	-	-	-	-	-	-	-
LE Fixed Gear	-0.48	-0.15	-0.28	-	-0.91	-0.21	-0.39	-0.31	-0.14	-1.04
Open Access	0.00	-0.03	-0.13	-	-0.17	-0.05	-0.01	-0.08	-0.22	-0.36
Tribal Groundfish	-0.02	-0.29	-0.30	-0.14	-0.74	-	-	-	-	-
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-
TOTAL	-1.13	-0.62	-2.66	-0.14	-4.54	-3.57	-3.43	-1.53	-0.68	-9.21
Alternative 2										
Shoreside LE Trawl	0.11	-0.01	-0.98	-	-0.88	+0.07	-1.12	+0.21	+0.11	-0.73
At Sea Whiting	-	-	-	-	-	-	-	-	-	-
LE Fixed Gear	-0.47	-0.15	-0.28	-	-0.90	-0.21	-0.39	-0.31	-0.14	-1.04
Open Access	0.00	-0.03	-0.13	-	-0.16	-0.05	-0.01	-0.08	-0.17	-0.31
Tribal Groundfish	-0.02	-0.29	-0.21	-0.14	-0.65	-	-	-	-	-
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-
TOTAL	-0.39	-0.47	-1.60	-0.14	-2.60	-0.19	-1.52	-0.17	-0.20	-2.08
Alternative 3										
Shoreside LE Trawl	0.13	+0.00	-0.10	-	+0.04	+0.61	-0.03	+0.32	+0.11	+1.02
At Sea Whiting	-	-	-	-	-	-	-	-	-	-
LE Fixed Gear	-0.47	-0.15	-0.28	-	-0.90	-0.21	-0.38	-0.31	-0.13	-1.03
Open Access	0.00	-0.03	-0.13	-	-0.16	-0.05	-0.01	-0.08	-0.12	-0.26
Tribal Groundfish	-0.02	-0.29	+0.05	-0.14	-0.39	-	-	-	-	-
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-
TOTAL	-0.36	-0.46	-0.45	-0.14	-1.41	+0.35	-0.42	-0.06	-0.14	-0.27
Preferred Alternative (Low Whiting OY)										
Shoreside LE Trawl	0.08	-0.00	-1.76	-	-1.69	-0.27	-2.01	+0.21	+0.18	-1.89
At Sea Whiting	-	-	-	-	-	-	-	-	-	-
LE Fixed Gear	-0.47	-0.15	-0.28	-	-0.90	-0.21	-0.38	-0.31	-0.13	-1.03
Open Access	0.00	-0.03	-0.13	-	-0.17	-0.05	-0.01	-0.08	-0.12	-0.26
Tribal Groundfish	-0.02	-0.29	-0.30	-0.14	-0.74	-	-	-	-	-
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-
TOTAL	-0.42	-0.47	-2.47	-0.14	-3.49	-0.52	-2.41	-0.17	-0.08	-3.18
Preferred Alternative (Medium Whiting OY)										
Shoreside LE Trawl	0.08	-0.00	-0.97	-	-0.90	+0.15	-1.05	+0.29	+0.18	-0.43
At Sea Whiting	-	-	-	-	-	-	-	-	-	-
LE Fixed Gear	-0.47	-0.15	-0.28	-	-0.90	-0.21	-0.38	-0.31	-0.13	-1.03
Open Access	0.00	-0.03	-0.13	-	-0.16	-0.05	-0.01	-0.08	-0.12	-0.26
Tribal Groundfish	-0.02	-0.29	-0.21	-0.14	-0.65	-	-	-	-	-
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-
TOTAL	-0.42	-0.47	-1.59	-0.14	-2.61	-0.11	-1.44	-0.09	-0.08	-1.72
Preferred Alternative (High Whiting OY)										
Shoreside LE Trawl	0.08	-0.00	-0.09	-	-0.02	+0.61	+0.02	+0.38	+0.18	+1.19
At Sea Whiting	-	-	-	-	-	-	-	-	-	-
LE Fixed Gear	-0.47	-0.15	-0.28	-	-0.90	-0.21	-0.38	-0.31	-0.13	-1.03
Open Access	0.00	-0.03	-0.13	-	-0.16	-0.05	-0.01	-0.08	-0.12	-0.26
Tribal Groundfish	-0.02	-0.29	+0.05	-0.14	-0.39	-	-	-	-	-
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-
TOTAL	-0.42	-0.47	-0.45	-0.14	-1.47	+0.36	-0.38	+0.00	-0.08	-0.10

Table 7-63b. Change from No Action in projected exvessel revenue impacts from commercial fishing activities by port area under the 2007-2008 action alternatives ($ million). (Page 2 of 2)

	CALIFORNIA											
Alternative / Fishery	**Crescent City**	**Eureka**	**Fort Bragg**	**Bodega Bay-San Francisco**	**Monterey**	**Morro Bay**	**Santa Barbara**	**Los Angeles**	**San Diego**	**CA TOTAL**	**At Sea**	**WEST COAST TOTAL**
No Action (2006)												
Shoreside LE Trawl	*0.70*	*2.43*	*1.83*	*0.71*	*0.83*	*0.47*	-	-	-	*6.96*	-	*32.46*
At Sea Whiting	-	-	-	-	-	-	-	-	-	*0.00*	*14.74*	*14.74*
LE Fixed Gear	*0.22*	*0.31*	*0.24*	*0.20*	*0.42*	-	*0.26*	*0.74*	*0.32*	*2.72*	-	*10.72*
Open Access	*0.37*	*0.25*	*0.98*	*0.26*	*0.53*	*0.95*	*0.14*	*0.09*	*0.18*	*3.75*	-	*6.33*
Tribal Groundfish	-	-	-	-	-	-	-	-	-	*0.00*	*2.57*	*7.76*
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	*0.00*	-	*10.47*
Non Groundfish	*2.91*	*2.44*	*2.29*	*18.27*	*6.55*	*1.48*	*22.27*	*27.66*	*4.60*	*88.47*	-	*196.98*
TOTAL	*4.20*	*5.44*	*5.33*	*19.44*	*8.32*	*2.90*	*22.68*	*28.49*	*5.10*	*101.90*	*17.31*	*279.45*
Alternative 1												
Shoreside LE Trawl	-0.27	-0.89	-0.72	-0.24	-0.25	-0.16	-	-	-	-2.52	-	-13.07
At Sea Whiting	-	-	-	-	-	-	-	-	-	-	-6.93	-6.93
LE Fixed Gear	-0.05	-0.08	-0.06	-0.04	-0.07	-	-0.05	-0.14	-0.07	-0.55	-	-2.50
Open Access	-0.03	-0.05	-0.22	-0.04	-0.09	-0.17	-0.02	-0.00	-0.03	-0.66	-	-1.19
Tribal Groundfish	-	-	-	-	-	-	-	-	-	-	-0.73	-1.47
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	-0.35	-1.02	-1.00	-0.31	-0.41	-0.33	-0.07	-0.15	-0.10	-3.73	-7.66	-25.14
Alternative 2												
Shoreside LE Trawl	+0.08	+0.16	+0.29	+0.03	+0.08	+0.03	-	-	-	+0.68	-	-0.94
At Sea Whiting	-	-	-	-	-	-	-	-	-	-	-3.91	-3.91
LE Fixed Gear	-0.04	-0.08	-0.06	-0.04	-0.07	-	-0.02	-0.03	-0.02	-0.35	-	-2.29
Open Access	-0.02	-0.05	-0.20	-0.02	-0.08	-0.09	-0.01	-0.00	-0.03	-0.50	-	-0.97
Tribal Groundfish	-	-	-	-	-	-	-	-	-	-	-0.54	-1.20
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	+0.02	+0.03	+0.03	-0.03	-0.06	-0.05	-0.02	-0.03	-0.04	-0.16	-4.46	-9.30
Alternative 3												
Shoreside LE Trawl	+0.09	+0.25	+0.31	+0.04	+0.08	+0.04	-	-	-	+0.81	-	+1.87
At Sea Whiting	-	-	-	-	-	-	-	-	-	-	-0.58	-0.58
LE Fixed Gear	-0.04	-0.07	-0.06	-0.04	-0.07	-	-0.02	-0.03	-0.02	-0.34	-	-2.27
Open Access	-0.00	-0.05	-0.18	-0.01	-0.06	-0.00	-0.00	-0.00	-0.03	-0.34	-	-0.76
Tribal Groundfish	-	-	-	-	-	-	-	-	-	-	-	-0.39
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	+0.04	+0.13	+0.07	-0.01	-0.04	+0.04	-0.02	-0.03	-0.04	+0.14	-0.58	-2.12
Preferred Alternative (Low Whiting OY)												
Shoreside LE Trawl	+0.13	+0.16	+0.48	+0.05	+0.12	+0.05	-	-	-	+0.98	-	-2.60
At Sea Whiting	-	-	-	-	-	-	-	-	-	-	-6.93	-6.93
LE Fixed Gear	-0.04	-0.07	-0.06	-0.04	-0.07	-	-0.02	-0.03	-0.02	-0.34	-	-2.27
Open Access	-0.00	-0.05	-0.18	-0.01	-0.06	-0.00	-0.00	-0.00	-0.03	-0.34	-	-0.76
Tribal Groundfish	-	-	-	-	-	-	-	-	-	-	-0.73	-1.47
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	+0.08	+0.03	+0.24	+0.00	-0.01	+0.05	-0.02	-0.03	-0.04	+0.31	-7.66	-14.03
Preferred Alternative (Medium Whiting OY)												
Shoreside LE Trawl	+0.13	+0.23	+0.48	+0.05	+0.12	+0.05	-	-	-	+1.05	-	-0.27
At Sea Whiting	-	-	-	-	-	-	-	-	-	-	-3.91	-3.91
LE Fixed Gear	-0.04	-0.07	-0.06	-0.04	-0.07	-	-0.02	-0.03	-0.02	-0.34	-	-2.27
Open Access	-0.00	-0.05	-0.18	-0.01	-0.06	-0.00	-0.00	-0.00	-0.03	-0.34	-	-0.76
Tribal Groundfish	-	-	-	-	-	-	-	-	-	-	-0.54	-1.20
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	+0.08	+0.10	+0.24	+0.00	-0.01	+0.05	-0.02	-0.03	-0.04	+0.38	-4.46	-8.41
Preferred Alternative (High Whiting OY)												
Shoreside LE Trawl	+0.13	+0.30	+0.48	+0.05	+0.12	+0.05	-	-	-	+1.13	-	+2.29
At Sea Whiting	-	-	-	-	-	-	-	-	-	-	-0.58	-0.58
LE Fixed Gear	-0.04	-0.07	-0.06	-0.04	-0.07	-	-0.02	-0.03	-0.02	-0.34	-	-2.27
Open Access	-0.00	-0.05	-0.18	-0.01	-0.06	-0.00	-0.00	-0.00	-0.03	-0.34	-	-0.76
Tribal Groundfish	-	-	-	-	-	-	-	-	-	-	-	-0.39
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	+0.08	+0.18	+0.24	+0.00	-0.01	+0.05	-0.02	-0.03	-0.04	+0.45	-0.58	-1.70

Table 7-64a. Estimated income impacts in 2005 and projected annual income impacts from commercial fishing activities by port area under the 2007-2008 action alternatives ($ million). (Income impacts are derived from harvesting, processing and support activities connected with Council-managed ocean area commercial fisheries.) (Page 1 of 2)

	WASHINGTON					OREGON				
Alternative / Fishery	Puget Sound	North Washington Coast	South and Central Washington Coast	Unidentified Washington	WA TOTAL	Astoria-Tillamook	Newport	Coos Bay	Brookings	OR TOTAL
2005										
Shoreside LE Trawl	4.14	0.89	18.72	-	23.76	17.86	18.49	5.77	1.37	43.48
At Sea Whiting	-	-	-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	3.21	0.86	1.62	-	5.70	1.09	2.06	1.63	0.77	5.55
Open Access	0.04	0.18	0.78	-	1.00	0.37	0.09	0.49	1.50	2.46
Tribal Groundfish	0.39	4.26	6.45	0.71	11.81	-	-	-	-	0.00
Tribal Non-Groundfish	1.15	4.39	0.41	8.73	14.68	-	-	-	-	0.00
Non Groundfish	6.95	3.21	80.96	0.02	91.14	75.82	23.76	22.44	12.25	134.26
TOTAL	15.88	13.80	108.95	9.46	148.09	95.14	44.40	30.32	15.89	185.75
No Action (2006)										
Shoreside LE Trawl	3.61	0.81	18.77	-	23.19	17.32	18.52	5.62	1.35	42.82
At Sea Whiting	-	-	-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	3.23	0.87	1.64	-	5.74	1.09	2.08	1.64	0.77	5.59
Open Access	0.04	0.18	0.79	-	1.01	0.37	0.09	0.49	1.50	2.45
Tribal Groundfish	0.42	4.80	6.38	0.74	12.34	-	-	-	-	0.00
Tribal Non-Groundfish	1.15	4.39	0.41	8.73	14.68	-	-	-	-	0.00
Non Groundfish	6.95	3.21	80.96	0.02	91.14	75.82	23.76	22.44	12.25	134.26
TOTAL	15.40	14.26	108.94	9.49	148.10	94.62	44.45	30.19	15.87	185.12
Alternative 1										
Shoreside LE Trawl	2.29	0.50	10.03	-	12.83	9.93	10.10	3.36	0.83	24.22
At Sea Whiting	-	-	-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	2.52	0.66	1.23	-	4.40	0.82	1.56	1.23	0.59	4.21
Open Access	0.03	0.14	0.59	-	0.75	0.31	0.08	0.38	1.22	1.99
Tribal Groundfish	0.43	4.47	4.74	0.58	10.22	-	-	-	-	0.00
Tribal Non-Groundfish	1.15	4.39	0.41	8.73	14.68	-	-	-	-	0.00
Non Groundfish	6.95	3.21	80.96	0.02	91.14	75.82	23.76	22.44	12.25	134.26
TOTAL	13.37	13.37	97.96	9.33	134.03	86.89	35.50	27.41	14.88	164.67
Alternative 2										
Shoreside LE Trawl	3.81	0.80	14.05	-	18.66	16.64	14.80	5.86	1.53	38.83
At Sea Whiting	-	-	-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	2.52	0.66	1.23	-	4.41	0.82	1.56	1.23	0.59	4.21
Open Access	0.03	0.14	0.59	-	0.76	0.31	0.08	0.38	1.28	2.04
Tribal Groundfish	0.43	4.47	5.19	0.58	10.66	-	-	-	-	0.00
Tribal Non-Groundfish	1.15	4.39	0.41	8.73	14.68	-	-	-	-	0.00
Non Groundfish	6.95	3.21	80.96	0.02	91.14	75.82	23.76	22.44	12.25	134.26
TOTAL	14.89	13.67	102.44	9.33	140.33	93.59	40.20	29.91	15.65	179.35
Alternative 3										
Shoreside LE Trawl	3.87	0.82	18.16	-	22.86	18.32	18.23	6.18	1.54	44.27
At Sea Whiting	-	-	-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	2.52	0.66	1.23	-	4.42	0.82	1.56	1.23	0.60	4.22
Open Access	0.03	0.14	0.60	-	0.77	0.31	0.08	0.38	1.33	2.10
Tribal Groundfish	0.43	4.47	6.54	0.58	12.01	-	-	-	-	0.00
Tribal Non-Groundfish	1.15	4.39	0.41	8.73	14.68	-	-	-	-	0.00
Non Groundfish	6.95	3.21	80.96	0.02	91.14	75.82	23.76	22.44	12.25	134.26
TOTAL	14.96	13.69	107.90	9.33	145.89	95.28	43.63	30.24	15.72	184.85
Preferred Alternative (Low Whiting OY)										
Shoreside LE Trawl	3.80	0.81	10.37	-	14.98	15.52	11.89	5.80	1.65	34.86
At Sea Whiting	-	-	-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	2.52	0.66	1.23	-	4.42	0.82	1.56	1.23	0.60	4.22
Open Access	0.03	0.14	0.59	-	0.76	0.31	0.08	0.38	1.33	2.10
Tribal Groundfish	0.43	4.47	4.74	0.58	10.22	-	-	-	-	0.00
Tribal Non-Groundfish	1.15	4.39	0.41	8.73	14.68	-	-	-	-	0.00
Non Groundfish	6.95	3.21	80.96	0.02	91.14	75.82	23.76	22.44	12.25	134.26
TOTAL	14.89	13.68	98.30	9.33	136.20	92.48	37.29	29.85	15.83	175.44
Preferred Alternative (Medium Whiting OY)										
Shoreside LE Trawl	3.80	0.81	14.07	-	18.68	16.90	14.95	6.06	1.65	39.56
At Sea Whiting	-	-	-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	2.52	0.66	1.23	-	4.42	0.82	1.56	1.23	0.60	4.22
Open Access	0.03	0.14	0.59	-	0.76	0.31	0.08	0.38	1.33	2.10
Tribal Groundfish	0.43	4.47	5.19	0.58	10.66	-	-	-	-	0.00
Tribal Non-Groundfish	1.15	4.39	0.41	8.73	14.68	-	-	-	-	0.00
Non Groundfish	6.95	3.21	80.96	0.02	91.14	75.82	23.76	22.44	12.25	134.26
TOTAL	14.89	13.68	102.46	9.33	140.36	93.86	40.35	30.11	15.83	180.14
Preferred Alternative (High Whiting OY)										
Shoreside LE Trawl	3.80	0.81	18.17	-	22.78	18.43	18.33	6.34	1.65	44.75
At Sea Whiting	-	-	-	-	0.00	-	-	-	-	0.00
LE Fixed Gear	2.52	0.66	1.23	-	4.42	0.82	1.56	1.23	0.60	4.22
Open Access	0.03	0.14	0.60	-	0.77	0.31	0.08	0.38	1.33	2.10
Tribal Groundfish	0.43	4.47	6.54	0.58	12.01	-	-	-	-	0.00
Tribal Non-Groundfish	1.15	4.39	0.41	8.73	14.68	-	-	-	-	0.00
Non Groundfish	6.95	3.21	80.96	0.02	91.14	75.82	23.76	22.44	12.25	134.26
TOTAL	14.89	13.68	107.91	9.33	145.81	95.38	43.73	30.39	15.83	185.33

Table 7-64a. Estimated income impacts in 2005 and projected annual income impacts from commercial fishing activities by port area under the 2007-2008 action alternatives ($ million). (Income impacts are derived from harvesting, processing and support activities connected with Council-managed ocean area commercial fisheries.) (Page 2 of 2)

	CALIFORNIA											
Alternative / Fishery	Crescent City	Eureka	Fort Bragg	Bodega Bay-San Francisco	Monterey	Morro Bay	Santa Barbara	Los Angeles	San Diego	CA TOTAL	At Sea	WEST COAST TOTAL
2005												
Shoreside LE Trawl	1.27	5.46	3.35	1.53	1.53	0.98	-	-	-	14.12	-	81.36
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	33.63	33.63
LE Fixed Gear	0.36	0.50	0.37	0.34	0.68	-	0.37	1.08	0.39	4.09	-	15.34
Open Access	0.51	0.40	1.53	0.41	0.83	1.34	0.21	0.12	0.25	5.59	-	9.05
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	8.00	19.82
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	14.68
Non Groundfish	5.01	4.03	3.58	33.16	21.32	2.28	57.08	98.45	7.72	232.63	-	458.04
TOTAL	7.15	10.39	8.82	35.45	24.36	4.60	57.66	99.65	8.36	256.44	41.63	631.91
No Action (2006)												
Shoreside LE Trawl	1.23	5.29	3.50	1.38	1.60	0.95	-	-	-	13.94	-	79.94
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	35.53	35.53
LE Fixed Gear	0.36	0.50	0.37	0.34	0.68	-	0.37	1.08	0.39	4.10	-	15.42
Open Access	0.51	0.40	1.54	0.41	0.83	1.34	0.21	0.12	0.24	5.61	-	9.07
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	7.88	20.22
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	14.68
Non Groundfish	5.01	4.03	3.58	33.16	21.32	2.28	57.08	98.45	7.72	232.63	-	458.04
TOTAL	7.11	10.23	8.98	35.29	24.44	4.56	57.66	99.65	8.36	256.27	43.40	632.90
Alternative 1												
Shoreside LE Trawl	0.73	3.26	2.13	0.91	1.09	0.62	-	-	-	8.74	-	45.78
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	18.83	18.83
LE Fixed Gear	0.29	0.38	0.28	0.27	0.57	-	0.30	0.87	0.31	3.27	-	11.88
Open Access	0.46	0.31	1.18	0.36	0.69	1.10	0.19	0.11	0.21	4.61	-	7.35
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	5.65	15.86
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	14.68
Non Groundfish	5.01	4.03	3.58	33.16	21.32	2.28	57.08	98.45	7.72	232.63	-	458.04
TOTAL	6.49	7.99	7.17	34.70	23.68	3.99	57.56	99.43	8.24	249.25	24.48	572.43
Alternative 2												
Shoreside LE Trawl	1.38	5.36	4.04	1.45	1.72	1.02	-	-	-	14.97	-	72.46
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	26.10	26.10
LE Fixed Gear	0.29	0.38	0.28	0.28	0.57	-	0.35	1.04	0.37	3.55	-	12.18
Open Access	0.49	0.31	1.21	0.38	0.71	1.22	0.20	0.11	0.21	4.84	-	7.64
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	6.21	16.87
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	14.68
Non Groundfish	5.01	4.03	3.58	33.16	21.32	2.28	57.08	98.45	7.72	232.63	-	458.04
TOTAL	7.16	10.09	9.11	35.27	24.32	4.52	57.63	99.60	8.31	255.99	32.31	607.97
Alternative 3												
Shoreside LE Trawl	1.39	5.73	4.07	1.47	1.76	1.04	-	-	-	15.45	-	82.59
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	34.14	34.14
LE Fixed Gear	0.29	0.39	0.28	0.28	0.57	-	0.35	1.04	0.37	3.56	-	12.20
Open Access	0.51	0.32	1.24	0.40	0.73	1.33	0.21	0.11	0.21	5.06	-	7.93
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	7.88	19.89
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	14.68
Non Groundfish	5.01	4.03	3.58	33.16	21.32	2.28	57.08	98.45	7.72	232.63	-	458.04
TOTAL	7.20	10.47	9.17	35.30	24.38	4.65	57.64	99.60	8.31	256.70	42.02	629.46
Preferred Alternative (Low Whiting OY)												
Shoreside LE Trawl	1.46	5.21	4.41	1.50	1.77	1.07	-	-	-	15.42	-	65.26
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	18.83	18.83
LE Fixed Gear	0.29	0.39	0.28	0.28	0.57	-	0.35	1.04	0.37	3.56	-	12.20
Open Access	0.51	0.32	1.24	0.40	0.73	1.33	0.21	0.11	0.21	5.06	-	7.92
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	5.65	15.86
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	14.68
Non Groundfish	5.01	4.03	3.58	33.16	21.32	2.28	57.08	98.45	7.72	232.63	-	458.04
TOTAL	7.28	9.94	9.50	35.34	24.39	4.68	57.64	99.60	8.31	256.67	24.48	592.79
Preferred Alternative (Medium Whiting OY)												
Shoreside LE Trawl	1.46	5.52	4.41	1.50	1.80	1.07	-	-	-	15.76	-	74.00
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	26.10	26.10
LE Fixed Gear	0.29	0.39	0.28	0.28	0.57	-	0.35	1.04	0.37	3.56	-	12.20
Open Access	0.51	0.32	1.24	0.40	0.73	1.33	0.21	0.11	0.21	5.06	-	7.92
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	6.21	16.87
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	14.68
Non Groundfish	5.01	4.03	3.58	33.16	21.32	2.28	57.08	98.45	7.72	232.63	-	458.04
TOTAL	7.28	10.26	9.50	35.34	24.42	4.68	57.64	99.60	8.31	257.01	32.31	609.82
Preferred Alternative (High Whiting OY)												
Shoreside LE Trawl	1.46	5.86	4.41	1.50	1.84	1.07	-	-	-	16.14	-	83.67
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	34.14	34.14
LE Fixed Gear	0.29	0.39	0.28	0.28	0.57	-	0.35	1.04	0.37	3.56	-	12.20
Open Access	0.51	0.32	1.24	0.40	0.73	1.33	0.21	0.11	0.21	5.06	-	7.93
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	7.88	19.89
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	14.68
Non Groundfish	5.01	4.03	3.58	33.16	21.32	2.28	57.08	98.45	7.72	232.63	-	458.04
TOTAL	7.28	10.60	9.50	35.34	24.45	4.68	57.64	99.60	8.31	257.39	42.02	630.54

Table 7-64b. Change from No Action in projected income impacts from commercial fishing activities by port area under the 2007-2008 action alternatives ($ million). (Income impacts are derived from harvesting, processing and support activities connected with Council-managed ocean area commercial fisheries.) (Page 1 of 2)

		WASHINGTON				OREGON				
Alternative / Fishery	Puget Sound	North Washington Coast	South and Central Washington Coast	Unidentified Washington	WASHINGTON TOTAL	Astoria-Tillamook	Newport	Coos Bay	Brookings	OREGON TOTAL
No Action (2006)										
Shoreside LE Trawl	*3.61*	*0.81*	*18.77*	*-*	*23.19*	*17.32*	*18.52*	*5.62*	*1.35*	*42.82*
At Sea Whiting	*-*	*-*	*-*	*-*	*0.00*	*-*	*-*	*-*	*-*	*0.00*
LE Fixed Gear	*3.23*	*0.87*	*1.64*	*-*	*5.74*	*1.09*	*2.08*	*1.64*	*0.77*	*5.59*
Open Access	*0.04*	*0.18*	*0.79*	*-*	*1.01*	*0.37*	*0.09*	*0.49*	*1.50*	*2.45*
Tribal Groundfish	*0.42*	*4.80*	*6.38*	*0.74*	*12.34*	*-*	*-*	*-*	*-*	*0.00*
Tribal Non-Groundfish	*1.15*	*4.39*	*0.41*	*8.73*	*14.68*	*-*	*-*	*-*	*-*	*0.00*
Non Groundfish	*6.95*	*3.21*	*80.96*	*0.02*	*91.14*	*75.82*	*23.76*	*22.44*	*12.25*	*134.26*
TOTAL	*15.40*	*14.26*	*108.94*	*9.49*	*148.10*	*94.62*	*44.45*	*30.19*	*15.87*	*185.12*
Alternative 1										
Shoreside LE Trawl	-1.31	-0.31	-8.73	-	-10.36	-7.39	-8.42	-2.26	-0.53	-18.60
At Sea Whiting	-	-	-	-	-	-	-	-	-	-
LE Fixed Gear	-0.71	-0.21	-0.41	-	-1.33	-0.27	-0.52	-0.41	-0.19	-1.38
Open Access	-0.01	-0.04	-0.20	-	-0.25	-0.07	-0.01	-0.11	-0.28	-0.47
Tribal Groundfish	0.01	-0.33	-1.64	-0.16	-2.13	-	-	-	-	-
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-
TOTAL	-2.03	-0.90	-10.98	-0.16	-14.07	-7.73	-8.95	-2.78	-0.99	-20.45
Alternative 2										
Shoreside LE Trawl	0.20	-0.01	-4.71	-	-4.52	-0.69	-3.72	0.24	0.18	-3.99
At Sea Whiting	-	-	-	-	-	-	-	-	-	-
LE Fixed Gear	-0.71	-0.21	-0.40	-	-1.32	-0.27	-0.52	-0.41	-0.18	-1.38
Open Access	-0.01	-0.04	-0.20	-	-0.25	-0.07	-0.01	-0.11	-0.22	-0.41
Tribal Groundfish	0.01	-0.33	-1.19	-0.16	-1.68	-	-	-	-	-
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-
TOTAL	-0.51	-0.60	-6.51	-0.16	-7.77	-1.02	-4.26	-0.28	-0.22	-5.78
Alternative 3										
Shoreside LE Trawl	0.27	0.01	-0.60	-	-0.33	0.99	-0.29	0.56	0.19	1.46
At Sea Whiting	-	-	-	-	-	-	-	-	-	-
LE Fixed Gear	-0.71	-0.21	-0.40	-	-1.32	-0.27	-0.52	-0.41	-0.18	-1.37
Open Access	-0.01	-0.04	-0.19	-	-0.24	-0.06	-0.01	-0.11	-0.17	-0.36
Tribal Groundfish	0.01	-0.33	0.15	-0.16	-0.33	-	-	-	-	-
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-
TOTAL	-0.44	-0.57	-1.04	-0.16	-2.21	0.66	-0.82	0.05	-0.15	-0.27
Preferred Alternative (Low Whiting OY)										
Shoreside LE Trawl	0.19	0.00	-8.40	-	-8.21	-1.81	-6.63	0.18	0.30	-7.96
At Sea Whiting	-	-	-	-	-	-	-	-	-	-
LE Fixed Gear	-0.71	-0.21	-0.40	-	-1.32	-0.27	-0.52	-0.41	-0.18	-1.37
Open Access	-0.01	-0.04	-0.20	-	-0.25	-0.06	-0.01	-0.11	-0.17	-0.36
Tribal Groundfish	0.01	-0.33	-1.64	-0.16	-2.13	-	-	-	-	-
Tribal Non-Groundfish	-	0.00	-	0.00	0.00	-	-	-	-	-
Non Groundfish	0.00	0.00	0.00	-	0.00	0.00	-	0.00	0.00	0.00
TOTAL	-0.52	-0.58	-10.64	-0.16	-11.90	-2.14	-7.16	-0.34	-0.04	-9.68
Preferred Alternative (Medium Whiting OY)										
Shoreside LE Trawl	0.19	0.00	-4.69	-	-4.50	-0.42	-3.57	0.44	0.30	-3.26
At Sea Whiting	-	-	-	-	-	-	-	-	-	-
LE Fixed Gear	-0.71	-0.21	-0.40	-	-1.32	-0.27	-0.52	-0.41	-0.18	-1.37
Open Access	-0.01	-0.04	-0.20	-	-0.24	-0.06	-0.01	-0.11	-0.17	-0.36
Tribal Groundfish	0.01	-0.33	-1.19	-0.16	-1.68	-	-	-	-	-
Tribal Non-Groundfish	-	0.00	-	0.00	0.00	-	-	-	-	-
Non Groundfish	0.00	0.00	0.00	-	0.00	0.00	-	0.00	0.00	0.00
TOTAL	-0.52	-0.58	-6.48	-0.16	-7.74	-0.76	-4.11	-0.08	-0.04	-4.99
Preferred Alternative (High Whiting OY)										
Shoreside LE Trawl	0.19	0.00	-0.60	-	-0.41	1.10	-0.20	0.72	0.30	1.93
At Sea Whiting	-	-	-	-	-	-	-	-	-	-
LE Fixed Gear	-0.71	-0.21	-0.40	-	-1.32	-0.27	-0.52	-0.41	-0.18	-1.37
Open Access	-0.01	-0.04	-0.19	-	-0.24	-0.06	-0.01	-0.11	-0.17	-0.36
Tribal Groundfish	0.01	-0.33	0.15	-0.16	-0.33	-	-	-	-	-
Tribal Non-Groundfish	-	0.00	-	0.00	0.00	-	-	-	-	-
Non Groundfish	0.00	0.00	0.00	-	0.00	0.00	-	0.00	0.00	0.00
TOTAL	-0.52	-0.58	-1.03	-0.16	-2.29	0.77	-0.73	0.21	-0.04	0.21

Table 7-64b. Change from No Action in projected income impacts from commercial fishing activities by port area under the 2007-2008 action alternatives ($ million). (Income impacts are derived from harvesting, processing and support activities connected with Council-managed ocean area commercial fisheries). (Page 2 of 2)

	CALIFORNIA											
Alternative / Fishery	Crescent City	Eureka	Fort Bragg	Bodega Bay-San Francisco	Monterey	Morro Bay	Santa Barbara	Los Angeles	San Diego	CALIFORNIA TOTAL	At Sea	WEST COAST TOTAL
No Action (2006)												
Shoreside LE Trawl	1.23	5.29	3.50	1.38	1.60	0.95	-	-	-	13.94	-	79.94
At Sea Whiting	-	-	-	-	-	-	-	-	-	0.00	35.53	35.53
LE Fixed Gear	0.36	0.50	0.37	0.34	0.68	-	0.37	1.08	0.39	4.10	-	15.42
Open Access	0.51	0.40	1.54	0.41	0.83	1.34	0.21	0.12	0.24	5.61	-	9.07
Tribal Groundfish	-	-	-	-	-	-	-	-	-	0.00	7.88	20.22
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	0.00	-	14.68
Non Groundfish	5.01	4.03	3.58	33.16	21.32	2.28	57.08	98.45	7.72	232.63	-	458.04
TOTAL	7.11	10.23	8.98	35.29	24.44	4.56	57.66	99.65	8.36	256.27	43.40	632.90
Alternative 1												
Shoreside LE Trawl	-0.49	-2.03	-1.37	-0.47	-0.50	-0.33	-	-	-	-5.20	-	-34.16
At Sea Whiting	-	-	-	-	-	-	-	-	-	-	-16.70	-16.70
LE Fixed Gear	-0.08	-0.12	-0.09	-0.07	-0.11	-	-0.07	-0.21	-0.08	-0.83	-	-3.54
Open Access	-0.05	-0.09	-0.35	-0.06	-0.14	-0.24	-0.02	-0.01	-0.04	-1.00	-	-1.72
Tribal Groundfish	-	-	-	-	-	-	-	-	-	-	-2.23	-4.35
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	-0.62	-2.24	-1.81	-0.60	-0.76	-0.57	-0.09	-0.21	-0.12	-7.02	-18.93	-60.47
Alternative 2												
Shoreside LE Trawl	0.15	0.07	0.54	0.08	0.12	0.07	-	-	-	1.03	-	-7.48
At Sea Whiting	-	-	-	-	-	-	-	-	-	-	-9.43	-9.43
LE Fixed Gear	-0.07	-0.12	-0.09	-0.07	-0.11	-	-0.02	-0.04	-0.02	-0.55	-	-3.25
Open Access	-0.02	-0.09	-0.33	-0.04	-0.13	-0.12	-0.01	0.00	-0.03	-0.77	-	-1.42
Tribal Groundfish	-	-	-	-	-	-	-	-	-	-	-1.67	-3.35
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	0.05	-0.14	0.13	-0.03	-0.12	-0.05	-0.03	-0.04	-0.05	-0.28	-11.10	-24.92
Alternative 3												
Shoreside LE Trawl	0.16	0.44	0.57	0.09	0.16	0.09	-	-	-	1.52	-	2.65
At Sea Whiting	-	-	-	-	-	-	-	-	-	-	-1.39	-1.39
LE Fixed Gear	-0.07	-0.11	-0.09	-0.07	-0.11	-	-0.02	-0.04	-0.02	-0.54	-	-3.23
Open Access	0.00	-0.09	-0.30	-0.01	-0.11	0.00	0.00	0.00	-0.03	-0.54	-	-1.14
Tribal Groundfish	-	-	-	-	-	-	-	-	-	-	0.00	-0.33
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
Non Groundfish	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	0.09	0.24	0.19	0.01	-0.06	0.08	-0.02	-0.04	-0.05	0.43	-1.39	-3.44
Preferred Alternative (Low Whiting OY)												
Shoreside LE Trawl	0.24	-0.08	0.91	0.12	0.17	0.12	-	-	-	1.48	-	-14.68
At Sea Whiting	-	-	-	-	-	-	-	-	-	-	-16.70	-16.70
LE Fixed Gear	-0.07	-0.11	-0.09	-0.07	-0.11	-	-0.02	-0.04	-0.02	-0.54	-	-3.23
Open Access	0.00	-0.09	-0.30	-0.01	-0.11	0.00	0.00	0.00	-0.03	-0.54	-	-1.15
Tribal Groundfish	-	-	-	-	-	-	-	-	-	-	-2.23	-4.35
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-	-	0.00
Non Groundfish	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00
TOTAL	0.17	-0.28	0.52	0.04	-0.05	0.11	-0.02	-0.04	-0.05	0.40	-18.93	-40.11
Preferred Alternative (Medium Whiting OY)												
Shoreside LE Trawl	0.24	0.23	0.91	0.12	0.20	0.12	-	-	-	1.83	-	-5.94
At Sea Whiting	-	-	-	-	-	-	-	-	-	-	-9.43	-9.43
LE Fixed Gear	-0.07	-0.11	-0.09	-0.07	-0.11	-	-0.02	-0.04	-0.02	-0.54	-	-3.23
Open Access	0.00	-0.09	-0.30	-0.01	-0.11	0.00	0.00	0.00	-0.03	-0.54	-	-1.14
Tribal Groundfish	-	-	-	-	-	-	-	-	-	-	-1.67	-3.35
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-	-	0.00
Non Groundfish	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00
TOTAL	0.17	0.03	0.52	0.04	-0.02	0.11	-0.02	-0.04	-0.05	0.74	-11.10	-23.08
Preferred Alternative (High Whiting OY)												
Shoreside LE Trawl	0.24	0.58	0.91	0.12	0.24	0.12	-	-	-	2.21	-	3.73
At Sea Whiting	-	-	-	-	-	-	-	-	-	-	-1.39	-1.39
LE Fixed Gear	-0.07	-0.11	-0.09	-0.07	-0.11	-	-0.02	-0.04	-0.02	-0.54	-	-3.23
Open Access	0.00	-0.09	-0.30	-0.01	-0.11	0.00	0.00	0.00	-0.03	-0.54	-	-1.14
Tribal Groundfish	-	-	-	-	-	-	-	-	-	-	0.00	-0.33
Tribal Non-Groundfish	-	-	-	-	-	-	-	-	-	-	-	0.00
Non Groundfish	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00
TOTAL	0.17	0.38	0.52	0.04	0.02	0.11	-0.02	-0.04	-0.05	1.12	-1.39	-2.35

7.2.9.2 Recreational Fisheries Impacts

In a similar manner to those developed for the commercial fishery, the following tables have been developed showing recreational fishing impacts. Shortened titles for these tables are:

7-65a Projected recreational effort by region in 2004 and 2005 and by alternative
7-65b Change in projected effort across alternatives
7-66a Projected angler expenditures by region in 2004 and 2005 and by alternative
7-66b Change in projected angler expenditures across alternatives
7-67a Projected recreational income impacts by region in 2004 and 2005, and by alternative
7-67b Change in recreational income impacts by region by alternative
7-68a Projected recreation employment impacts by region by alternative
7-68b Change in recreation employment impacts by region by area
7-68c Projected recreational employment impacts by trip target, region, mode, state and alternative
7-68d Projected West Coast recreational income by state, boat type and alternative
7-68e Summary of total three state recreational impacts (trips, expenditures, income) by boat type and trip target

Table 7-65a. Summary of estimated recreational ocean angler effort by region in 2004 and 2005 and projected effort under the action alternatives (angler trips).

Region	2004	2005	No Action	Alt 1	Alt 2	Alt 3	Council Preferred Alt
North Washington Coast	52,055	46,978	46,978	33,793	36,456	42,029	42,029
South & Central WA Coast	145,568	125,737	125,737	125,737	125,737	125,737	125,737
Astoria-Tillamook	58,251	40,764	41,794	37,073	41,794	41,794	41,794
Newport	72,331	55,368	58,487	46,177	58,487	58,487	58,487
Coos Bay	50,990	36,238	39,152	35,175	39,152	39,152	39,152
Brookings	35,382	34,128	35,817	27,008	35,817	35,817	35,817
Crescent City-Eureka	47,314	60,292	47,133	42,035	47,133	47,133	47,133
Fort Bragg	52,197	66,162	45,684	36,678	39,153	48,594	47,790
Bodega Bay - San Francisco	108,659	82,922	87,127	56,185	59,618	92,772	74,489
Monterey - Morro Bay	120,830	99,709	114,155	72,564	74,411	138,561	141,516
Santa Barbara	108,104	64,964	67,401	52,335	58,836	72,775	72,775
Los Angeles - San Diego	786,589	500,488	507,907	464,355	483,195	523,296	523,296
TOTAL	1,638,269	1,213,750	1,217,372	1,029,116	1,099,789	1,266,147	1,250,016

Table 7-65b. Change in projected recreational effort across action alternatives (angler trips).

Region	No Action	Alt 1	Alt 2	Alt 3	Council Preferred Alt
North Washington Coast	*46,978*	-13,185	-10,522	-4,949	-4,949
South & Central WA Coast	*125,737*	-	-	-	-
Astoria-Tillamook	*41,794*	-4,720	-	-	-
Newport	*58,487*	-12,310	-	-	-
Coos Bay	*39,152*	-3,977	+0	+0	+0
Brookings	*35,817*	-8,809	-	-	-
Crescent City-Eureka	*47,133*	-5,098	-	-	-
Fort Bragg	*42,943*	-6,265	-3,790	+5,651	+4,847
Bodega Bay - San Francisco	*66,953*	-10,768	-7,335	+25,819	+7,536
Monterey - Morro Bay	*116,663*	-44,099	-42,252	+21,897	+24,853
Santa Barbara	*72,482*	-20,147	-13,646	+293	+293
Los Angeles - San Diego	*522,440*	-58,085	-39,245	+856	+856
TOTAL	*1,216,580*	-187,464	-116,790	+49,567	+33,436

Table 7-66a. Summary of estimated recreational ocean angler expenditures by region in 2004 and 2005, and projected expenditures under the action alternatives (million $).

Region	2004	2005	No Action	Alt 1	Alt 2	Alt 3	Council Preferred Alt
North Washington Coast	3.4	3.0	3.0	2.1	2.3	2.7	2.7
South & Central WA Coast	15.7	14.4	14.4	14.4	14.4	14.4	14.4
Astoria-Tillamook	4.4	3.4	3.4	2.9	3.4	3.4	3.4
Newport	7.7	6.4	6.7	5.0	6.7	6.7	6.7
Coos Bay	3.8	2.8	2.9	2.5	2.9	2.9	2.9
Brookings	2.4	2.4	2.5	1.8	2.5	2.5	2.5
Crescent City-Eureka	2.8	3.0	2.6	2.3	2.6	2.6	2.6
Fort Bragg	4.1	3.6	2.5	2.1	2.3	3.1	2.8
Bodega Bay - San Francisco	10.1	7.7	7.0	5.8	6.1	10.7	7.8
Monterey - Morro Bay	10.2	7.1	11.6	6.1	6.3	13.7	14.2
Santa Barbara	10.8	5.9	6.8	4.9	5.6	6.8	6.8
Los Angeles - San Diego	81.0	45.4	47.9	42.4	44.4	48.0	48.0
TOTAL	156	105	111	92	99	118	115

Table 7-66b. Change in estimated recreational ocean angler expenditures by region under the action alternatives (million $).

Region	No Action	Alt 1	Alt 2	Alt 3	Council Preferred Alt
North Washington Coast	*3.0*	-0.9	-0.7	-0.3	-0.3
South & Central WA Coast	*14.4*	-	-	-	-
Astoria-Tillamook	*3.4*	-0.5	-	-	-
Newport	*6.7*	-1.8	-	-	-
Coos Bay	*2.9*	-0.4	-	-	-
Brookings	*2.5*	-0.7	-	-	-
Crescent City-Eureka	*2.6*	-0.3	-	-	-
Fort Bragg	*2.5*	-0.4	-0.2	+0.6	+0.3
Bodega Bay - San Francisco	*7.0*	-1.2	-0.9	+3.7	+0.8
Monterey - Morro Bay	*11.6*	-5.5	-5.4	+2.0	+2.5
Santa Barbara	*6.8*	-1.9	-1.2	+0.0	+0.0
Los Angeles - San Diego	*47.9*	-5.5	-3.6	+0.1	+0.1
TOTAL	*111*	-19.1	-12.0	+6.1	+3.5

Table 7-67a. Summary of estimated income impacts resulting from recreational ocean angler expenditures by region in 2004 and 2005, and projected income impacts under the action alternatives (million $).

Region	2004	2005	No Action	Alt 1	Alt 2	Alt 3	Council Preferred Alt
North Washington Coast	2.6	2.4	2.4	1.7	1.8	2.1	2.1
South & Central WA Coast	13.2	12.1	12.1	12.1	12.1	12.1	12.1
Astoria-Tillamook	3.3	2.5	2.6	2.2	2.6	2.6	2.6
Newport	5.9	5.0	5.2	3.9	5.2	5.2	5.2
Coos Bay	2.8	2.1	2.2	1.9	2.2	2.2	2.2
Brookings	1.8	1.8	1.9	1.3	1.9	1.9	1.9
Crescent City-Eureka	2.3	2.4	2.1	1.9	2.1	2.1	2.1
Fort Bragg	3.4	2.9	2.0	1.7	1.8	2.5	2.3
Bodega Bay - San Francisco	8.4	6.4	5.8	4.8	5.1	9.0	6.5
Monterey - Morro Bay	7.9	5.5	9.0	4.7	4.9	10.6	10.9
Santa Barbara	8.4	4.6	5.2	3.8	4.3	5.3	5.3
Los Angeles - San Diego	62.6	35.1	37.1	32.8	34.3	37.1	37.1
TOTAL	123	83	88	73	78	93	90

Table 7-67b. Change in estimated income impacts resulting from recreational ocean angler expenditures by region under the Action Alternatives (million $).

Region	No Action	Alt 1	Alt 2	Alt 3	Council Preferred Alt
North Washington Coast	*2.4*	-0.7	-0.6	-0.2	-0.2
South & Central WA Coast	*12.1*	-	-	-	-
Astoria-Tillamook	*2.6*	-0.4	-	-	-
Newport	*5.2*	-1.4	-	-	-
Coos Bay	*2.2*	-0.3	-	-	-
Brookings	*1.9*	-0.5	-	-	-
Crescent City-Eureka	*2.1*	-0.2	-	-	-
Fort Bragg	*2.0*	-0.3	-0.2	+0.5	+0.2
Bodega Bay - San Francisco	*5.8*	-1.0	-0.7	+3.1	+0.7
Monterey - Morro Bay	*9.0*	-4.3	-4.1	+1.6	+1.9
Santa Barbara	*5.2*	-1.5	-0.9	+0.0	+0.0
Los Angeles - San Diego	*37.1*	-4.3	-2.8	+0.1	+0.1
TOTAL	*88*	-14.9	-9.4	+5.0	+2.7

Table 7-68a. Summary of estimated employment impacts resulting from recreational ocean angler expenditures by region in 2004 and 2005 and projected employment impacts under the action alternatives (number of jobs).

Region	2004	2005	No Action	Alt 1	Alt 2	Alt 3	Council Preferred Alt
North Washington Coast	118	106	106	74	80	96	96
South & Central WA Coast	591	546	546	546	546	546	546
Astoria-Tillamook	149	114	117	99	117	117	117
Newport	267	225	236	173	236	236	236
Coos Bay	126	93	99	84	99	99	99
Brookings	81	79	83	60	83	83	83
Crescent City-Eureka	90	95	82	74	82	82	82
Fort Bragg	135	115	80	68	72	99	89
Bodega Bay - San Francisco	333	254	232	191	203	356	259
Monterey - Morro Bay	273	191	312	164	168	367	380
Santa Barbara	291	158	182	131	149	183	183
Los Angeles - San Diego	2,171	1,217	1,286	1,138	1,190	1,288	1,288
TOTAL	4,625	3,194	3,360	2,802	3,025	3,551	3,458

Table 7-68b. Change in estimated employment impacts resulting from recreational ocean angler expenditures by region under the Action Alternatives (number of jobs).

Region	No Action	Alt 1	Alt 2	Alt 3	Council Preferred Alt
North Washington Coast	*106*	-32	-26	-10	-10
South & Central WA Coast	*546*	-	-	-	-
Astoria-Tillamook	*117*	-18	-	-	-
Newport	*236*	-63	-	-	-
Coos Bay	*99*	-15	-	-	-
Brookings	*83*	-23	-	-	-
Crescent City-Eureka	*82*	-8	-	-	-
Fort Bragg	*80*	-12	-8	+19	+9
Bodega Bay - San Francisco	*232*	-41	-29	+124	+27
Monterey - Morro Bay	*312*	-148	-144	+54	+68
Santa Barbara	*182*	-51	-33	+1	+1
Los Angeles - San Diego	*1,286*	-148	-96	+3	+3
TOTAL	*3,360*	-558	-335	+191	+98

Table 7-68c. Estimated West Coast employment impacts resulting from recreational ocean angler expenditures by state, region and trip target in 2004 and 2005, and projected employment impacts under the action alternatives (number of jobs). (Employment impacts are a measure of local employment generated by the expenditures associated with recreational fishing activities.)

State	Region	Trip Target	2004	2005	No Action	Alt 1	Alt 2	Alt 3	Council Preferred Alt
WASHINGTON									
	North Washington Coast								
		Groundfish	13	24	24	12	16	18	18
		Halibut	41	39	39	18	21	35	35
		Other	63	44	44	43	44	43	43
		TOTAL	118	106	106	74	80	96	96
	South & Central WA Coast								
		Groundfish	97	110	110	110	110	110	110
		Halibut	33	29	29	29	29	29	29
		Other	461	407	407	407	407	407	407
		TOTAL	591	546	546	546	546	546	546
WASHINGTON TOTALS									
		Groundfish	110	133	133	122	125	128	128
		Halibut	75	67	67	47	50	63	63
		Other	524	451	451	451	451	451	451
		TOTAL	709	652	652	620	626	642	642
OREGON									
	Astoria-Tillamook								
		Groundfish	33	42	44	27	44	44	44
		Halibut	9	12	13	13	13	13	13
		Other	106	60	59	59	59	59	59
		TOTAL	149	114	117	99	117	117	117
	Newport								
		Groundfish	118	150	158	96	158	158	158
		Halibut	26	29	30	30	30	30	30
		Other	123	46	47	47	47	47	47
		TOTAL	267	225	236	173	236	236	236
	Coos Bay								
		Groundfish	32	35	37	22	37	37	37
		Halibut	7	6	6	6	6	6	6
		Other	87	53	57	57	57	57	57
		TOTAL	126	93	99	84	99	99	99
	Brookings								
		Groundfish	45	56	59	36	59	59	59
		Halibut	0	0	0	0	0	0	0
		Other	36	23	24	24	24	24	24
		TOTAL	81	79	83	60	83	83	83
OREGON TOTALS									
		Groundfish	229	283	298	180	298	298	298
		Halibut	43	47	50	50	50	50	50
		Other	352	182	187	187	187	187	187
		TOTAL	623	512	535	417	535	535	535
CALIFORNIA									
	North Coast: Humboldt and Del Norte counties								
		Groundfish	70	93	79	71	79	79	79
		Other	20	3	3	3	3	3	3
		TOTAL	90	95	82	74	82	82	82
	North-Central Coast: Sonoma and Mendocino counties								
		Groundfish	82	99	64	52	57	83	74
		Other	53	16	16	16	16	16	16
		TOTAL	135	115	80	68	72	99	89
	North-Central Coast: San Mateo County up through Marin County								
		Groundfish	166	192	170	129	140	294	197
		Other	168	62	62	62	62	62	62
		TOTAL	333	254	232	191	203	356	259
	South-Central Coast: San Luis Obispo County through Santa Cruz County								
		Groundfish	204	178	300	152	156	354	367
		Other	69	13	13	13	13	13	13
		TOTAL	273	191	312	164	168	367	380
	South Coast: Ventura and Santa Barbara counties								
		Groundfish	114	94	117	67	84	118	118
		Other	177	64	64	64	64	64	64
		TOTAL	291	158	182	131	149	183	183
	South Coast: San Diego County through Los Angeles County								
		Groundfish	338	275	344	196	248	347	347
		Other	1,834	942	942	942	942	942	942
		TOTAL	2,171	1,217	1,286	1,138	1,190	1,288	1,288
CALIFORNIA TOTALS									
		Groundfish	973	931	1,074	666	765	1,275	1,182
		Other	2,320	1,100	1,100	1,100	1,100	1,100	1,100
		TOTAL	3,293	2,031	2,174	1,765	1,864	2,374	2,281

Table 7-68d. Estimated West Coast income impacts* resulting from recreational ocean angler expenditures by state, region, boat type and trip target in 2004 and 2005 and projected income impacts under the action alternatives (million $). (Page 1 of 3)

State	Region	Boat Type	Trip Target	2004	2005	No Action	Alt 1	Alt 2	Alt 3	Council Preferred Alt
WASHINGTON										
	North Washington Coast									
		Charter								
			Groundfish	0.03	0.12	0.12	0.06	0.07	0.10	0.10
			Halibut	0.66	0.59	0.59	0.31	0.35	0.54	0.54
			Other	0.47	0.33	0.33	0.33	0.33	0.33	0.33
			TOTAL	1.16	1.04	1.04	0.70	0.75	0.96	0.96
		Private								
			Groundfish	0.26	0.41	0.41	0.22	0.28	0.31	0.31
			Halibut	0.26	0.27	0.27	0.10	0.12	0.23	0.23
			Other	0.94	0.65	0.65	0.64	0.64	0.63	0.63
			TOTAL	1.46	1.32	1.32	0.96	1.03	1.17	1.17
	South & Central WA Coast									
		Charter								
			Groundfish	2.10	2.37	2.37	2.37	2.37	2.37	2.37
			Halibut	0.74	0.62	0.62	0.62	0.62	0.62	0.62
			Other	7.48	6.87	6.87	6.87	6.87	6.87	6.87
			TOTAL	10.32	9.86	9.86	9.86	9.86	9.86	9.86
		Private								
			Groundfish	0.06	0.07	0.07	0.07	0.07	0.07	0.07
			Halibut	0.01	0.01	0.01	0.01	0.01	0.01	0.01
			Other	2.76	2.20	2.20	2.20	2.20	2.20	2.20
			TOTAL	2.83	2.28	2.28	2.28	2.28	2.28	2.28
WASHINGTON TOTALS										
		Charter								
			Groundfish	2.13	2.49	2.49	2.43	2.44	2.47	2.47
			Halibut	1.40	1.21	1.21	0.93	0.97	1.16	1.16
			Other	7.95	7.20	7.20	7.20	7.19	7.20	7.20
			TOTAL	11.48	10.90	10.90	10.56	10.61	10.83	10.83
		Private								
			Groundfish	0.32	0.48	0.48	0.29	0.35	0.38	0.38
			Halibut	0.27	0.28	0.28	0.11	0.13	0.25	0.25
			Other	3.70	2.84	2.84	2.83	2.84	2.83	2.83
			TOTAL	4.29	3.60	3.60	3.24	3.31	3.45	3.45

*Income impacts are a measure of local value added generated by the expenditures associated with recreational fishing activities.

Table 7-68d. Estimated West Coast income impacts* resulting from recreational ocean angler expenditures by state, region, boat type and trip target in 2004 and 2005 and projected income impacts under the action alternatives (million $). (Page 2 of 3)

State	Region	Boat Type	Trip Target	2004	2005	No Action	Alt 1	Alt 2	Alt 3	Council Preferred Alt
OREGON										
	Astoria-Tillamook									
		Charter								
			Groundfish	0.65	0.71	0.75	0.45	0.75	0.75	0.75
			Halibut	0.15	0.21	0.22	0.22	0.22	0.22	0.22
			Other	0.79	0.49	0.48	0.48	0.48	0.48	0.48
			TOTAL	1.58	1.41	1.45	1.15	1.45	1.45	1.45
		Private								
			Groundfish	0.09	0.23	0.24	0.15	0.24	0.24	0.24
			Halibut	0.06	0.07	0.07	0.07	0.07	0.07	0.07
			Other	1.58	0.83	0.84	0.84	0.84	0.84	0.84
			TOTAL	1.73	1.13	1.16	1.06	1.16	1.16	1.16
	Newport									
		Charter								
			Groundfish	2.48	3.08	3.25	1.96	3.25	3.25	3.25
			Halibut	0.34	0.34	0.36	0.36	0.36	0.36	0.36
			Other	1.66	0.63	0.60	0.60	0.60	0.60	0.60
			TOTAL	4.47	4.05	4.22	2.93	4.22	4.22	4.22
		Private								
			Groundfish	0.16	0.26	0.28	0.17	0.28	0.28	0.28
			Halibut	0.25	0.30	0.32	0.32	0.32	0.32	0.32
			Other	1.08	0.40	0.44	0.44	0.44	0.44	0.44
			TOTAL	1.48	0.96	1.03	0.92	1.03	1.03	1.03
	Coos Bay									
		Charter								
			Groundfish	0.60	0.58	0.61	0.37	0.61	0.61	0.61
			Halibut	0.11	0.07	0.07	0.07	0.07	0.07	0.07
			Other	0.57	0.37	0.35	0.35	0.35	0.35	0.35
			TOTAL	1.27	1.01	1.03	0.79	1.03	1.03	1.03
		Private								
			Groundfish	0.12	0.20	0.21	0.13	0.21	0.21	0.21
			Halibut	0.05	0.05	0.06	0.06	0.06	0.06	0.06
			Other	1.38	0.82	0.91	0.91	0.91	0.91	0.91
			TOTAL	1.55	1.07	1.17	1.09	1.17	1.17	1.17
	Brookings									
		Charter								
			Groundfish	0.58	0.63	0.67	0.40	0.67	0.67	0.67
			Halibut	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Other	0.11	0.05	0.05	0.05	0.05	0.05	0.05
			TOTAL	0.69	0.69	0.72	0.46	0.72	0.72	0.72
		Private								
			Groundfish	0.43	0.61	0.64	0.39	0.64	0.64	0.64
			Halibut	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Other	0.69	0.47	0.49	0.49	0.49	0.49	0.49
			TOTAL	1.12	1.08	1.13	0.88	1.13	1.13	1.13
OREGON TOTALS										
		Charter								
			Groundfish	4.30	5.00	5.27	3.19	5.27	5.27	5.27
			Halibut	0.59	0.62	0.66	0.66	0.66	0.66	0.66
			Other	3.12	1.53	1.49	1.49	1.49	1.49	1.49
			TOTAL	8.00	7.16	7.42	5.33	7.42	7.42	7.42
		Private								
			Groundfish	0.80	1.30	1.37	0.83	1.37	1.37	1.37
			Halibut	0.36	0.42	0.45	0.45	0.45	0.45	0.45
			Other	4.72	2.52	2.67	2.67	2.67	2.67	2.67
			TOTAL	5.88	4.24	4.50	3.95	4.50	4.50	4.50

*Income impacts are a measure of local value added generated by the expenditures associated with recreational fishing activities.

Table 7-68d. Estimated West Coast income impacts* resulting from recreational ocean angler expenditures by state, region, boat type and trip target in 2004 and 2005 and projected income impacts under the action alternatives (million $). (Page 3 of 3)

State	Region	Boat Type	Trip Target	2004	2005	No Action	Alt 1	Alt 2	Alt 3	Council Preferred Alt
CALIFORNIA										
	North Coast: Humboldt and Del Norte counties									
		Charter								
			Groundfish	0.63	0.16	0.39	0.37	0.39	0.39	0.39
			Other	0.03	0.00	0.00	0.00	0.00	0.00	0.00
			TOTAL	0.66	0.16	0.39	0.37	0.39	0.39	0.39
		Private								
			Groundfish	1.14	2.17	1.60	1.42	1.60	1.60	1.60
			Other	0.47	0.07	0.07	0.07	0.07	0.07	0.07
			TOTAL	1.60	2.24	1.68	1.49	1.68	1.68	1.68
	North-Central Coast: Sonoma and Mendocino counties									
		Charter								
			Groundfish	1.12	0.39	0.40	0.30	0.32	0.76	0.47
			Other	0.89	0.16	0.16	0.16	0.16	0.16	0.16
			TOTAL	2.01	0.55	0.55	0.45	0.48	0.91	0.62
		Private								
			Groundfish	0.94	2.11	1.22	1.02	1.10	1.33	1.39
			Other	0.45	0.24	0.24	0.24	0.24	0.24	0.24
			TOTAL	1.39	2.35	1.47	1.26	1.35	1.58	1.63
	North-Central Coast: San Mateo County up through Marin County									
		Charter								
			Groundfish	3.04	3.33	3.40	2.52	2.75	6.45	3.97
			Other	3.03	1.29	1.29	1.29	1.29	1.29	1.29
			TOTAL	6.07	4.62	4.69	3.81	4.04	7.74	5.26
		Private								
			Groundfish	1.14	1.50	0.87	0.72	0.78	0.95	0.99
			Other	1.19	0.28	0.28	0.28	0.28	0.28	0.28
			TOTAL	2.33	1.78	1.15	1.00	1.07	1.23	1.27
	South-Central Coast: San Luis Obispo County through Santa Cruz County									
		Charter								
			Groundfish	4.32	2.86	7.21	3.12	3.21	8.41	8.83
			Other	1.14	0.16	0.16	0.16	0.16	0.16	0.16
			TOTAL	5.46	3.02	7.37	3.28	3.37	8.58	8.99
		Private								
			Groundfish	1.57	2.29	1.43	1.25	1.28	1.79	1.76
			Other	0.84	0.20	0.20	0.20	0.20	0.20	0.20
			TOTAL	2.41	2.48	1.63	1.44	1.48	1.99	1.96
	South Coast: Ventura and Santa Barbara counties									
		Charter								
			Groundfish	2.88	2.28	2.89	1.76	2.19	2.92	2.92
			Other	4.03	1.16	1.16	1.16	1.16	1.16	1.16
			TOTAL	6.90	3.44	4.05	2.92	3.35	4.08	4.08
		Private								
			Groundfish	0.41	0.43	0.49	0.16	0.25	0.49	0.49
			Other	1.07	0.70	0.70	0.70	0.70	0.70	0.70
			TOTAL	1.48	1.13	1.19	0.86	0.94	1.19	1.19
	South Coast: San Diego County through Los Angeles County									
		Charter								
			Groundfish	8.93	6.74	8.54	5.19	6.47	8.62	8.62
			Other	43.67	19.62	19.62	19.62	19.62	19.62	19.62
			TOTAL	52.60	26.36	28.16	24.81	26.09	28.23	28.23
		Private								
			Groundfish	0.80	1.20	1.37	0.45	0.69	1.38	1.38
			Other	9.20	7.53	7.53	7.53	7.53	7.53	7.53
			TOTAL	10.00	8.73	8.90	7.98	8.22	8.90	8.90
CALIFORNIA TOTALS										
		Charter								
			Groundfish	20.91	15.76	22.84	13.26	15.34	27.54	25.19
			Other	52.78	22.39	22.39	22.39	22.39	22.39	22.39
			TOTAL	73.69	38.14	45.22	35.65	37.72	49.93	47.57
		Private								
			Groundfish	5.98	9.70	6.99	5.02	5.71	7.54	7.61
			Other	13.23	9.02	9.02	9.02	9.02	9.02	9.02
			TOTAL	19.21	18.72	16.00	14.04	14.72	16.56	16.62

*Income impacts are a measure of local value added generated by the expenditures associated with recreational fishing activities.

Table 7-68e. Summary of total three-state (Washington, Oregon, California) estimated recreational ocean angler effort (angler trips), expenditures (million $), and income impacts* (million $) by boat type and trip target in 2004 and 2005, and projected under the action alternatives.

Boat Type	Trip Target	2004	2005	No Action	Alt 1	Alt 2	Alt 3	Council Preferred Alt
Effort (angler trips)								
Charter								
	Groundfish	233,899	193,408	262,299	157,363	191,839	301,153	283,487
	Halibut	12,002	11,218	11,470	9,910	10,141	11,162	11,162
	Other	562,420	261,621	261,266	261,260	261,251	261,264	261,264
	TOTAL	808,321	466,247	535,035	428,534	463,232	573,579	555,914
Private								
	Groundfish	195,319	314,162	243,259	167,764	203,186	255,741	257,275
	Halibut	18,122	20,141	20,784	15,653	16,105	19,818	19,818
	Other	616,508	413,200	417,502	417,165	417,267	417,009	417,009
	TOTAL	829,948	747,503	681,544	600,582	636,558	692,567	694,102
Charter+Private								
	Groundfish	429,217	507,570	505,557	325,127	395,025	556,893	540,762
	Halibut	30,124	31,359	32,254	25,563	26,246	30,980	30,980
	Other	1,178,928	674,821	678,768	678,425	678,518	678,273	678,273
	TOTAL	1,638,269	1,213,750	1,216,580	1,029,116	1,099,789	1,266,147	1,250,016
Angler Expenditures (million $)								
Charter								
	Groundfish	34.34	29.05	38.53	23.56	28.84	44.20	41.48
	Halibut	2.32	2.16	2.20	1.88	1.93	2.14	2.14
	Other	80.82	38.90	38.84	38.84	38.84	38.84	38.84
	TOTAL	117.48	70.11	79.57	64.28	69.61	85.18	82.46
Private								
	Groundfish	9.19	14.84	11.50	7.96	9.68	12.07	12.15
	Halibut	0.88	0.99	1.02	0.79	0.81	0.98	0.98
	Other	28.80	19.12	19.34	19.33	19.33	19.32	19.32
	TOTAL	38.88	34.94	31.86	28.07	29.82	32.37	32.45
Charter+Private								
	Groundfish	43.53	43.89	50.03	31.51	38.52	56.28	53.63
	Halibut	3.21	3.14	3.22	2.67	2.74	3.11	3.11
	Other	109.62	58.02	58.18	58.17	58.17	58.16	58.16
	TOTAL	156.36	105.05	111.43	92.35	99.43	117.55	114.90
Income Impacts (million $)								
Charter								
	Groundfish	27.34	23.25	30.60	18.88	23.05	35.28	32.93
	Halibut	1.99	1.84	1.87	1.59	1.63	1.82	1.82
	Other	63.85	31.12	31.07	31.07	31.07	31.07	31.07
	TOTAL	93.18	56.20	63.54	51.54	55.75	68.17	65.82
Private								
	Groundfish	7.10	11.48	8.84	6.14	7.43	9.30	9.36
	Halibut	0.63	0.70	0.73	0.56	0.58	0.69	0.69
	Other	21.65	14.38	14.54	14.53	14.53	14.52	14.52
	TOTAL	29.38	26.56	24.10	21.23	22.53	24.51	24.57
Charter+Private								
	Groundfish	34.44	34.72	39.44	25.02	30.48	44.58	42.29
	Halibut	2.62	2.54	2.60	2.15	2.21	2.51	2.51
	Other	85.50	45.50	45.61	45.60	45.60	45.59	45.59
	TOTAL	122.56	82.76	87.64	72.76	78.29	92.68	90.39

*Income impacts are a measure of local value added generated by the expenditures associated with recreational fishing activities.

Table 7-68f. Summary of estimated income impacts resulting from combined recreational angler expenditures and commercial fisheries landings by region under the action alternatives (million $).

Region	No Action	Alt 1	Alt 2	Alt 3	Council Preferred Alternative: Low whiting OY	Council Preferred Alternative: Medium whiting OY	Council Preferred Alternative: High whiting OY
Puget Sound	15.4	13.4	14.9	15.0	14.9	14.9	14.9
North Washington Coast	16.6	15.0	15.5	15.8	15.8	15.8	15.8
South & Central WA Coast	121.1	110.1	114.6	120.0	110.4	114.6	120.1
Astoria-Tillamook	97.2	89.1	96.2	97.9	95.1	96.5	98.0
Newport	49.7	39.4	45.4	48.9	42.5	45.6	49.0
Coos Bay	32.4	29.3	32.1	32.4	32.1	32.3	32.6
Brookings	17.7	16.2	17.5	17.6	17.7	17.7	17.7
Crescent City-Eureka	19.4	16.3	19.3	19.7	19.3	19.6	19.9
Fort Bragg	11.0	8.9	10.9	11.7	11.8	11.8	11.8
Bodega Bay - San Francisco	41.1	39.5	40.4	44.3	41.9	41.9	41.9
Monterey - Morro Bay	38.0	32.4	33.7	39.6	40.0	40.0	40.1
Santa Barbara	62.9	61.3	61.9	62.9	62.9	62.9	62.9
Los Angeles - San Diego	145.1	140.5	142.2	145.0	145.0	145.0	145.0
At Sea (including Tribal)	43.4	24.5	32.3	42.0	24.5	32.3	42.0
TOTAL	711.1	635.9	676.9	712.8	673.8	690.9	711.6

Table 7-68g. Change (from No Action) in estimated income impacts resulting from combined recreational angler expenditures and commercial fisheries landings by region under the action alternatives (million $).

Region	***No Action***	Alt 1	Alt 2	Alt 3	Council Preferred Alternative: Low whiting OY	Council Preferred Alternative: Medium whiting OY	Council Preferred Alternative: High whiting OY
Puget Sound	*15.4*	-2.0	-0.5	-0.4	-0.5	-0.5	-0.5
North Washington Coast	*16.6*	-1.6	-1.2	-0.8	-0.8	-0.8	-0.8
South & Central WA Coast	*121.1*	-11.0	-6.5	-1.0	-10.6	-6.5	-1.0
Astoria-Tillamook	*97.2*	-8.1	-1.0	+0.7	-2.1	-0.8	+0.8
Newport	*49.7*	-10.4	-4.3	-0.8	-7.2	-4.1	-0.7
Coos Bay	*32.4*	-3.1	-0.3	+0.0	-0.3	-0.1	+0.2
Brookings	*17.7*	-1.5	-0.2	-0.2	-0.0	-0.0	-0.0
Crescent City-Eureka	*19.4*	-3.1	-0.1	+0.3	-0.1	+0.2	+0.5
Fort Bragg	*11.0*	-2.1	-0.1	+0.7	+0.8	+0.8	+0.8
Bodega Bay - San Francisco	*41.1*	-1.6	-0.8	+3.1	+0.7	+0.7	+0.7
Monterey - Morro Bay	*38.0*	-5.6	-4.3	+1.6	+2.0	+2.0	+2.1
Santa Barbara	*62.9*	-1.6	-1.0	+0.0	+0.0	+0.0	+0.0
Los Angeles - San Diego	*145.1*	-4.6	-2.9	-0.0	-0.0	-0.0	-0.0
At Sea (including Tribal)	*43.4*	-18.9	-11.1	-1.4	-18.9	-11.1	-1.4
TOTAL	*711.1*	-75.2	-34.1	+1.8	-37.2	-20.2	+0.6

Table 7-68h. Summary of estimated employment impacts resulting from combined recreational angler expenditures and commercial fisheries landings by region under the action alternatives (number of jobs).

					Council Preferred Alternative		
Region	**No Action**	**Alt 1**	**Alt 2**	**Alt 3**	**Low whiting OY**	**Medium whiting OY**	**High whiting OY**
Puget Sound	692	601	669	672	669	669	669
North Washington Coast	747	675	694	711	711	711	711
South & Central WA Coast	5,442	4,948	5,149	5,395	4,963	5,150	5,395
Astoria-Tillamook	4,365	4,000	4,319	4,395	4,269	4,331	4,399
Newport	2,231	1,767	2,040	2,194	1,910	2,047	2,199
Coos Bay	1,454	1,315	1,442	1,456	1,439	1,451	1,464
Brookings	796	728	786	789	794	794	794
Crescent City-Eureka	770	649	767	783	766	778	792
Fort Bragg	437	353	434	463	467	467	467
Bodega Bay - San Francisco	1,633	1,569	1,603	1,757	1,662	1,662	1,662
Monterey - Morro Bay	1,441	1,242	1,290	1,496	1,510	1,511	1,513
Santa Barbara	2,182	2,128	2,148	2,182	2,182	2,182	2,182
Los Angeles - San Diego	5,032	4,872	4,933	5,031	5,031	5,031	5,031
At Sea (including Tribal)	1,951	1,100	1,452	1,888	1,100	1,452	1,888
TOTAL	*29,172*	25,947	27,727	29,213	27,473	28,236	29,166

Table 7-68i. Change (from No Action) in estimated employment impacts resulting from combined recreational angler expenditures and commercial fisheries landings by region under the action alternatives (number of jobs).

					Council Preferred Alternative		
Region	***No Action***	**Alt 1**	**Alt 2**	**Alt 3**	**Low whiting OY**	**Medium whiting OY**	**High whiting OY**
Puget Sound	*692*	-91	-23	-20	-23	-23	-23
North Washington Coast	*747*	-72	-53	-36	-36	-36	-36
South & Central WA Coast	*5,442*	-494	-292	-47	-478	-291	-46
Astoria-Tillamook	*4,365*	-365	-46	+30	-96	-34	+34
Newport	*2,231*	-465	-191	-37	-322	-184	-33
Coos Bay	*1,454*	-139	-12	+2	-15	-4	+9
Brookings	*796*	-68	-10	-7	-2	-2	-2
Crescent City-Eureka	*770*	-122	-3	+13	-5	+8	+21
Fort Bragg	*437*	-84	-3	+26	+30	+30	+30
Bodega Bay - San Francisco	*1,633*	-65	-30	+124	+29	+29	+29
Monterey - Morro Bay	*1,441*	-198	-150	+55	+70	+71	+72
Santa Barbara	*2,182*	-54	-34	+0	+0	+0	+0
Los Angeles - San Diego	*5,032*	-160	-99	-1	-1	-1	-1
At Sea (including Tribal)	*1,951*	-851	-499	-62	-851	-499	-62
TOTAL	*29,172*	-3,226	-1,446	+41	-1,699	-936	-7

7.2.9.2.1 Commercial Impact Comparison

Under the No Action Alternative, total West Coast landings from all fisheries including groundfish would yield 510,000 mt of fish and shellfish landed shoreside or delivered at sea, generating about $280 million in exvessel revenues which in turn would lead to $625 million in income impacts; at an income level of $26,000 per year, this would yield 24,000 jobs. The 2005 estimates are quite similar to the No Action Alternative. Alternative 1 would lead to a level of $567 million in personal income, nearly a 10 percent decrease in income impacts, whereas Action Alternative 3 would bring about less than 1 percent decline in income and Action Alternative 2, a 4 percent decline. For non-tribal groundfish income impacts, the No Action Alternative and 2005 levels of personal income are about $140 million. Implementation of Action Alternative 1 would lead to a decline of $56 million in groundfish fishery generated income, a 40 percent decline. Action Alternative 2 would lead to a 15 percent decline in non-tribal income impacts including at-sea fisheries, and Action Alternative 3 yields a 2 percent decline. Under the final Council-preferred Alternative, there are three estimates based on the range of potential Pacific whiting U.S. catch OYs that the Council may adopt in March 2007 (“Low” is 150,000 mt, “Medium” is 200,000 mt, and “High” is 260,000 mt). Compared to the No Action Alternative, in all cases, the final Council-preferred Alternative would yield a reduction in the total fish and shellfish landed or delivered at sea. If the High Pacific whiting OY is chosen in March 2007, the final Council-preferred Alternative yields economic impacts similar to Action Alternative 3, generating $278 million in exvessel revenues leading to $623 million in income impacts and just under 24,000 jobs. Implementing this alternative would lead to an estimated 1 percent decline in non-tribal groundfish income impacts including at-sea fisheries.

7.2.9.2.2 Recreational Impact Comparison

It is estimated that under the No Action Alternative, 1.2 million angler trips would be taken and the estimated $113 million that these anglers would spend on fishing would generate $89 million in personal income or the equivalent of 3,422 jobs. These estimates are similar to the ones generated for 2005 but differ significantly with Action Alternative 1. Under Action Alternative 1, one million trips would be taken leading to $92 million in expenditures, $73 million in income and 2,802 jobs; this represents a difference of $16 million in income or an 18 percent decline from the No Action Alternative. These estimates are for all fisheries including groundfish. With respect to groundfish targeted trips, the No Action Alternative leads to $39 million in personal income impacts compared to a 2005 level of $35 million. If Action Alternative 1 were implemented, the recreational groundfish fishery would generate $25 million, a decline of more than 35 percent. Action Alternative 3 would generate $45 million in personal income impacts and Action Alternative 2, $30 million in personal income impacts. If the final Council-preferred Alternative is implemented, it is estimated that 1.25 million total angler trips would be taken leading to $115 million in angler expenditures, generating $90 million in personal income impacts and an estimated 3,458 jobs. Included in these estimates is an estimate of $42 million in income impacts associated with groundfish targeted trips.

7.2.10 Other Management Measure Analyses

7.2.10.1 Economic Impacts of Management Measures Designed to Reduce the Mortality of Yelloweye Rockfish

The 2002 yelloweye stock assessment (on which the 2005-2006 ABC and OY were based) was more optimistic than the 2006 stock assessment. The 2006 stock assessment estimated biomass – or status of the stock – to be at a 17.7 percent depletion level (percent of unfished biomass), and the 2002 assessment estimated the depletion level to be 24 percent. This does not mean that the population has been declining, but rather that the re-estimated stock size is smaller than previously thought. While the difference in the depletion level between the two assessments was a difference of approximately 6.3 percent, one of the more major changes to the stock assessment pertains to the assumed life history characteristics of yelloweye rockfish. The characteristics used in the 2002 rebuilding analysis resulted in estimates that showed the species to be more productive than the 2006 assessment. The result of findings and assumptions used in the 2006 assessment means that the estimates from the 2002 assessment allowed for shorter rebuilding times and/or larger harvests when compared to the 2006 assessment. For example, the 2006 OY for yelloweye rockfish was set at 27 mt, and the results of the 2002 rebuilding analysis estimated that the stock would be rebuilt by 2023 under the SPR harvest rate corresponding to a 27 mt OY in 2006. Estimates from the 2006 assessment show that a 2007 OY of 12 mt would rebuild the stock in 2078. That is, if the Council adopted and NMFS implemented a 66 percent reduction in the yelloweye rockfish OY compared to status quo, the rebuilding period would still be 55 years longer than the previous T_{target}, and 30 years longer than $T_{F=0}$.

This substantial change in the assessment results will have dramatic implications for management measures designed to protect yelloweye rockfish. Management measures ultimately adopted will likely need to result in a smaller harvest of yelloweye rockfish than previous measures, and such management measures will also have negative economic consequences on fishing communities. Under status quo management, the sectors that take the largest amount of yelloweye rockfish are the recreational groundfish and halibut sectors, followed by directed open access groundfish, and limited entry fixed gear and tribal sectors. In order to achieve reductions in the bycatch of overfished groundfish, the Council has, in the past, restricted to the greatest extent those sectors that have the largest impact on that particular species. However, in many instances the tribal fisheries are left unaffected. Based on past approaches to management, the largest source of reduction in yelloweye rockfish bycatch is likely to come from the recreational and directed open access sectors. At the end of 2005, the recreational sectors were estimated to take 13.1 mt of yelloweye rockfish, and all other sectors (including tribal and non-groundfish fisheries) were estimated to take 8.9 mt.

Several alternatives were analyzed pertaining to yelloweye rockfish OYs. These OYs include zero harvest, a 2007 OY of 12 mt, 12.6 mt, 17 mt, 21 mt, 24 mt, 27 mt, and a ramp-down strategy which has a 2007 OY of 23 mt, 20 mt in 2008, 17 mt in 2009, and 14 mt in 2010 respectively. Implicit in the ramp down strategy is the development of additional management tools in order to allow some harvest of more abundant target species while reducing the catch of yelloweye over time. It is likely that new management tools would not be able to be developed without a ramp-down strategy because the development of additional tools inherently relies on the ability to take some additional bycatch in order to test the effectiveness of those tools.

7.2.10.1.1 Economic Impact of a $T_{F=0}$ Yelloweye Rockfish OY

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 7-69). 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 like 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 rockfish is estimated to be rebuilt under zero harvest.

7.2.10.1.2 Economic Impact of a 12 mt Yelloweye Rockfish OY in 2007

Under the alternative that puts in place a 12 mt yelloweye rockfish OY in 2007, multiple sectors and communities are estimated to be negatively impacted to a large degree. Analysis of commercial management measures designed to achieve a suite of OYs for all overfished species and which included the 12 mt yelloweye rockfish OY showed that exvessel revenues would be reduced by nearly 40 percent. However, this is likely an overestimate of what would occur if only yelloweye rockfish were to be reduced to 12 mt and other overfished species were to remain at status quo levels. In terms of recreational fisheries however, it is estimated that recreational fishing effort for groundfish and Pacific halibut off Washington would decrease by 30 percent under the 12 mt yelloweye rockfish alternative. Off Oregon, it is estimated that recreational fishing effort for groundfish and Pacific halibut would decrease by 32 percent, and recreational fishing effort for groundfish off California would decrease by over 33 percent. In addition, 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 would be larger than indicated by only examining changes to angler trips.

Under the 12 mt 2007 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 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 2007 OY for yelloweye rockfish is less than 12 mt. In order to achieve the necessary reductions in yelloweye rockfish 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 that is only a few tons is functionally equivalent to zero harvest.

Under a 12.6 mt yelloweye rockfish OY in 2007 the impacts to commercial fisheries, recreational fisheries, and fishing communities is expected to be nearly equivalent to a 12 mt OY.

7.2.10.1.3 Economic Impact of the Yelloweye Rockfish Ramp-Down Strategy

The yelloweye rockfish ramp-down OY results in economic impacts to recreational fisheries that range from near status quo, to reductions in angler effort of approximately 22 percent in 2007 compared to 2005 levels. Commercial exvessel revenues for alternatives corresponding to the yelloweye ramp-down strategy show that revenues would range from near status quo, to reductions of 13 percent in 2007 compared to 2005 levels. Beyond 2007, the impacts are less clear as the impact of tools that will be developed will not be fully known until after they have been implemented. However, it is expected that the economic implications will be less severe than the 12 mt and 12.6 mt 2007 OY alternatives. It is estimated that these impacts would be in place until 2084, or 36 years longer than $T_{F=0}$.

7.2.10.1.4 Consideration of Other Yelloweye OY Alternatives

Optimum yields that are equivalent to an SPR harvest rate of 17 mt or greater in 2007 exceed T_{max} according to the 2006 rebuilding analysis, and therefore are not further considered. However, negative economic consequences for these alternatives are far less than SPR harvest rates that correspond to a 12 mt or 12.6 mt OY in 2007.

7.2.10.2 Economic Impacts of Zero Harvest Alternatives for Rebuilding Species

The analysis of zero harvest alternatives examined the economic impacts of setting similar overfished species OYs to zero, where similarity was determined based on the correlation of species across latitude and depths. Species that were considered similar under this definition are: canary and yelloweye rockfish; bocaccio and cowcod; and Pacific ocean perch 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 7-69).

Sectors were analyzed in this case based on the known associations of those sectors with overfished species under management measures currently in place (2006). These include existing allocations between sectors and regions, area closures that are currently in place, and current patterns of fishery effort. The analysis in Table 7-69 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 7-69 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 coastal pelagic species 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 (Table 7-69). 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.

Table 7-69. Exvessel value and number of angler trips lost under zero harvest of rebuilding species alternatives. (Page 1 of 2)

		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 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 7-69. Exvessel value and number of angler trips lost under zero harvest of rebuilding species alternatives. (Page 2 of 2)

		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	
	Exvessel value loss	64,628,943	106,190,358	50,887,385	70,948,617	177,857,691	
	Angler trip loss		1,149,518	741,569	996,991	1,149,518	

Alternative GAP Impact Estimates

During the June Council meeting, the Council's Groundfish Advisory Panel reviewed the economic information developed in the preliminary draft EIS that was presented to the Council. Their efforts generated supplemental reports (Attachment B):

> GAP-1 Agenda Item F.2.c Groundfish Advisory Subpanel Report on Tentative Adoption of 2007-2008 Groundfish Fishery Specifications/Management Measures and Amendment 16.4 (This the major GAP report concerning OYs)
>
> GAP-2 Agenda Item F.2.c Economic Impacts for zero OY and low OY alternatives (This document is a table that summarizes some of the data found in the major GAP report)
>
> GAP-3 Agenda Item F.2.c Supplemental GAP Report 2 (This is copy of the a Table 7-California (All) Total Expenditures by Resident Status, 2000 (in thousands of dollars from Gentner (2001))
>
> GAP-4 Agenda Item F.6.c Supplemental GAP Report Groundfish Advisory Subpanel Report on Final Adoption of 2007-2008 Groundfish Fishery Specification /Management Measures and Amendment 16-4 (This document contains the GAP's recommendations on commercial fishery seasons, trip limits and RCA boundaries

The GAP went through a methodical process of determining the possible effects of various overfished species OY levels on various sectors. In so doing, the GAP made the following observations as reported in GAP-1:

> The GAP referenced Agenda Item F.2.a, Attachment 2; page 158, Table 7-69 [also Table 7-69 in this document], for exvessel values. In addition, the GAP defines "take" in this document as the amount of catch expected to be harvested (including discard mortality). The GAP has also applied a 3:1 multiplier effect when identifying associated community impacts. The income impact multiplier for all groundfish is 2.16. The GAP believes that the community impacts are much more significant than income impacts alone and believes that the 3:1 multiplier is a more accurate depiction of overall community impacts. Recreational information comes from a National Marine Fisheries Service (NMFS) 2001 study "Technical Memorandum NMFS-F-SPO-49 October 2001."
>
> The draft DEIS does not include the social value of recreational fishing. Dollar signs cannot describe the value of families fishing for food and fun.
>
> For the Washington recreational fleet, – both private and charter operations are operating under restrictions that are difficult to live with currently and further reductions and restrictions will be devastating. Businesses in all sectors, (hotel/motel, bait and tackle shots, charter offices, etc.) are showing a downturn of as much as 1/3 in revenues from this time last year. This is a cumulative effect of short halibut seasons, fm restrictions, fuel prices, and a poor economy. Many charter operations have been operating on the margin and any further restrictions are likely to break them and place the stronger businesses into their position. A zero OY on yelloweye, short halibut seasons, reduced salmon opportunity, and bad press involving albacore could result in a fleet reduction similar to the collapse of the salmon in the early eighties. There are no immediately feasible fisheries to fall back on. On (Agenda Item F.2.a, Attachment 2; page 161,) Table

> 7-71 Summary of Percentage Change in Recreational Income Impacts it lists the south and central Washington coasts as 0.0% change, due to the fact that these areas can no longer reduce their take of yelloweye. The assumption that further restricting opportunity in these areas will result in no change in income is ludicrous. Businesses are substantially reduced because of this year's management measures. Loss of revenue from a zero OY on canary or yelloweye will result in a loss in excess of $5 million.

Though it was recognized that summing all of the impacts reported by each species discussed leads to double counting (See GAP-2), it is clear that the GAP's estimates and methodologies are different from those used by the Council's Analytical Team. For purposes of discussion Table 7-70 was developed based on the GAP's estimates by non-tribal sector, but only including estimates associated with the most constraining species for that sector:

Table 7-70. GAP estimates of exvessel value lost under zero harvest and low OY alternatives.

Non-tribal sectors	Constraining Species		Zero OY Alternative	Low OY Alternative
			(Sector Losses, Million $)	
LE Trawl Non-Whiting		Darkblotched	14.3	10.4
LE Whiting	Yelloweye	Canary	30.0	20.0
LE Fixed Gear		Canary	19.0	18.6
OA Directed		Canary	8.0	5.3
Total Non-Tribal Ex-vessel Losses			71.3	54.3
Impact multiplier			3.0	3.0
Commercial Community Impacts			213.9	162.9
Recreational Community Impacts				
Washington	Yelloweye	Canary	5.0	4.0
Oregon	Yelloweye	canary	45.0	26.7
California	Bocaccio	Widow	1,000.0	840.0
Total GAP Estimate of Community Impacts			1,263.9	1,033.6

The GAP also analyzed impacts on the tribal fishery. For tribal fisheries, yelloweye and canary rockfish are the most constraining fisheries. Under the zero harvest alternative for canary rockfish, the GAP predicted that the tribal fishery would have to close all groundfish fisheries and salmon fisheries resulting in a loss of $11.7 million in exvessel revenue. Adding these figures to the GAP non-tribal estimate brings about a total of approximately $225 million in exvessel revenue losses under the zero harvest alternative; applying the GAP multiplier of 3 this yields a total economic impact of close to $1.3 billion.

These estimates differ from the approach taken by the Council's Analytical Team in two primary ways.

1) As indicated above, particularly for Washington and California, the GAP projects that under severe cutback scenarios, the geographic range of potential impacts is greater and more sub-sectors would be affected than was assumed by the Council Analytical Team. In the case of Washington, the GAP assumed that there would an impact on salmon fisheries and on Washington's South and Central Coast.

For California, it appears that the GAP is assuming that almost all fisheries off California will have to be closed if the zero OY were adopted.

2) The GAP approach uses 2005 estimates and adjusts them in a linear fashion. The following is excerpted from GAP-1:

> <u>Limited Entry Trawl Non-whiting Fishery</u>
> Under a zero OY alternative, there would be no limited entry trawl non-whiting fishery south of 40˚10' N. latitude. This results in a loss of $2,600,000 exvessel value which equates to a $7,800,000 impact to affected communities.
>
> Under the low OY alternative (bocaccio OY of 40 mt), the limited entry trawl non-whiting fishery is expected to take 9.1 mt of Bocaccio (Table 2-14). In 2006, this same fishery is expected to take 47.9 mt of Bocaccio. This is an 80% reduction in catch, resulting in a $2,080,000 loss in exvessel revenues, which equates to $6,240,000 loss to affected communities.
>
> Under the high OY alternative (bocaccio OY of 218 mt), the limited entry trawl non-whiting fishery is expected to take 50.5 mt of bocaccio (Table 2-21). This number is more similar to the expected catch in 2006 and the higher OY allows a fishery similar to the status quo fishery, which is already severely constrained.
>
> <u>California Recreational Fishery</u>
> Under a zero OY alternative all California recreational fisheries that encounter bocaccio would be eliminated. This results in a loss of more than $1 billion to affected communities.
>
> Under the low OY alternative (bocaccio OY of 40 mt), the California recreational fishery is expected to take 16.0 mt of bocaccio (Table 2-14). This same fishery is expected to take 98.0 mt in 2006. This is an 84 percent reduction in catch and equates to an $840,000,000 economic impact to California communities.
>
> Under the high OY alternative (bocaccio OY of 218 mt), the California recreational fishery is expected to take 106.8 mt of bocaccio (Table 2-21). The high OY allows a status quo fishery, which is already severely constrained.
>
> Maintaining bocaccio catches at 2006 levels in order to prosecute fisheries on healthier stocks DOES NOT represent a profitable position for any of the fisheries which interact with bocaccio. Using 2006 levels as a benchmark for measuring impacts is misleading in that 2006 levels are not reflective of healthy fishing communities. Total bocaccio catches prior to the groundfish fishery disaster declaration in 2000 were significantly higher with 480 mt landed in 1997. The total catch expected in 2006 is just under 174 mt. This reflects a 64 percent reduction in bocaccio catch as well as a higher percentage reduction in catches of associated species.

In using 2005 as the baseline, it appears that this approach assumes that the future 2007-2008 fishery will have the same target species OYs, and that no adjustments will be made by the fleets in terms of species mix or areas fished. Because of time and access to more detailed data, the Council's Analytical Team was able to look at sectors such as the limited entry non-trawl non-whiting fishery on detailed monthly and area basis, and make modeling assumptions about time, area, and species mix as discussed elsewhere in this document. In addition, the Council's Analytical Team was able to factor in explicitly the upcoming declines in target species OYs such as sablefish, and increasing OYs for several of the flatfish species.

Though it is not clear in the GAP statement how this data in GAP-3 was used, it is expected that the GAP used the data in the following way. The GAP-3 table shows estimated trip expenditures by residents and non-residents by mode that add to approximately $360 million; applying the GAP multiplier of 3 results in a total of $1.0 billion in impacts. In using GAP-3 for the California recreational estimate of $1 billion, two assumptions are being made. First, this estimate is based on the California fisheries as they were in 2000, rather than the 2005 fishery. The Council Analytical team uses the average trip expenditures per trip shown in GAP-3, adjusts them for inflation, and then multiplies them by the projected number of trips. This process leads to the estimates in Table 7-66a. If the estimates for the California regions are summed, they would lead to total state expenditures of $120 million in 2004 and about $73 million in 2005, compared with the $360 million estimate in GAP-3.
The second assumption, mentioned previously, is that the GAP believes that setting rebuilding OYs to keep total catch down to very low levels, as reflected in OY Alternative 1, will have a greater impact on non-groundfish fisheries. The total of $1.0 billion in impacts estimated by the GAP includes additional expenditures than those in the analysis of the Council's Analytical Team, for example those made by recreational fishermen who participate in trips for tuna off Mexico that are initiated from California ports. The Council's Analytical Team basically assumed that for the non-groundfish fisheries, levels of participation in 2007 and 2008 would be the same as those in 2005 (See California portions of Tables 7-68b, 7-68c, and 7-68d) and only predicted changes to the estimate of groundfish trips. Therefore using this $1 billion figure leads to a much greater effect on non-groundfish fisheries than is projected by the Analytical Team's analysis.

With respect to the choice of multiplier, the GAP's use of a multiplier of 3 is akin to use of a "sales" multiplier, which differs from the personal income multiplier that the Council uses in its economic impact models to assess the income regional impacts (REI) resulting from West Coast commercial and recreational fisheries. Data on reported landings (for commercial fisheries) or estimates of recreational angler trips are combined with regional economic response coefficients generated by FEAM to estimate local income impacts resulting from changes in fishing activity and/or angler effort expected under alternative fisheries management scenarios. For a detailed explanation of the Council's economic impact estimating methodology see Appendix D in the 2005-06 specifications EIS (PFMC 2004b).

Another quantity sometimes used to measure economic impacts is change in total sales. Also referred to as "turnover" or "rollover", this measure, sums the total amount of sales in an economy that is affected by a change in the sales of a particular sector. Like FEAM, sales impacts are determined using regional economic response coefficients taken from input-output models. However unlike FEAM, total sales multipliers include the total value of all goods and services affected by the change, including those imported into the community. To illustrate, suppose it is determined that as a result of an economic shock, a local auto dealer will sell one less Mercedes-Benz next year. While this represents a loss in direct sales of, say, $50,000 to the dealer and the community, only a fraction of the $50,000 would have stayed in the community. Most is paid to the manufacturer in Germany. Payments are also made to the brokers, shippers, bankers and insurers who arranged import and delivery to the dealer. None of these businesses are likely to be resident in the auto dealer's community. In fact, of the $50,000 sale price, only perhaps $5,000 stays with the dealer to cover his own expenses for rent, utilities, insurance, taxes and payroll, with any remainder becoming his own "profit".

FEAM personal income estimates include the total of all changes in payrolls and profits in a community. In the example above, while the total of all sales impacts calculated using a sales multiplier would be at last $50,000, FEAM would calculate a community income impact of less than $5,000.

From a local point of view, the best measure of the benefit from a change in policies or regulations is the change in local income. The economic impact of a change includes spending and re-spending on inputs by affected businesses, and so can rise or fall irrespective of whether or not local incomes rise. For example, when the price of fuel rises, truckers and fishing guides charge more for their services. Higher costs may translate into an increase in spending on processing activities and by recreational anglers. But the actual incomes earned by owners and employees in these activities will remain about the same.

In sum, the GAP's analysis indicates the uncertainty in projecting which fishery sectors are affected and the geographic scope of these effects. Also, since projections made by the Council's Analytical Team generally include only the income generated by changes in recreational angler trips and commercial fishery landings, they are likely to underestimate the effects of alternatives that embody drastic change from status quo activity levels. This discussion also highlights how the choice of baselines and impact multiplier can affect estimates of economic change.

7.2.11 Other Analyses

7.2.11.1 Vulnerable Commercial Communities

Table 7-71 shows the percentage change in estimated commercial fishery income impacts for shoreside landings by port group compared to the No Action Alternative.

Table 7-71. Summary of percentage change in estimated commercial fishery income impacts by port group compared to the No Action Alternative for shoreside landings only.

									Council Preferred Alternative					
	No Action (2006)		Alt 1		Alt 2		Alt 3		Low whiting OY		Med whiting OY		High whiting OY	
	(million $)		% Change in Shoreside commercial fishery **income** impacts generated by:											
Port Group Area	*All Council-managed fisheries*	*Groundfish fisheries*	All Council-managed fisheries	Groundfish fisheries	All Council-managed fisheries	Groundfish fisheries	All Council-managed fisheries	Groundfish fisheries	All Council-managed fisheries	Groundfish fisheries	All Council-managed fisheries	Groundfish fisheries	All Council-managed fisheries	Groundfish fisheries
Puget Sound	*15.4*	*7.3*	-13.2%	-27.8%	-3.3%	-7.0%	-2.9%	-6.0%	-3.4%	-7.1%	-3.4%	-7.1%	-3.4%	-7.1%
North Washington Coast	*14.3*	*6.7*	-6.3%	-13.5%	-4.2%	-9.0%	-4.0%	-8.6%	-4.1%	-8.7%	-4.1%	-8.7%	-4.1%	-8.7%
South and Central Washington Coast	*108.9*	*27.6*	-10.1%	-39.8%	-6.0%	-23.6%	-1.0%	-3.8%	-9.8%	-38.6%	-5.9%	-23.5%	-0.9%	-3.7%
Unidentified Washington	*9.5*	*0.7*	-1.7%	-21.4%	-1.7%	-21.4%	-1.7%	-21.4%	-1.7%	-21.4%	-1.7%	-21.4%	-1.7%	-21.4%
Astoria-Tillamook	*94.6*	*18.8*	-8.2%	-41.1%	-1.1%	-5.4%	+0.7%	+3.5%	-2.3%	-11.4%	-0.8%	-4.0%	+0.8%	+4.1%
Newport	*44.5*	*20.7*	-20.1%	-43.3%	-9.6%	-20.6%	-1.9%	-4.0%	-16.1%	-34.6%	-9.2%	-19.8%	-1.6%	-3.5%
Coos Bay	*30.2*	*7.8*	-9.2%	-35.9%	-0.9%	-3.6%	+0.2%	+0.6%	-1.1%	-4.4%	-0.3%	-1.0%	+0.7%	+2.7%
Brookings	*15.9*	*3.6*	-6.2%	-27.2%	-1.4%	-6.1%	-1.0%	-4.2%	-0.3%	-1.1%	-0.3%	-1.1%	-0.3%	-1.1%
Crescent City	*7.1*	*2.1*	-8.7%	-29.4%	+0.8%	+2.6%	+1.2%	+4.2%	+2.3%	+7.9%	+2.3%	+7.9%	+2.3%	+7.9%
Eureka	*10.2*	*6.2*	-21.9%	-36.2%	-1.3%	-2.2%	+2.4%	+3.9%	-2.8%	-4.5%	+0.3%	+0.5%	+3.7%	+6.1%
Fort Bragg	*9.0*	*5.4*	-20.1%	-33.5%	+1.4%	+2.3%	+2.1%	+3.4%	+5.8%	+9.7%	+5.8%	+9.7%	+5.8%	+9.7%
Bodega Bay-San Francisco	*35.3*	*2.1*	-1.7%	-27.9%	-0.1%	-1.3%	+0.0%	+0.4%	+0.1%	+2.0%	+0.1%	+2.0%	+0.1%	+2.0%
Monterey	*24.4*	*3.1*	-3.1%	-24.4%	-0.5%	-3.7%	-0.2%	-1.9%	-0.2%	-1.5%	-0.1%	-0.5%	+0.1%	+0.6%
Morro Bay	*4.6*	*2.3*	-12.6%	-25.1%	-1.0%	-2.1%	+1.8%	+3.7%	+2.5%	+5.0%	+2.5%	+5.0%	+2.5%	+5.0%
Santa Barbara	*57.7*	*0.6*	-0.2%	-16.3%	-0.1%	-5.4%	-0.0%	-3.6%	-0.0%	-3.6%	-0.0%	-3.6%	-0.0%	-3.6%
Los Angeles	*99.6*	*1.2*	-0.2%	-17.9%	-0.0%	-3.7%	-0.0%	-3.7%	-0.0%	-3.7%	-0.0%	-3.7%	-0.0%	-3.7%
San Diego	*8.4*	*0.6*	-1.4%	-18.6%	-0.6%	-8.3%	-0.6%	-8.3%	-0.6%	-8.3%	-0.6%	-8.3%	-0.6%	-8.3%
WA-OR-CA TOTAL	*589.5*	*116.8*	-7.0%	-35.6%	-2.3%	-11.8%	-0.3%	-1.8%	-3.6%	-18.1%	-2.0%	-10.3%	-0.2%	-0.8%

Under Action Alternative 1, the port groups with the greatest percentage decrease in estimated income from all Council-managed commercial fisheries compared to the No Action Alternative are Eureka (21.6 percent), Newport (20.2 percent) and Fort Bragg (20.0 percent). All three port groups consist of counties that were identified as three of the six “most vulnerable” counties (Lincoln, Humboldt, and Mendocino counties) in the Engagement, Dependence, Resiliency and Identification of Vulnerable Areas Analysis (see section 7.1.5.2). These “most vulnerable” areas were identified for the purpose of ranking those counties and ports most reliant upon the commercial and recreational fishery resource but least able to adjust to additional decreases in harvest levels. The analysis identified six commercially “most vulnerable” counties and four “most vulnerable” cities based on commercial fishing data and one recreationally “most vulnerable” city based on recreational data. The analysis also identified several other vulnerable counties and cities that are considered potentially at risk but to a lesser degree than the “most vulnerable” areas.

Morro Bay (13 percent), Puget Sound (13 percent) and South and Central Washington Coast (10 percent) also have large decreases estimated under Action Alternative 1. The South and Central Washington Coast port group is composed of three counties, two of which were identified as two of the six most vulnerable counties (Grays Harbor and Pacific counties). The port group also contains one of four cities identified as most vulnerable areas in the Identification of Vulnerable Areas Analysis (Ilwaco). Morro Bay and Puget Sound port groups also encompass some vulnerable areas, but to a lesser degree than the other port groups named above.

The greatest percentage decrease in estimated income from commercial groundfish fisheries under Action Alternative 1 compared to the No Action Alternative are Newport (43.5 percent), Astoria-Tillamook (41 percent), South and Central Washington Coast (39.9 percent), Coos Bay (35.9 percent), Eureka (35.5 percent), and Fort Bragg (33.3 percent). As mentioned above, Newport, South and Central Washington Coast, Eureka, and Fort Bragg port groups include five of the six counties identified as most vulnerable counties in the Identification of Vulnerable Areas Analysis (Lincoln, Grays Harbor, Pacific, Humboldt, and Mendocino counties). The Coos Bay port group also includes one of the six counties identified as most vulnerable counties (Coos County). Astoria-Tillamook and Coos Bay encompass counties identified as vulnerable areas to a lesser degree than the ones mentioned above. However, the Astoria-Tillamook contains one of the four ports identified as most vulnerable ports (Garibaldi).

Under Action Alternative 2, the port groups with the greatest percentage decrease in estimated income from all Council managed commercial fisheries and groundfish fisheries compared to the No Action Alternative are Newport (9.7 percent and 20.8 percent, respectively) and South and Central Washington Coast (6 percent and 23.6 percent, respectively). As mentioned above, these port groups include counties identified as most vulnerable areas.

Under Action Alternative 3, the port groups with the greatest percentage decrease in estimated income from all Council managed commercial fisheries and groundfish fisheries compared to the No Action alternative are North Washington Coast (4.2 percent and 9 percent, respectively) and Puget Sound (2.6 percent and 5.5 percent, respectively). North Washington Coast contains one of the four most vulnerable ports (Neah Bay). Neah Bay and La Push are both located in the North Washington Coast port group and both are ranked as least resilient according to the Identification of Vulnerable Areas Analysis. Both ports were also identified in a 2004 study by PSMFC as “isolated cities” or cities not located on a major highway and which fell outside of a 35-mile buffer of cities with populations greater than 20,000.

7.2.11.2 Vulnerable Recreational Communities

Table 7-72 shows the percentage change in estimated recreational income impacts compared to the No Action Alternative.

Under Action Alternative 1, the regions with the greatest percentage decrease in estimated income from total charter boat trips compared to the No Action Alternative are the California South-Central Coast (53.7 percent), California North Central Coast: San Mateo up through Marin County (47.4 percent), and California North-Central Coast: Sonoma and Mendocino counties (47.1 percent). Brookings (36.1 percent), North Washington Coast (32.7 percent), and Newport (30.6 percent) are also expected to experience relatively large decreases. The California South–Central Coast ties with the California South Coast: San Diego through Los Angeles region as the most highly recreationally engaged area in California according to the Identification of Vulnerable Areas Analysis. The California South–Central Coast region encompasses Moss Landing and Santa Cruz, two cities with low resiliency according to the Identification of Vulnerable Areas Analysis and two counties (Monterey and San Luis Obispo) with low resiliency. California North-Central Coast: San Mateo through Marin County contains one city with low resiliency (Oakland). The California North-Central Coast: Sonoma and Mendocino region encompasses two cities (Fort Bragg and Bodega Bay) and one county (Mendocino) with low resiliency. The Brookings region contains one recreational vulnerable area (Gold Beach). North Washington Coast contains two recreational vulnerable areas (Neah Bay and La Push) and Newport contains two recreational vulnerable areas (Depoe Bay and Newport). With regard to private boat trips, North Washington Coast (27.3 percent), Brookings (22.1 percent), and CA South Coast: Ventura and Santa Barbara counties (20.4 percent) are estimated to experience the largest decreases in income under this alternative. The North Washington Coast contains two recreational vulnerable cities (Neah Bay and La Push), and Brookings contains one recreational vulnerable city (Gold Beach).

The regions predicted to experience the greatest percentage decrease under Action Alternative 1 compared to the No Action alternative in estimated income from recreational groundfish charter boat fisheries are the two North Central CA Coast regions (57.6 percent for San Mateo up through Marin County and 57.1 percent for Sonoma and Mendocino Counties), CA South Central Coast (55 percent) and North Washington Coast (50 percent). Under Action Alternative 1, all Oregon regions are estimated to experience decreases above 39 percent and South CA Coast ports are estimated to experience decreases of about 35 percent. With regard to private trips, the South Coast regions are predicted to experience the greatest percentage decrease in income (57.9 percent for Ventura and Santa Barbara counties and 57.5 percent for San Diego through Los Angeles County). All Oregon regions are estimated to experience decreases of above 37 percent.

Under Action Alternative 2, with regard to total charter boat trips, the regions with the greatest percentage decrease in estimated income compared to the No Action Alternative are: California South-Central Coast: San Luis Obispo County through Santa Cruz (52.5 percent); California North-Central Coast: San Mateo through Marin County (44.2 percent); North-Central Coast: Sonoma and Mendocino counties (43.5 percent); and North Washington Coast (27.9 percent). As mentioned previously, the California South-Central Coast: San Luis Obispo County through Santa Cruz contains two counties and two cities with low resiliency. California North-Central Coast: San Mateo up through Marin County contains one city with low resiliency. California North-Central Coast: Sonoma and Mendocino counties contain two cities and one county with low resiliency. The North Washington Coast region contains two recreational vulnerable cities. With regard to total private trips, North Washington Coast (22 percent) and California South Coast: Ventura and Santa Barbara counties (13 percent) are estimated to experience the largest decreases in income from recreational fishing.

The regions predicted to experience the greatest percentage decrease in estimated income under Action Alternative 2 from recreational groundfish charter boat fisheries compared to the No Action Alternative are the California North Central regions (54.3 percent for Sonoma and Mendocino counties and 53.8 percent for San Mateo up through Marin County), the California South Central region (53.7 percent), and the North Washington Coast (41.7 percent). With regard to private recreational groundfish trips, the California South Coast regions (34.9 percent for San Diego County through Los Angeles County and 34.2 percent for Ventura and Santa Barbara counties) and North Washington Coast (31.7 percent) are estimated to experience the largest decreases in income from recreational fishing.

Under Action Alternative 3, the region with the greatest percentage decrease in estimated income from total recreational charter boat trips compared to the No Action Alternative is the North Washington Coast (7.7 percent). All other regions in Washington and Oregon show no expected change. Most regions in California show increases under Action Alternative 3. With regard to private groundfish trips, North Washington Coast shows the greatest decrease (11.4 percent). California South-Central Coast and California South Coast: Ventura and Santa Barbara counties are estimated to experience the largest increases in income from private recreational fishing (22.1 percent and 10.2 percent respectively).

The region predicted to experience the greatest percentage decrease in estimated income under Action Alternative 3 from recreational groundfish charter boat trips compared to the No Action Alternative is the North Washington Coast (16.7 percent). With regard to private trips for groundfish, the North Washington coast (24.4 percent) is also estimated to experience the largest decreases in income from recreational fishing.

Table 7-72. Summary of percentage change, by region, in estimated recreational income impacts under the action alternatives compared to the No Action Alternative. (Page 1 of 2)

State	Region	Boat Type	*No Action*	Alt 1	Alt 2	Alt 3
WASHINGTON						
	North Washington Coast					
		Charter				
		Groundfish	*0.12*	-50.0%	-41.7%	-16.7%
		TOTAL	*1.04*	-32.7%	-27.9%	-7.7%
		Private				
		Groundfish	*0.41*	-46.3%	-31.7%	-24.4%
		TOTAL	*1.32*	-27.3%	-22.0%	-11.4%
	South & Central WA Coast					
		Charter				
		Groundfish	*2.37*	0.0%	0.0%	0.0%
		TOTAL	*9.86*	0.0%	0.0%	0.0%
		Private				
		Groundfish	*0.07*	0.0%	0.0%	0.0%
		TOTAL	*2.28*	0.0%	0.0%	0.0%
OREGON						
	Astoria-Tillamook					
		Charter				
		Groundfish	*0.75*	-40.0%	0.0%	0.0%
		TOTAL	*1.45*	-20.7%	0.0%	0.0%
		Private				
		Groundfish	*0.24*	-37.5%	0.0%	0.0%
		TOTAL	*1.16*	-8.6%	0.0%	0.0%
	Newport					
		Charter				
		Groundfish	*3.25*	-39.7%	0.0%	0.0%
		TOTAL	*4.22*	-30.6%	0.0%	0.0%
		Private				
		Groundfish	*0.28*	-39.3%	0.0%	0.0%
		TOTAL	*1.03*	-10.7%	0.0%	0.0%
	Coos Bay					
		Charter				
		Groundfish	*0.61*	-39.3%	0.0%	0.0%
		TOTAL	*1.03*	-23.3%	0.0%	0.0%
		Private				
		Groundfish	*0.21*	-38.1%	0.0%	0.0%
		TOTAL	*1.17*	-6.8%	0.0%	0.0%
	Brookings					
		Charter				
		Groundfish	*0.67*	-40.3%	0.0%	0.0%
		TOTAL	*0.72*	-36.1%	0.0%	0.0%
		Private				
		Groundfish	*0.64*	-39.1%	0.0%	0.0%
		TOTAL	*1.13*	-22.1%	0.0%	0.0%

Table 7-72. Summary of percentage change, by region, in estimated recreational income impacts under the action alternatives compared to the No Action Alternative. (Page 2 of 2)

State	Region	Boat Type	*No Action*	Alt 1	Alt 2	Alt 3
CALIFORNIA						
	North Coast: Humboldt and Del Norte counties					
		Charter				
		Groundfish	*0.39*	-5.1%	0.0%	0.0%
		TOTAL	*0.39*	-5.1%	0.0%	0.0%
		Private				
		Groundfish	*1.6*	-11.3%	0.0%	0.0%
		TOTAL	*1.68*	-11.3%	0.0%	0.0%
	North-Central Coast: Sonoma and Mendocino counties					
		Charter				
		Groundfish	*0.7*	-57.1%	-54.3%	8.6%
		TOTAL	*0.85*	-47.1%	-43.5%	7.1%
		Private				
		Groundfish	*1.24*	-17.7%	-11.3%	7.3%
		TOTAL	*1.48*	-14.9%	-8.8%	6.8%
	North-Central Coast: San Mateo up through Marin County					
		Charter				
		Groundfish	*5.95*	-57.6%	-53.8%	8.4%
		TOTAL	*7.24*	-47.4%	-44.2%	6.9%
		Private				
		Groundfish	*0.88*	-18.2%	-11.4%	8.0%
		TOTAL	*1.16*	-13.8%	-7.8%	6.0%
	South-Central Coast: San Luis Obispo County through Santa Cruz					
		Charter				
		Groundfish	*6.93*	-55.0%	-53.7%	21.4%
		TOTAL	*7.09*	-53.7%	-52.5%	21.0%
		Private				
		Groundfish	*1.43*	-12.6%	-10.5%	25.2%
		TOTAL	*1.63*	-11.7%	-9.2%	22.1%
	South Coast: Ventura and Santa Barbara counties					
		Charter				
		Groundfish	*2.69*	-34.6%	-18.6%	8.6%
		TOTAL	*3.85*	-24.2%	-13.0%	6.0%
		Private				
		Groundfish	*0.38*	-57.9%	-34.2%	28.9%
		TOTAL	*1.08*	-20.4%	-13.0%	10.2%
	South Coast: San Diego County through Los Angeles County					
		Charter				
		Groundfish	*7.93*	-34.6%	-18.4%	8.7%
		TOTAL	*27.55*	-9.9%	-5.3%	2.5%
		Private				
		Groundfish	*1.06*	-57.5%	-34.9%	30.2%
		TOTAL	*8.59*	-7.1%	-4.3%	3.6%

7.2.11.3 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.

Much of the information provided below is based on the supplemental reports presented to the Council by its committees or by the States themselves. These reports can be found in Appendix B. In addition, Appendix C summarizes public comments, many of which are relevant to the discussion below.

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 (economic) 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.

The Council's SSC also considered the issue of discounting and found it to be complex. In reviewing the preliminary draft economic analysis presented to the Council at its June meeting, the Council's SSC made the following statement (see the Supplemental SSC Report in Appendix B):

> The economic analyses take into consideration current economic effects, but not how those effects may change through time. For example, it is not clear how an economic sacrifice today may be mitigated by increased revenue due to higher abundances at a future date, or how loss of current fishing opportunities may result in loss of port infrastructure that reduces future fishing opportunities. A dynamic benefit-cost analysis would help inform the Council on these trade-offs. However, such an analysis would need to project forward for all fisheries and sectors impacted by overfished species, which would be a complex undertaking.

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 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. Some of these ports are: 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 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 for those sectors, and have likely decreased net revenues for other 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 on 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 (RMLAs) 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.

As an example of the effects of management in response to resource declines, California 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, and this is expected to result in area closures that are more specific to protecting yelloweye rockfish and more refined than current depth-based management.

Oregon Recreational Bottomfish Fishery

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.

For example as expressed by a public comment letter by an independent fish filleter (see ODFW statement in Appendix B):

> Ever decreasing bag limits and seasonal depth restrictions have crippled my ability to make a living in my chosen career, following in my father's footsteps as a fish filleter for both sports and commercial fishing enterprises. When I began my business the Oregon bag limit was 15 rockfish it is currently 6 marine fish, the effect this drastic and sudden lowering of sports as well as commercial catch limits has driven nearly all the seafood workers and managers I know out of the fishing community or into a lowered standard of living. This is only the tip of the social and economic impacts that are occurring…Of all the options listed the only one I feel that will not fatally wound my fishing community is the "No Action" alternative. We who have survived in the industry have tried our best to be creative and industrious to adapt to the recent "catastrophe" that has befallen us and continue on as a business as well as my fishing community. I am afraid it cannot take another blow without dying. So please do not ignore the impacts decisions based on flawed conclusions will make to the social and economic dynamics of my fishing community."

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, and this is expected to result in area closures that are more specific to protecting yelloweye rockfish and more refined than current depth-based management.

Washington Recreational Bottomfish Fishery

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, and this is expected to result in area closures that are more specific to protecting yelloweye rockfish and more refined than current depth-based management.

Commercial Groundfish Fisheries

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 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, but at this time no post-buyback analysis has been done to verify that result. However, exvessel revenue per vessel has increased. 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, limited entry vessels are now required to carry VMS, and beginning in 2007, 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, and this is expected to result in area closures that are more specific to protecting yelloweye rockfish and more refined than current depth-based management.

Fishing Communities

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, since while they have survived the cutbacks associated with the Secretary of Commerce's declaration of a West Coast groundfish disaster in 2000, they are now also facing new cutbacks associated with the 2006 salmon fishery, which may result in another disaster declaration.

Many of the cumulative effects on fishing communities that stem from the fisheries management effects discussed above were summarized in the Council's GMT and GAP supplemental statements presented to the Council at its June Council meeting (see Appendix B). A graphic representation of commercial trends is found in Figure 2-13, which displays trends in exvessel revenues from the West Coast groundfish fishery and projected revenues under the final Council-preferred Alternative.

In reference to general fishery economic trends, the context of 9th Circuit Court of Appeals guidance, and effects of proposed alternatives on communities, the GMT stated the following:

> In its guidance on **taking into account the needs of fishing communities**, the 9th Circuit Court of Appeals stated, "The purpose of the [Magnuson-Stevens] Act is clearly to give conservation of fisheries priority over short-term economic interests. The Act sets this priority in part because the longer-term economic interests of fishing communities are aligned with the conservation goals set forth in the Act." The 9th Circuit goes on to state "The natural reading of this language, however, is that Congress intended to ensure that overfished species were rebuilt as quickly as possible, but wanted to leave some leeway to avoid disastrous short-term consequences for fishing communities."
>
> We discussed the three action alternatives and the zero harvest alternative and their effects on fishing communities in terms of: short term economic impacts compared to status quo, short term economic impacts compared to historic economic impacts, short term economic impacts compared to the 2000 disaster declaration by the Secretary of Commerce, and short term economic impacts of each action alternative when compared to one another. While there is currently no definition that establishes a threshold for identifying "disastrous short term consequences," there are several precedents that help put the economic impacts of the action alternatives into perspective:

> - The Secretary of Commerce's 2000 commercial fishery disaster declaration for the groundfish fishery;
> - The US department of Agriculture defines severe production losses in a county as a reduction countywide of at least 30 percent; and
> - The Small Business Administration will make a physical disaster declaration when at least three businesses have uninsured losses of 40% or more of their estimated fair replacement value.
>
> Under the status quo fishery, revenues are lower than revenues generated in 2000, the year of the disaster declaration. In 2000, 2001, and 2002 groundfish exvessel revenues were approximately $62 million, $52 million, and $43 million respectively. Recreational angler trips numbered an estimated 1,218,000 in 2000, 927,000 in 2001, and 843,000 in 2002.
>
> The action alternatives result in exvessel revenue, recreational angler trips, and income impacts that continue to be lower than when the disaster declaration was made. Personal income is lowest under Action Alternative 1 and this alternative reduces personal income by $57.6 million from status quo levels (see table 7-68g, page 505 of the Preliminary DEIS). The percent change in income impacts (compared to status quo) under Action Alternative 1 reduces personal income by more than 40% for many port groups. Action Alternative 2 reduces commercial groundfish fishery income by more than 20% for some port groups. Action Alternative 3 reduces commercial groundfish fishery income by less than 15% for all port groups (see Table 7-68, page 510 of the Preliminary DEIS).

The GAP further discussed this theme with the following statement:

> Members of the GAP representing all sectors of the industry continue to voice their desire to be allowed to fish over the long term. Many interpretations of the Ninth Circuit Court's ruling have been made. Taking into consideration the needs of fishing communities to avoid short-term disastrous consequences has different meanings to different stakeholders. However, one fact is undisputable: short-and long-term consequences to fishing communities are intrinsically linked. In order for there to be commercial and recreational fishing industries over the long term, short-term management measures must help preserve fishing businesses. More plainly said, if no fishing industry exists into the future because of overly extreme cuts in harvest then the Council has not taken into account the economic needs of fishing communities. If individual businesses continue to become depleted, necessary infrastructure within fishing communities that support commercial and recreational industries also become depleted. Once boats are tied to the dock, doors are closed, markets are lost, it isn't just one season's fishing foregone.
>
> The GAP believes that some access to depleted species in order to catch healthy stocks is necessary to avoid disastrous short-term consequences to fishing communities. If communities and fishery sectors cannot survive short-term restrictions, longer-term efforts at sustainability apply only to the biology of fish – not to sustaining communities. The GAP believes the relationship between sustainable fishing communities and stable fisheries stocks is intrinsic, and preserving both for the long-term is not only worthwhile, but a necessity….
>
> Generally from 1981 through 1997 the exvessel value of the commercial non-whiting groundfish fishery ranged from $80 to $100 million. In 1998, the first year of the

> groundfish disaster, the value of the entire non-whiting groundfish fishery was $61 million. The disaster was officially declared in 2000, and from 2002 through 2005 exvessel value of the fishery ranged from approximately $40 to $45 million. A difference of $40 to $55 million from the earlier period.
>
> During this time of harvest cuts many fishing businesses and several seafood processors have gone out of business. Secondary and tertiary businesses associated with the fishing industry have also suffered. The additional hardship of increased fuel costs has only made it more difficult to maintain business plans.
>
> Taking into consideration the needs of fishing communities goes beyond simple measures of changes in revenue. Socioeconomic effects should also be a major part of the discussion. For example, unemployment rates are higher for older individuals who have a more difficult time transitioning to new employment opportunities. This type of information is difficult to quantify but we know there are detrimental social consequences when businesses are suffering financially and closing their doors.
>
> Incentives for improved science, management, and fishing practices should always be encouraged and explored. However, the one control the Council has for decision-making today on rebuilding plans is controlling fishing effort. Recreational and commercial fisheries have adapted to reduced harvests. Areas are now closed to protect overfished stocks. Essential fish habitat was established to protect spawning grounds and sensitive habitats. These reductions, closures, and other management measures are in place and there is evidence that stocks are rebuilding. Further reductions in harvest will harm the West Coast groundfish fishery and support industries without any meaningful gain in rebuilding times for most overfished species.

The Supplemental WDFW Report (in Appendix B) provides an analysis that characterizes the underlying conditions of the communities that are likely result of past fishery and other natural resource decisions—in a sense the same series of events have led these communities to the point of being determined "depressed" by the State's Office of Communities, Economics, and Trade and being classified as "Vulnerable" under the socio-economic analysis taken in support of this EIS:

> Under the $T_{F=0}$ yelloweye OY (Zero OY Alternative), the estimated loss to recreational fisheries is about 1,150,000 angler trips….Washington recreational bottomfish and halibut angler trips are estimated to decline by 30% under the yelloweye OY of 12 mt…. These projected reductions in angler trips would cause undue hardship on Washington's coastal communities that are already depressed.
>
> For reference, the status of Washington's coastal communities was described in the 2000 U.S. census. In 2000, the population of Neah Bay was 794, which is a 13.3% decline from 1990. There is a 24% unemployment rate in Neah Bay. The per-capita income was $11,338 with a median household income of $21,635; these data indicate that 29.9% of the Neah Bay population is below the poverty level. A lot of employment in Neah Bay is seasonal in nature, with fisheries employing about 300 people per year.
>
> Also according to the 2000 U.S. census, the population of La Push was 371. There is an unemployment rate of 27.4% in La Push. The per capita income was $9.589 with a median household income of $21,750, which indicates that 34.5% of the population is below the poverty level. In 2000, the population of Westport was 2,1237. There was a

> per capita income of $17,362, and a median household income of $32,037, which indicates that 14.3% of the population is below the poverty level.
>
> …. These depth restrictions, especially in the North Coast area, have severely impacted recreational botttomfish fisheries targeting health lingcod and black rockfish stocks, and have resulted in additional economic loss to coastal communities.
>
> …. Both Neah Bay and La Push are considered to be vulnerable recreational communities and they both have low resiliency.
>
> Under the $T_{F=0}$ yelloweye OY, the estimated loss to commercial fisheries is over $100 million in exvessel revenues, which would result from complete closures of the tribal groundfish fisheries and closures of Washington longline and pot fisheries… To ensure this low OY was not exceeded, the non-trawl RCA would have to expand from the shoreline to 150 fm offshore, precluding access to prime sablefish and dogfish areas that are the backbone of Washington's longline fishery. The economic impacts resulting from these measures, again, would cause undue hardship on Washington's coastal communities that are already depressed. Areas labeled "most vulnerable" with regard to commercial fishing in Washington include Neah Bay and Ilwaco; other commercial vulnerable areas with low resiliency include La Push, Westport and Bellingham.

Finally, it should be noted that in addition to the steady decline of groundfish fishing opportunities, communities in Oregon and California are also experiencing severe cutbacks in their salmon-related fishing activities during 2006. Based on Council estimates, the 2006 management decisions will yield a reduction of about $30 million in salmon-related personal income impacts in northern California and Oregon communities compared to the 2005 season. These cutbacks are severe enough that both states have declared disasters and are developing disaster aid programs. At the Federal level, Congress is considering providing federal disaster relief funding while the Department of Commerce is reviewing the situation in the context of the federal disaster aid provisions of the MSA and the Interjurisdictional Fisheries Act. The President is also reviewing requests for a declaration under the Stafford Act. The current level of combined economic stress on coastal communities looks set to continue or worsen in the near future.

8.0 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 Amendment 16-4 and the 2007-08 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.

<u>Short-term uses versus long-term productivity</u>. This relationship is central to the management framework, which is intended to allow harvests in 2007–08 (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 actions 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.

<u>Irreversible resource commitments</u>. 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 that are 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.

<u>Irretrievable resource commitments</u>. 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.

<u>Energy requirements and conservation potential of the alternatives</u>. 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.

<u>Urban quality, historic resources, and the design of the built environment</u>. The alternatives have no direct effect on these resources. However, 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. This concern is particularly true for those communities identified as vulnerable in Section 7.1.5.2.

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. The 2005–06 groundfish harvest specifications EIS screened for potentially significant impacts of the alternatives using factors described at 40 CFR 1508.27 and in Section 6.02 of National Oceanic and Atmospheric Administration (NOAA) Administrative Order (NAO) 216-6. The EISs for groundfish FMP amendments 16-2 and 16-3, which address rebuilding plans for overfished groundfish, contain similar sections. None of those EISs identified 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. 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. As noted above, this EIS evaluates two related proposed actions. The first is the revision of rebuilding plans, or specifically, the targets under which these species will be managed. Table 8–1 compares the current targets for these species and those proposed under Amendment 16-4. Targets for other alternatives are discussed in Chapter 4. For the preferred alternative, for all the species except yelloweye rockfish, the year by which the stock is estimated to rebuild to target biomass is earlier than the previous estimate. P_{MAX}, an indicator of the likelihood of achieving the target, is estimated to remain the same or be more favorable under the proposed changes, with the exception of canary rockfish, which shows a modest increase in risk.[32] Furthermore, depleted species OYs in 2007–08 are consistent with adopted rebuilding strategies, and, with the exception of darkblotched rockfish, are lower than the 2006 values. Thus, the rebuilding strategies associated with the Council-preferred OY alternative are less likely to result in significant impacts to biological environment in comparison to the no action alternative. The second proposed action is adopting harvest limits (OYs) and associated management measures for the 2007–08 biennium. This EIS considers a choice of OYs as a basis for considering alternative rebuilding strategies, providing a link between the two proposed actions. In general the proposed OYs are consistent with projected catches of depleted species in 2006 (cf. tables 2–2a and 2–5) with adjustments to account for increasing CPUE as stocks recover.

[32]The EA for Amendment 16-1 (PFMC 2003a) includes a discussion of how the P_{MAX} statistic is derived.

Table 8–1. Comparison of current and proposed OYs and rebuilding targets for depleted species.

Species	OY		P_{MAX}		T_{TARGET}	
	2006	Proposed (2007)	Current	Proposed	Current	Proposed
Bocaccio	309	218	70%	78%	2027[a/]	2026
Canary	47	44	60	55	2074	2063
Cowcod	4.2	4	60	91	2090	2039
Darkblotched	200	330[b/]	80	100	2030	2011
POP	447	150	70	93	2026	2017
Widow	368	289	60	95	2038	2015
Yelloweye	27	23[c/]	80	80	2058	2084

[a /]Corrected value for target adopted by the Council, see footnote a to Table 2–3.
[b/] 2008 OY; 2007 OY is 290 mt.
[c/] 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. Under this strategy the 2007–10 OYs are 23 mt, 20 mt, 17 mt, and 14 mt, respectively.

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, and to a lesser extent canary rockfish, the relationship between short-term (2007–08) 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. 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. Additional steps, although not evaluated as part of the preferred alternative, will be taken. In particular, WDFW will implement an education program to encourage recreational anglers to take steps to avoid catching yelloweye rockfish. ODFW has been developing techniques to reduce barotrauma-related post-release mortality common in rockfish such as yelloweye. These techniques also could be disseminated to recreational fishers to help reduce recreational bycatch mortality.

Because of the choice of OYs, management measures for 2007–08 are similar to those applied in the 2005–06 biennium with one important exception. The Council-preferred management measure alternative reduces the extent of the western CCA by opening areas deeper than 175 fm to commercial fishing with fixed gear. As discussed in Section 4.3.1.1, current monitoring, combined with the difficulty of estimating actual future fishing mortality, make it difficult to forecast the effects of this change. However, reducing the area of the western CCA increases the risk that harvests could exceed the Council-preferred OY of 4 mt, although catch projections included in this EIS indicate that harvests will remain below this level. To mitigate this risk, all vessels fishing in the area will be subject to elevated VMS monitoring and, to facilitate enforcement, transiting through the remaining closed areas within 175 fm will be prohibited.

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. Although fishing opportunity has stabilized at a more modest level in the past few years, there continues to be the potential for significant adverse impacts. This is illustrated by Figure 2-13, which shows exvessel revenue trends since 1981. Total groundfish exvessel revenue has fallen from about $130 million in 1995 to around $70 million today. Going forward, the rebuilding of depleted stocks may, perhaps counter-intuitively, impose additional constraints. Increased abundance could boost CPUEs, requiring a management response of shortening seasons or imposing other measures to limit total fishing effort. For firms currently at or near the break-even point, the loss of cash flow due to a seasonal closure or overall reduced opportunity could put them out of business. Although these effects cannot be predicted, cumulatively significant socioeconomic impacts could result.

In addition, the ramp down strategy adopted for phasing a lower harvest rate for yelloweye rockfish is likely to require additional constraints across a range of fisheries, which may reduce fishing opportunity and/or lower participation across affected sectors. For the 2007–08 biennium, a combination of new measures, such as expanded YRCAs, along with adaptive management strategies are expected to keep total yelloweye rockfish catch below the 2008 OY of 20 mt. Additional measures will likely be required to further reduce catches to the 2009–10 OYs. Although the socioeconomic effects of the required management response in the foreseeable future cannot be predicted, there is a likelihood of at least localized significantly adverse socioeconomic impacts, particularly to communities most dependent on groundfish resources and most economically vulnerable to a change in groundfish resource availability.

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. Alternatives are mitigative to the degree that management measures constrain fishing mortality to levels below the harvest specifications. 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. As evidenced by past years, there is little risk of exceeding OYs for non-depleted species because management measures to protect depleted species constrain fishing effort below non-depleted species' OYs. As indicated in the previous section, inseason management will be used to make necessary adjustments to adapt to ramped down yelloweye rockfish OYs and to develop strategies to achieve further catch reductions consistent with 2009–10 OYs.

As discussed in Section 5.3, a similar mitigation measure—inseason action—is proposed to address bycatch of listed Chinook salmon. Automatic action authority would allow NMFS to 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.

8.3 Rationale for Preferred Alternative

The key decision evaluated in this EIS is the adoption of rebuilding plans for depleted species and adoption of associated OYs and management measures for the 2007–08 management period. 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)). Thus, 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 indicated in Table 8–1, as compared to the status quo, the preferred alternative results in further reductions in harvest limits to hasten rebuilding. Table 2–30 (based on information in Table 7–68) shows estimated income impacts under the different management measure alternatives by region. The Council-preferred alternative with an assumption of a high whiting OY most closely reflects whiting opportunity in the current year. This shows personal income impacts very close to No Action.[33] Thus, the Council-preferred alternative, in comparison to No Action, adopts more aggressive rebuilding strategies for most depleted species with modest 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 (see Figure 2–13) has been significant. Additional substantial reductions in revenue due to management restrictions would likely have additional significant short-term socioeconomic impacts. The preferred alternative is likely to result in personal income impacts (socioeconomic benefits) similar to or somewhat lower than No Action while adopting more aggressive rebuilding schedules for depleted species. The rationale for adopting the preferred alternative is therefore consistent with the requirements of the MSA at §304(e)(4)(A).

The Council-preferred management measure alternative is designed to allow access to target stocks while managing to the comparatively low, and thus constraining, OYs for depleted species. Table 8–2 compares the projected total catch of depleted species under each alternative to the Council-preferred OYs for 2007. It can be seen that all of the management measure alternatives are projected to constrain catches below the preferred OYs. The Council-preferred management measure alternative is intended to

[33] These whiting OY scenarios are based on likely constraints due to depleted species bycatch. However, in terms of management, the whiting OY is usually set based on whiting stock status and then bycatch caps (total catch limits) for selected depleted species are imposed on the whiting sectors. Under this management strategy vessels have the opportunity to lower their bycatch rates in order to achieve higher whiting catches. This would allow them to realize higher income levels than reflected in the scenarios in Table 2–20.

maximize fishing opportunity for non-depleted target stocks within the constraints imposed by the need to rebuild overfished species.

Table 8–2. Comparison of projected catch mortality of depleted species under the alternatives and the Council-preferred OYs for 2007. (Projected catch values have been rounded to the nearest whole number with the exception of cowcod.)

	Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Preferred 2007 OY	**218**	**44**	**4.0**	**290**	**150**	**368**	**23**
No Action[a]	135	44	3.4	182	74	257	20
Alt. 1	39	25	0.5	81	44	116	11
Alt. 2	111	33	3.3	197	99	144	14
Alt. 3	186	41	3.5	203	100	191	18
Preferred Alternative	150	43	3.5	264	115	264	20

[a] No Action is projected total catch in 2006 (from Table 2–5).

9.0 CONSISTENCY WITH THE GROUNDFISH FMP AND MSA NATIONAL STANDARDS

9.1 FMP Goals and Objectives

The Groundfish FMP, under amendments currently under review, contains three broad goals and 17 objectives intended to achieve those goals. Past EISs for rebuilding plans (Amendment 16-2 and 16-3) and for the 2005–06 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 first FMP goal is *Prevent overfishing and rebuild stocks by managing for appropriate harvest levels and prevent, to the extent practicable, any net loss of the habitat of living marine resources*. The proposed actions evaluated in the EIS address this goal by revising rebuilding plan targets to achieve stock rebuilding in the shortest time period possible, recognizing the needs of fishing communities. OYs (harvest limits) adopted for the 2007–08 biennium are consistent with the targets identified in revised rebuilding plans and management measures are projected to constrain total fishing mortality to those harvest limits. The proposed actions do not address impacts to fish habitat directly, but in a separate action management measures have been recently adopted to mitigate the adverse impacts of fishing on essential fish habitat. The second FMP goal is *Maximize the value of the groundfish resource as a whole*. Revised rebuilding plans are intended to maximize the long-term value of groundfish by rebuilding stock sizes to levels intended to provide a higher, optimum yield, recognizing the biology of the stocks, the needs of fishing communities, and the role of these stocks in the marine ecosystem. The third FMP goal is *Within the constraints of overfished species rebuilding requirements, achieve the maximum biological yield of the overall groundfish fishery, promote year-round availability of quality seafood to the consumer, and promote recreational fishing opportunities*. The managed measures adopted for the 2007–08 biennium are structured to allow year-round fishing commercial fishing opportunity and recreational fishing opportunities while rebuilding overfished species stocks in the shortest time possible.

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 have been revised to 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 and, in some cases, would specify harvest limits that are not sufficiently precautionary.

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 2004 for management in 2005-06, 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. Stocks are managed throughout the range of that stock (as opposed to the species), although issues do arise in the case of stocks straddling international borders. For this reason, allocation of the harvestable surplus of Pacific whiting between the U.S. and Canada is subject to a negotiated agreement.

National Standard 4 states that conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishers, such allocation shall be (A) fair and equitable to all such fishers; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges. The proposed measures will not discriminate between residents of different states.

Management measures are developed through the Council process, which facilitates substantial participation by state representatives. Generally, state proposals are brought forward when alternatives are crafted and integrated to the degree practicable. Decisions about catch allocation between different sectors or gear groups are also part of this participatory process, and emphasis is placed on equitable division while ensuring conservation goals. None of the management measures in the alternatives would allocate specific shares or privileges to one individual or corporation.

National Standard 5 states that conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

Management measures in the groundfish fishery are not designed specifically for the purpose of efficient utilization. However, lower OY levels and other restrictions are likely to result in further fleet capacity reduction as fishing becomes economically unviable for more vessels. There is broad consensus that capacity reduction in some sectors is needed to rationalize fisheries. 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 has begun to explore the potential for individual quotas, in part, 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 judgement of whether management measures will constrain fisheries sufficiently.

National Standard 7 states that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

The alternatives do not explicitly address this standard. Generally, by coordinating management, monitoring, and enforcement activities between the three West Coast states, duplication, and thus cost, is minimized. Necessary monitoring and enforcement programs, such as the use of fishery observers and implementation of 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 Sections 7.3.6, 7.4.6, and 7.5.6), 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.

10.0 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 2007–08 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.

The West Coast groundfish fisheries are considered a Category III fishery, indicating a remote likelihood of or no known serious injuries or mortalities to marine mammals, in the annual list of fisheries published in the *Federal Register*. Based on its Category III status, the incidental take of marine mammals in the West Coast groundfish fisheries does not significantly impact marine mammal stocks. The proposed action will affect the intensity, duration, and location of groundfish fisheries through implemented management measures. But these changes would not 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 2007-08 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	Sections 1.2 & 1.3
Description of the fishery	Chapter 7
Statement of the problem	Section 1.2.2
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.

Table ES-4 provides estimates in the change from No Action alternative in estimated personal income impacts resulting from combined angler expenditures and commercial fisheries landings by region under for each of the management alternatives. These impacts include impacts associated with both groundfish and non-groundfish fisheries. The estimates range from a decrease of $75 million (a decrease of 11%) under Alternative 1 (the most restrictive suite of management measures among the action alternatives analyzed) to an increase of $1.8 million (essentially no change from the No Action Alternative) under Alternative 3. Assuming the Council adopts the high Pacific whiting OY in March 2007, the final Council-preferred Alternative would lead to a $0.6 million increase in personal income. This represents essentially no change from the No Action alternative.

1.b. Present a risk to long term productivity.

There are always inherent risks to fish stocks from management and policy decisions because of the lack of scientific data (see Chapter 8's introduction and section 8.1). This is especially true when it comes to managing the eighty-plus stocks that make up the groundfish fishery, including very small OYs for the rebuilding species such as yelloweye rockfish (less than 30 mt) and cowcod (less than 5 mt) for the entire coast. Current Council processes and implementation of the final Council-preferred alternative reduces the risk to long term productivity in three time dimensions: Long-term, short-term, and immediate. In comparison to the current rebuilding regimes, the final Council-preferred alternative potentially reduces the risk to long term productivity by reducing the currently scheduled rebuilding times for overfished species As indicated in section ES.1, this alternative is a balance of restoring overfished stocks to their long term productive levels in as short as time as possible while taking into account the needs of fishing communities:

> Because of the uncertainty surrounding stock assessments and future population trends (due, for example, to variable recruitment), the rebuilding period limits and the target need to be expressed probabilistically. In past years, the Council's approach at the outset of the rebuilding period had been to set T_{TARGET} so there was at least a 50% probability of achieving B_{MSY} within the T_{MAX}. Although this approach gave some flexibility for the Council to choose a target rebuilding year falling anywhere between the T_{MIN} and T_{MAX} by considering tradeoffs between biological and socioeconomic impacts, a recent Ninth Circuit Court of Appeals decision requires a 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. The current action responds to this by reconsidering the targets and parameters in previously established rebuilding plans with more emphasis placed on swift rebuilding.

For the short term, the Council's biennial process is another means of reducing risks to long term productivity in that the fishery is being constantly monitored for progress towards rebuilding. Every two years, as part of the Council's biennial process, OYs and other biological parameters are revisited based on updated or new stock assessments. If appropriate progress is not being observed, then adjustments will be made. For the immediate term (2007-08), "buffers" have been created for certain species. As described in section 7.2.8.2:

> In addition to anticipating increases in the incidental catch rate, the Council preferred alternative creates a buffer between predicted total mortality and the OY for darkblotched, Pacific ocean perch, and widow rockfish. While point estimate predictions show that the fishery could achieve predicted economic impacts with lower OYs for those species, point estimates do not take into account likely deviations between predictions of catch and actual catch. If actual catch is higher than predicted catch, some

constraining management response is necessary and this has the potential to reduce economic impacts. The Council preferred alternative accommodates the likelihood that actual catch will deviate from predicted catch by establishing a buffer on these species, and in doing so, reduces the amount of uncertainty surrounding the economic impact predictions.

2. Create a serious inconsistency or otherwise interfere with action taken or planned by another agency.

The alternatives and their associated analyses were developed through a public review process that will continue through the public comment period associated with this document. To date, neither the Council nor NMFS has received any comments indicating that adoption of the preferred alternative would 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.

The alternatives and their associated analyses were developed through a public review process that will continue through the public comment period associated with this document. To date, neither the Council nor NMFS has received any comments indicating that adoption of the preferred alternative would materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of recipients thereof. The Council-preferred alternative is projected to provide the west coast economy with levels of ex-vessel revenues, recreational expenditures, and personal income comparable to those generated by the fishery during the years 2005-2006.

4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this EO.

Adoption of the Council-preferred alternative does not raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this EO. The proposed conservation and management policies and regulations are within the standard set of past policies and regulations employed in this fishery under the MSA. However, the proposed conservation and management policies and regulations reflect the Council's efforts to respond to the recent Ninth Circuit Court of Appeals decision which directed the Council 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.

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 gone unemployed. From a social perspective, if the individual were 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, that is 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 for a 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, if 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.

Producer Surplus

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, and 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 on a similar level with 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. The Table below summarizes the following analysis of social net benefits under the 2007-2008 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, e.g., Alternatives 1 and 2. However the lower harvest alternatives also carry a somewhat higher probability that CPUE will increase in the future.

Buyers and Processors: There may be higher adjustment costs in the near-term under the lower harvest alternatives, e.g., Alternatives 1 and 2.

Recreational Charter Vessels: Demand for recreational charter trips depends on consumer income and the perceived quality of the available experience. The supply of recreational angler trips is lowest under Alternative 1, followed by Alternative 2 and the No Action Alternative. The Council-preferred Alternative and Alternative 3 offer the greatest potential supply of recreational angler trips.

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. However the very low harvest levels allowed under Alternatives 1 and 2 may adversely affect certain buyers, especially in local fresh and live fish markets such as restaurants that specialize in serving locally caught fare.

Recreational Anglers: There may be some difference in the quality of recreational fishing experience available due to the projected level of angler effort under the alternatives. In ranking the alternatives based on the projected number of angler trips available, Alternative 3 and the Council-preferred Alternative offer the greatest opportunities, followed by No Action, Alternative 2 and Alternative 1. Due to the extra measures necessary to avoid catching yelloweye rockfish, Alternative 1 also probably offers the lowest potential quality angling experience.

Nonconsumptive Users: Enhanced protection for sensitive fish stocks may enhance the value of wildlife viewing experience for nonconsumptive users. Alternative 1 probably ranks highest in nonconsumptive use benefits since rebuilding is projected to occur most quickly under Alternative 1, due to larger RCAs and the protection these afford shelf rockfish species. However all of the proposed 2007-2008 management alternatives are designed to rebuild overfished stocks within the allowable time period.

Nonusers: Enhanced protection for sensitive fish stocks may also enhance nonuse values. Due to larger RCAs stocks may increase most quickly under Alternative 1, although it should be noted that since all of the proposed 2007-2008 management alternatives are designed to rebuild overfished stocks within the allowable time period, 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 and Alternative 2, higher costs may be required in order to enforce relatively more complicated Cowcod Conservation Areas in the California Bight. Under Alternative 3, enforcement costs should be lower and not significantly different than No Action.

TABLE 10-1. Summary of net social benefit analysis for impacts under the 2007-2008 management alternatives.

	Alternatives				
Socioeconomic Effect **(Note: Higher number implies higher net benefits)**	*No Action*	*Alternative 1*	*Alternative 2*	*Alternative 3*	*Council-preferred Alternative (w/ high whiting OY)*
PRODUCER SURPLUS					
Seafood Harvesters					
Adjustment costs (rankings based on projected revenue in 2007: 1 = highest adjustment cost (lowest revenue), 5 = lowest adjustment cost (highest revenue))	5	1	2	3	4
Seafood Processors and Handlers					
Adjustment costs (rankings based on projected value of fish deliveries in 2007: 1 = highest adjustment cost (lowest revenue), 5 = lowest adjustment cost (highest revenue))	5	1	2	3	4
Recreational Charter Vessels					
Ability to supply recreational experience (rankings based on projected angler trips: 1 = fewest angler trips, 5 = most angler trips)	3	1	2	5	4
CONSUMER SURPLUS					
Seafood Consumers					
Availability of fresh and frozen products (rankings based on projected 2007 commercial harvests: 1 = lowest harvest (lowest supply), 5 = highest harvest (highest supply))	5	1	2	3	4
Recreational Fishers					
Availability of higher quality experience (rankings based on projected angler trips: 1 = fewest angler trips, 5 = most angler trips)	3	1	2	5	4
Nonconsumptive Users					
Value of wildlife viewing experience (rankings based on degree of protection for overfished species: 1 = lower value (smallest RCA), 5 =higher value (largest RCA))	1	5	4	2	3
Nonusers					
Option, existence and bequeathal values (rankings based on degree of protection for overfished species: 1 = lower value (smallest RCA), 5 =higher value (largest RCA))	1	5	4	2	3
PUBLIC EXPENDITURES (May affect either consumer or producer surpluses.)					
Monitoring and Enforcement costs (1 = relatively higher costs, 2 = relatively lower costs)	2	1	1	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 2006 meetings. Rebuilding is extended by five years or less relative to $T_{F=0}$ for bocaccio, cowcod, darkblotched rockfish, Pacific ocean perch, and widow rockfish. Canary and yelloweye rockfish rebuilding periods are extended by an estimated 10 years and 36 years, respectively under the final Council-preferred alternative.

The Council-preferred alternative is similar to Action Alternative 3 in that some sectors see more exvessel revenue and recreational angler effort than in 2005 and 2006, while others see less. 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, like Action Alternative 2 and 3, 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 OY negatively impacts recreational fisheries in the northern areas, but recreational fisheries in the southern areas are able to attain a higher number of angler trips than under 2005 and 2006 regulations. In the case of commercial fisheries, the bottom trawl sector is able to attain higher levels of exvessel revenues when compared to 2005 and 2006, primarily as a result of the increase in the Dover sole OY. The Pacific whiting fishery is able to attain revenues that are roughly equal to 2005 and 2006 levels, but the impact to this fishery is also dependant on results of the 2007 and 2008 stock assessments for Pacific whiting. Alternatively, the fixed gear sablefish sectors achieve lower levels of revenue because of a decrease in the sablefish OY. Other groundfish fisheries generate exvessel revenues that are comparable to–status quo.

On a coastwide basis, commercial exvessel revenues for the major directed groundfish sectors are estimated to be approximately $67.5 million, and the number of recreational bottomfish trips is estimated to be 571,742. These figures represent 98% of 2005 exvessel revenues, and 106% of 2005 recreational angler trips. (It should be noted that the GAP and others believe many of the economic impact estimates are underestimates of the true impacts— see 7.2.10.2.)

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. The Council-preferred management measure alternative would change the configuration of the larger of these two areas by allowing commercial fixed gear vessels to fish in depths greater than 175 fm, where available information indicates cowcod rarely occur. These vessels will be subject to increased monitoring and enforcement requirements. Off of Washington, a YRCA encloses an area where bycatch of this species is higher and commercial fixed gear vessels are directed to avoid on a voluntary basis. Two new YRCAs are proposed under the Council Preferred alternative, one subject to voluntary compliance, the other mandatory compliance.

Seafood Harvesters

The final Council-preferred alternative generates slightly lower exvessel revenue on a coastwide basis when compared to 2005 and originally scheduled 2006 regulations, but the distribution of these impacts is different across sectors

Under the final Council-preferred alternative, the limited entry bottom trawl sector is predicted to generate slightly more exvessel revenue than 2005 and originally scheduled 2006 regulations, but this is primarily driven by increases in the abundance of dover sole and shortspine thornyheads 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 2005 and 2006. Namely, the deepwater portion of the fishery is scheduled to fish outside 250 fathoms in areas north of 40°10' N latitude for several periods of the year, whereas originally scheduled 2005 and 2006 regulations allowed vessels to fish between 200 fathoms and 250 fathoms in the same area for most of the year. This change represents a decrease in the amount of fishable area and an increase in the cost of fishing because more fuel is required to travel to, and fish at, those deeper depths. At these depths, the bycatch of rebuilding species that are found in deeper waters is expected to be minimized, however, based on the increasing trend of incidental darkblotched and Pacific Ocean perch encounters, the higher OY for darkblotched rockfish (compared to the 2006 OY) is not expected to translate into more fishing opportunity.

The limited entry whiting fishery is expected to be able to attain revenues similar to those generated in 2005 and scheduled for 2006. Rebuilding species that largely constrain the whiting fishery include widow and canary rockfish. While the 2007 and 2008 widow rockfish OY is 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.

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

The fixed gear sablefish sectors generate less exvessel revenue under the final Council-preferred alternative ($8.7 million) than 2005 and 2006, because the OY for sablefish is reduced in 2007 and 2008. The decrease in the sablefish OY results in less effort being expended by sablefish fishers, and this also reduces the incidental catch of several depleted groundfish species.

Fixed gear fisheries south of Pt. Conception have less restrictive area management under the Council preferred alternative, as the size of the CCA is smaller than in 2005 and 2006. An increased in accessible fishing areas is expected to result in easier attainment of target slope species catch limits. Catch limits are scheduled to remain the same as in 2006. While changes in exvessel revenue under this alternative are not predicted to differ to any appreciable degree from status quo, costs may be lower under this alternative because vessels will be able to fish areas of higher CPUE or areas closer to their home port which should decrease travel cost and the amount of time needed to attain catch limits.

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 2005-2006. Therefore, it is expected that effects of this alternative upon buyers and processors should be similar to those generated by the 2005-2006 fishery. In addition, the preferred alternative takes into account the desires by Buyers and Processors to have a year round groundfish fishery. 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/February 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

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 2007 yelloweye rockfish OY under the Council preferred alternative represents a decrease from status quo levels, and the 2008 yelloweye rockfish OY represents an even further reduction. Management measures designed to achieve catch levels that meet this reduction in the yelloweye OY are also sufficient to achieve the necessary reductions in the canary rockfish OY. Management measures used to achieve the reductions in the bycatch of yelloweye rockfish include the option of restricting recreational fisheries to depths of only 10 to 20 fathoms inseason, imposing new closed areas to specifically protect yelloweye rockfish, reducing bag limits for target species inseason, and/or early closure of the recreational fishing season. In terms of recreational effort, the number of angler trips is higher under the Council preferred alternative when compared to 2005 and 2006, but most of this increase occurs off California. The number of angler trips off Oregon and Washington are similar to 2005 and 2006.

Tribal Fisheries

It is expected that under the proposed 2007-2008 management measures, tribal groundfish fisheries should generate about the same level of ex-vessel revenues and personal income as generated in 2005 and expected 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:

> This EIS evaluates two related actions which are being implemented by the National Marine Fisheries Service (NMFS) and the Pacific Fishery Management Council (Council) to manage the harvest of groundfish in Federal waters off of Washington, Oregon, and California within the framework of the Council's Pacific Coast Groundfish Fishery Management Plan. First, the Council re-evaluated and proposed revisions to rebuilding plans for seven depleted (overfished) groundfish species adopted pursuant to §304(e)(3) of the Magnuson-Stevens Fishery Conservation and Management Act in the groundfish FMP. Amendment 16-4 would amend the groundfish FMP, so that the rebuilding periods for the seven species are as short as possible, taking into account the status and biology of the depleted species, and the socioeconomic needs of West Coast fishing communities, and the interaction of the depleted stocks within the marine ecosystem. Second, the Council identified harvest limits (termed optimum yield values, or OYs) for stocks and stock complexes comprising the fishery management unit species identified in the FMP and the management measures necessary to keep total catch (in all commercial and recreational fisheries) within these OYs. Optimum yield represents the acceptable biological catch (ABC) or a reduction from ABC for biological or socioeconomic reasons. These harvest specifications and management measures apply to the 2-year management cycle, 2007–08, consistent with the periodic management framework described in the groundfish FMP.

- 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 2007 and 2008 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 is comprised of 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.

There are no additional projected reporting, record-keeping, and other compliance requirements of the proposed rule not already envisioned within the scope of current requirements.

- 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, and extensive analysis of the effects of rebuilding the seven depleted groundfish species subject to revised rebuilding plans under Amendment 16-4. 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 2007-2008 groundfish management measures are designed to provide fishing opportunities to harvest healthy, target species within the constraints of alternative depleted species’ OYs. The three Action Alternatives decided by the Council in April 2006 follow a gradient of conservatism, with Action Alternative 1 being the most conservative in that these management measures constrain fishing opportunities the most, but result in faster rebuilding. Conversely, Action Alternative 3 has the most liberal management measures and provides the most fishing opportunity at a cost of longer rebuilding times. Action Alternative 2 is intermediate in the predicted effects to fishing opportunities and rebuilding times.

The Council decided preferred 2007-2008 OYs for all non-depleted species and two OY alternatives (a preferred Low OY Alternative and a preferred High OY Alternative) for detailed analysis at their April 2006 meeting. Action Alternative 1 management measures are designed to stay within the preferred Low OYs for depleted species and Action Alternative 3 management measures are designed to stay within the preferred High OYs for depleted species in 2007-2008. Action Alternative 2 was designed to stay within the preferred Low OY for some depleted species and otherwise not exceed the preferred High OY.

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 2006. (Included in the analyses and testimony was a review of fishery trends and community impacts, as exemplified by Section 2.3.) The final Council-preferred alternative includes recommended harvest specifications and rebuilding plans for the seven depleted groundfish species and management measures for 2007 and 2008 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 2006 meetings. Rebuilding is extended by five years or less relative to $T_{F=0}$ for bocaccio, cowcod, darkblotched rockfish, Pacific ocean perch, and widow rockfish. Canary and yelloweye rockfish rebuilding periods are extended by an estimated 10 years and 36 years, respectively under the final Council-preferred alternative.

The Council-preferred alternative is similar to Action Alternative 3 in that some sectors see more exvessel revenue and recreational angler effort than in 2005 and 2006, while others see less. 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, like Action Alternative 2 and 3, 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 OY negatively impacts recreational fisheries in the northern areas, but recreational fisheries in the southern areas are able to attain a higher number of angler trips than under 2005 and 2006 regulations. In the case of commercial fisheries, the bottom trawl sector is able to attain higher levels of exvessel revenues when compared to 2005 and 2006, primarily as a result of the increase in the Dover sole OY. The Pacific whiting fishery is able to attain revenues that are roughly equal to 2005 and 2006 levels, but the impact to this fishery is also pending, depending on the 2007 and 2008 stock assessments for Pacific whiting. Alternatively, the fixed gear sablefish sectors achieve lower levels of revenue because of a decrease in the sablefish OY. Other groundfish fisheries generate exvessel revenues that are equivalent–or close to–status quo. On a coastwide basis, commercial exvessel revenues for the major directed groundfish sectors are estimated to be approximately $67.5 million, and the number of recreational bottomfish trips is estimated to be 571,742. These figures represent 98% of 2005 exvessel revenues, and 106% of 2005 recreational angler trips.

Yelloweye Ramp-Down Alternatives

The Council adopted for analysis an OY alternative of 12.6 mt for 2007-2008 and consideration of a yelloweye harvest rate ramp-down strategy, which is explained in more detail below. Therefore, the full range of viable yelloweye OY alternatives analyzed for 2007-2008 and Amendment 16-4 are 0 mt, 12 mt, 12.6 mt, and the harvest rate ramp-down strategy, which specifies OYs of 23 mt and 20 mt for 2007 and 2008, respectively. This compares to the status quo OYs of 26 mt in 2005 and 27 mt in 2006.

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 7-69). 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 put in place a 12 mt yelloweye OY in 2007, multiple sectors and communities are estimated to be negatively impacted to a large degree. Analysis of commercial management measures designed to achieve a suite of OYs for all overfished species which included the 12 mt yelloweye OY showed that exvessel revenues would be reduced by nearly 40%. However, this is likely an overestimate of what would occur if only yelloweye were to be reduced to 12 mt and other overfished species were to remain at status quo levels. In terms of recreational fisheries however, it is estimated that recreational fishing effort for groundfish and Pacific halibut off Washington would decrease by 30% under the 12 mt yelloweye alternative. Off Oregon, it is estimated that recreational fishing effort for groundfish and Pacific halibut would decrease by 32%, and recreational fishing effort for groundfish off California would decrease by over 33%. In addition, 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 12 mt 2007 yeloweye 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 2007 OY for yelloweye is less than 12 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 that is only a few tons is functionally equivalent to zero harvest. (The analysis of the 12.6 ton OY is same as that for the 12.0 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 reductions in angler effort of approximately 22% in 2007 compared to 2005 levels. Commercial exvessel revenues for alternatives corresponding to the yelloweye ramp-down strategy show that revenues would range from near status quo, to reductions of 13% in 2007 compared to 2005 levels. Beyond 2007, the impacts are less clear as the effects of management tools that will be developed will not be fully known until after they have been developed and implemented. However, it is expected that the economic implications will be less severe than the 12 mt and 12.6 mt 2007 OY alternatives. It is estimated that these impacts would be in place until 2084, or 36 years longer than $T_{F=0}$.

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 range of yelloweye). In comparison to the 12.0 ton OY Alternative, the ramp down approach extends the rebuilding period by 6 years from 2078 to 2084, allows the current sectors to continue, and prevents major closures of fisheries and the associated harm to communities and their small businesses.

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12.0 AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THIS STATEMENT WERE SENT

The Council makes both the DEIS and FEIS available on its website, so anyone with computer access may download an electronic copy. Electronic copies on CD-ROM and paper copies are made available upon request. The Council distributes a notice of availability for the DEIS and FEIS through its electronic mailing list, which include state and Federal agencies, tribes, and individuals. Copies of the FEIS are sent to anyone who comments on the DEIS. In addition, NMFS distributes copies of the DEIS to the following agencies:

Department of Interior
Department of State
U.S. Coast Guard, Commander Pacific Area
Marine Mammal Commission
Pacific States Marine Fisheries Commission
Washington Coastal Zone Management Program, Shoreline Environmental Assistance, Department of Ecology, Washington State
Ocean-Coastal Management Program, Department of Land Conservation and Development, State of Oregon
California Coastal Commission

13.0 RESPONSES TO DEIS COMMENTS

13.1 Introduction

When preparing a Final EIS, an agency must address comments received on the draft, either by modifying the alternatives in the DEIS, supplementing the DEIS alternatives, revising the analyses, making factual corrections, or explaining why the comments do no warrant further agency response (40 CFR 1503.4). A 45-day public comment period on the DEIS for this action began on July 28, 2006, and ended on September 11. Comments to the DEIS were provided by the U.S. Environmental Protection Agency; the Natural Resources Defense Council, Oceana, and The Ocean Conservancy (NRDC, et al.); Mr. Jordan Carroll-Larson, an economist on contract with the Natural Resources Defense Council; Dr. Milton Love from the University of California in Santa Barbara; The Makah Tribe of northern Washington; the California Department of Fish and Game; Ms. Ann Maurice; and Ms. Ellen Faulkner of the Northcoast Consumers Alliance.

This chapter summarizes the public comments received on the DEIS, which are provided in their entirety in Appendix D, and provides the responses from the National Marine Fisheries Service to those comments. The comments (in italics) are summarized by subject followed by detailed responses from the National Marine Fisheries Service.

13.2 Responses to DEIS Comments on Management Issues and Biological Analyses

Yelloweye rockfish management: *NRDC, et al. commented the yelloweye harvest rate ramp down strategy proposed in the preferred alternative is too risky and too liberal considering the depressed condition of the stock. Furthermore, they commented the analysis did not adequately explore OYs less than 12 mt, the "C-shaped" yelloweye rockfish conservation area (YRCA) off northern Washington should not be modified from a mandatory closure to a voluntary closure, and the lack of regional harvest guidelines could lead to serial depletion of the stock. Finally, NRDC et al. encourages comparable YRCAs in federal waters off Oregon and California as recommended in the preferred alternative for waters off Washington.*

The Makah Tribe of northern Washington provided comment regarding their dependence on groundfish fishing in general and recreational groundfish and Pacific halibut fisheries in particular. The Makah Tribe states immediate reduction of these fishing opportunities due to yelloweye and canary rockfish management measures would have "direct, adverse effects on the Tribe."

Response: The Council and NMFS are concerned about the depressed condition of the yelloweye rockfish stock and therefore have recommended a rebuilding plan that rebuilds the stock as quickly as possible, taking into account the status and biology of the stock and the needs of fishing communities. The Council and NMFS did consider the full range of impacts of yelloweye rockfish OY alternatives ranging from a zero-harvest alternative, a 12 mt alternative, a 12.6 mt alternative, and the ramp down strategy (see DEIS sections 2.1.1.1, 4.3.1.1, and 7.2.10.1). As explained in the DEIS, the ramp-down strategy recommended in the preferred alternative seeks to reduce the current harvest rate to less than half that of status quo in the next four years. Two primary reasons for recommending a four-year harvest rate ramp down strategy are: 1) WDFW and ODFW need the time to determine the best way to restructure recreational fisheries targeting Pacific halibut, where most of the incidental bycatch of yelloweye rockfish occurs, and 2) time is needed to better understand the distribution of yelloweye rockfish to develop more effective area management strategies. Recreational fisheries targeting Pacific halibut are particularly important to the economies of Oregon and Washington coastal fishing communities. Immediately implementing yelloweye rockfish OYs at or below 12 mt, or significantly less than those recommended for the next four years, would significantly impact these economies by severely restricting or eliminating recreational fisheries for Pacific halibut (see sections 7.2.10.1.1 and 7.2.10.1.2). The comment from the Makah Tribe underscores the importance of the recreational Pacific halibut fishery to northern coastal communities and that of Neah Bay, Washington, in particular. As they state, an immediate reduction of this fishery would have a direct, adverse impact on the tribal community of Neah Bay. This result is supported in DEIS analyses showing the dependence of Neah Bay and other northern coastal communities on these fishing opportunities and the lack of economic diversification and resiliency of these communities (see DEIS section A.4.5 and Table A.4-20).

NRDC, et al., in their detailed critique of the yelloweye ramp down strategy, seem to suggest the ramp down strategy is not legally viable because the 2007 and 2008 OYs would result in less than a 50 percent probability of rebuilding by T_{MAX} (as defined in the National Standard 1 Guidelines). NMFS acknowledges this would be true if the recommended OYs were part of a constant harvest rate rebuilding plan through the entire course of rebuilding. However, the proposed yelloweye rebuilding plan recommends a variable (decreasing) harvest rate for the 2007–10 period before assuming a relatively low and constant harvest rate in 2011. The distinction here is that the higher OYs are recommended for just the first few years of a 78-year rebuilding plan and not for the entire rebuilding period. Furthermore, NRDC, et al. argues the Council-recommended ramp down strategy was more liberal than the Council's SSC recommendation to specify the 12.6 mt OY alternative. This clearly misinterprets the SSC's guidance, which did not recommend any one OY option, but cautioned that any of the OYs in the ramp down strategy need to ensure "the resulting annual Fs (annual harvest rates) during the ramp-down period are maintained at or below the F_{MSY} overfishing threshold." In other words, the SSC cautioned against a policy that might result in the OY exceeding the ABC in any one year of the ramp down strategy, which is clearly not the case given the 2007–08 ABC of 26 mt and the 2007–10 OYs of 23 mt, 20 mt, 17 mt, and 14 mt, respectively under the ramp down strategy (see DEIS Table 2-1). As explained in numerous sections in the DEIS (e.g., section 2.1.1.1), rebuilding time is extended for less than one year with the ramp down strategy relative to the constant harvest rate that results in the 12.6 mt OY in 2007–08. The DEIS analysis demonstrates that the ramp down strategy as a whole, which considers OYs after 2007–08 as part of the strategy, would rebuild the stock within the National Standard 1 Guidelines framework.

The Council and NMFS are also interested in exploring other ways to reduce yelloweye rockfish mortalities—most significantly, more area closures. Unfortunately, yelloweye rockfish spatial distributions are not well known. Those additional yelloweye RCAs recommended for 2007–08 in the proposed action are a first step in a more effective area management strategy. The proposed YRCAs were determined through evaluation of survey data from the NMFS trawl survey, the IPHC longline survey for Pacific halibut, WDFW/NMFS submersible surveys, and fishermen accounts of areas where yelloweye rockfish are encountered. The Council and NMFS agree more YRCAs need to be developed in the near future. The 4-year ramp down management strategy affords the time to consider a more effective and comprehensive area management strategy for rebuilding the yelloweye rockfish stock while determining ways to manage recreational fisheries targeting Pacific halibut and healthy groundfish stocks without eliminating them.

NMFS disagrees with the comment that the proposed action would modify the current "C-shaped" YRCA from a mandatory closure to a voluntary one. There has been no modification of the "C-shaped" YRCA off northern Washington. The proposed regulations maintain this area as a mandatory closure for recreational groundfish and Pacific halibut fisheries, as has been the case since the inception of this YRCA.

NRDC, et al. argues "state-based or regional OYs would be a logical way to avoid putting more pressure on yelloweye than the population in certain areas can withstand." This comment seems to assume there is an ongoing fishery for yelloweye. In fact, retention of yelloweye rockfish is prohibited in all fisheries except trawl, where a small landings allowance is intended to reduce discard of incidental catch. Additionally, RCAs and trawl gear restrictions have redirected fishing effort away from depths and/or habitats where yelloweye are most common. However, NMFS agrees regional harvest guidelines should be considered in managing yelloweye rockfish to avoid serial depletion. The preferred alternative for yelloweye rockfish management measures does recommend regional harvest guidelines for recreational groundfish fisheries by specifying separate recreational harvest guidelines for the California recreational fishery and the combined Washington/Oregon recreational fisheries (see DEIS section 2.2.3.5.6 and Table 2-26). Regional commercial harvest guidelines for yelloweye rockfish are not part of the proposed action in this DEIS since commercial mortalities are minimal. Yelloweye rockfish mortalities will be minimized in 2007-2008 commercial fisheries by using the trawl and non-trawl RCAs, coupled with the requirement to only use selective flatfish trawls shoreward of the RCA north of 40°10' N latitude, where yelloweye rockfish most commonly occur. The estimated mortalities of yelloweye rockfish by fishing sector in 2007–08 are depicted in Table 2-24 of the DEIS.

Changes to the Cowcod Conservation Area: *There were three comments regarding proposed changes to the seaward perimeter of the western Cowcod Conservation Area (CCA). Two commenters (NRDC et al. and Dr. Milton Love) believe these proposed changes are too risky for rebuilding the depleted cowcod stock and the third commenter (CDFG) provided analysis in support of these changes. In response to the justification in the Council-preferred alternative for altering the CCA boundaries to access healthy stocks such as blackgill rockfish, NRDC, et al. comment that "the data included in the blackgill stock assessment only goes back a few years to 2002, so there is no historical context against which to compare current population levels." Furthermore, they comment "it is unclear what impacts altering the CCA boundaries will have on stocks such as bocaccio and darkblotched."*

Response: The DEIS in Chapter 4 exposes the cowcod rebuilding risks associated with uncertain assessments, uncertain catch monitoring systems for the fisheries where cowcod are most prone to be incidentally caught, and the level of stock depletion (see section 4.3.1.1). Chapter 4 of the DEIS also discusses the potential benefits of the proposed CCA boundary change, which are positive socioeconomic impacts associated with greater fishing opportunities for healthy groundfish species such as blackgill rockfish. The CDFG analysis provided as public comment to the DEIS analyzes available data to support the proposed change to the western CCA.

NMFS disagrees with the comment that the data included in the blackgill rockfish stock assessment only goes back a few years to 2002, so there is no historical context against which to compare current population levels. While it is true that there are no fishery-independent survey data south of Point Conception prior to 2002, there is fishery-independent data north of Conception, as well as fishery-dependent data south of Conception, prior to 2002. The historical catch in the blackgill rockfish assessment was reconstructed back to 1950, commercial biological data is available from 1981 onward, and fishery-independent survey data was included from 1995 to the present.

NMFS disagrees with the comment the DEIS is unclear regarding the impacts of altering the CCA boundaries on stocks such as bocaccio and darkblotched rockfish. Darkblotched rockfish are observed infrequently south of San Francisco and are likely quite rare in the CCA areas as evidenced by the distribution of the stock from trawl survey data showing a rare occurrence of darkblotched rockfish south of 37º N latitude (see DEIS Figure 4-3). Likewise, bocaccio depth distributions show a decreasing density deeper than 82 fm and no occurrence of bocaccio deeper than 180 fm (see DEIS Table 4-1); the proposed CCA boundary change is to open depths deeper than 175 fm.

Darkblotched rockfish management: *An NRDC, et al. comment raised "serious concerns about the modeling approach used to predict the new, far more optimistic rebuilding period for darkblotched rockfish which appears to depend on steepness of the stock recruitment relationship which is highly sensitive to the likelihood weighting scheme." They add the two proposed RCAs could be effective in helping to rebuild this stock, especially if closed year-round.*

Response: The Council and NMFS rely on the rigorous assessment review process and on the recommendations of the Stock Assessment Review panels and the Council's SSC on using the best available assessment science and results in management decision-making. The current darkblotched rockfish assessment was endorsed by these scientific review bodies.

NRDC, et al. comments on the "large effect small changes in (darkblotched rockfish) steepness has on the projected time(s) to recovery." NMFS contends the decrease in the expected time to rebuild is as much, if not more, a function of two very strong year classes which are just now entering both the fishery and the spawning population. From the June F.2.C GMT report (see DEIS Appendix B), the Council's Groundfish Management Team commented on the darkblotched rockfish recovery prospects as follows, "Additionally, this species is nearing its rebuilt level, with particularly strong year classes from 1999 and 2000 that are now entering the fishery. Between 2000 and 2005, both the biomass and the spawning output of darkblotched roughly doubled. The biomass is expected to increase by an additional 40% from current levels by 2010, with spawning output doubling again in that period, at which point the stock is expected to be rebuilt based on the assessment point estimate." In other words, the reason the stock is expected to be rebuilt so quickly is because of observed strong year classes (1999 and 2000) that were picked up by the assessment via age, length composition, and fishery-independent survey data. It is not because steepness is fixed at 0.95, rather the model is estimating a very high steepness value. That is, the assessment model assumes high productivity for the stock precisely because the model is "seeing" two very strong year classes in the data and therefore the model estimates that steepness must be high. The data are driving the large year classes and rapid rebuilding, not the parameter estimate. There is some uncertainty about exactly how strong these year classes are and uncertainty regarding stock-recruitment steepness, but there is no doubt that they are very strong (as 1999 and to a lesser extent 2000 were for nearly every other groundfish stock on the West Coast).

Furthermore, NRDC, et al. states, "reducing the steepness estimate from 0.95 (as used in the assessment) to 0.90 extended the estimated minimum rebuilding time from 11.5 years to 30 years." NMFS disagrees with this conclusion. In response to this comment, NMFS re-ran the darkblotched rebuilding model using a much lower steepness value of 0.70 and obtained only a four-year delay in estimated rebuilding time.

The Council and NMFS agree that, once further information on these areas becomes available, the two proposed darkblotched rockfish RCAs in waters off California may further reduce darkblotched rockfish mortalities.

OY specifications/rebuilding model comments: *The NRDC, et al. comments that the relationship between OYs and rebuilding time periods predicted by the model is not clear and must be explained further. The uncertainty of data feeding into the stock assessment model requires a more precautionary approach than the DEIS adopts.*

Response: The DEIS explains the relationship between depleted species' OYs and predicted rebuilding time periods in sections 2.1.1.1, 4.3.1.1, and 6.1.6. A more thorough description of the mechanics of rebuilding analyses, where the relationship of harvest rate, OY, and predicted rebuilding times can be found in more detail, was incorporated by reference to section 3.2.2.2 of the Pacific Coast Groundfish FMP (see section 6.1.6 of the DEIS).

The DEIS does use stock assessment uncertainty as a primary criterion for evaluating OY alternatives (see DEIS section 4.2.2). As stated in DEIS section 4.2.2, "… 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. … 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." The DEIS directly uses this criterion, among others, to evaluate OY alternatives for depleted species (see DEIS Tables 4-8 through 4-14). Therefore, NMFS disagrees that a more precautionary approach was not considered in DEIS analyses when evaluating OY alternatives for depleted species.

Ecosystem-based fisheries management: *The NRDC, et al. comments on "a real need for developing an ecosystem-based fisheries management approach for Pacific fisheries, including overarching ecosystem goals and objectives that guide fisheries management decisions. The current focus on achieving maximum sustainable yield objectives for market valued species, on a species-by-species basis, threatens and risks the health of the California Current ecosystem and ultimately, long-term ecologically sustainable fisheries. An ecosystem-based fisheries management approach means asking what the ecosystem needs to maintain biodiversity, healthy populations of apex predators and prey, local population and age structure and healthy and intact habitats, while providing for ecologically sustainable fisheries and vibrant coastal communities. Other concrete steps include increasing inter-agency communication and coordination to address both fishing and non-fishing impacts to essential fish habitat and incorporation of predator-prey interaction into primary management advice."*

Response: NMFS agrees ecosystem needs and effects are critical elements in managing West Coast fisheries. However, NMFS disagrees with the comment that the current management framework focuses only on achieving MSY for market value species. 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 DEIS complies with this mandate. Section 3.1.6 of the DEIS contemplates the role of overfished species in the West Coast marine ecosystem and section 3.2 discusses the direct and indirect effects of proposed 2007-2008 management measures on West Coast EFH and the marine ecosystem. Additionally, both the Northwest and Southwest Fisheries Science Centers are actively engaged in research efforts that are focused on modeling predator-prey and ecosystem dynamics, incorporating environmental indices into stock assessments, and evaluating the consequences of fishing on other elements of the ecosystem. However, as reported in section 3.3.3 of the DEIS, "... the data necessary to develop and adequately parameterize multispecies models are lacking for most ecosystems, including the California Current. Even with adequate data, the ability of multispecies models to make meaningful predictions regarding the consequences of decisions is limited."

Pacific rockfish biology and management: *Peer-reviewed science, published in 2004, suggest the need to revise West Coast groundfish management with the objective of increasing the proportion of older fish in rockfish populations (Berkeley, et al. 2004). Management strategies that increase the proportion of older rockfish may have significant biological and economic benefits.*

Response: NMFS agrees with the need to consider the age structure of rockfish populations and the potential benefit of increasing the proportion of older fish in these populations as suggested in the

Berkeley, et al. (2004) publication. In fact, a primary objective of groundfish rebuilding plans, as stated in section 4.5.3.1 of the FMP, is to "achieve the population size and structure (emphasis added) that will support the maximum sustainable yield within the specified time period." NMFS agrees with this potential benefit and believes the management measures currently in place for the West Coast groundfish fishery do contribute to positive changes in rockfish population age structures. Such management measures include area management strategies (i.e., RCAs and MPAs), low OYs for depleted species, lower trip limits and harvest guidelines for fisheries constrained by stock rebuilding needs, and gear restrictions (i.e., selective flatfish trawls) designed to reduce mortality on depressed rockfish populations. NMFS notes, however, that one of the unintended consequences of meeting a mandate to rebuild a population as quickly as possible is that year classes that have entered the fishery since the start of the rebuilding plan will be more heavily represented in the population than those year classes that were available to the fishery prior to the start of the rebuilding plan.

Other management measures: *The NRDC, et al. comments, "Several liberal trawl management measures preferred in the DEIS are incompatible with achieving lower OYs. Furthermore, despite a legal obligation to rebuild as quickly as possible, the Council chose the most liberal management measures for 5 of the 7 overfished species. Finally, there is a need to take a precautionary approach even with 'healthy' fisheries where the data underlying the stock assessment have significant uncertainty."*

Response: NMFS disagrees with the comment that the limited entry trawl management measures are incompatible with achieving low OYs. First, the limited entry trawl fishery has been significantly constrained in recent years to reduce overfished species' mortalities by: 1) closing depths where these species are most abundant (trawl RCA), 2) mandatory gear restrictions (selective flatfish trawls shoreward of the RCA north of 40°10' N latitude and small footrope trawls shoreward of the RCA south of 40°10' N latitude), 3) reduced trip limits for co-occurring species, and 4) capacity reduction (trawl buyback program). Table 2-24 of the DEIS depicts the projected 2007-2008 impacts on overfished species by the limited entry trawl fishery. NMFS notes there is increasing confidence in impact projections for this sector given the accumulated observations of at-sea discards in the limited entry trawl sector (the sector with the most at-sea observations in the West Coast Groundfish Observer Program). While the impacts projected for the trawl sector are by no means certain, inseason adjustments to trawl management measures in 2007 and 2008 should maintain trawl impacts at acceptable levels.

NMFS also disagrees that the most liberal management measures were chosen by the Council for five of the seven overfished species. Tables 2-1 and 2-2 depict the range of OYs considered for each of the seven overfished species. In only one case, yelloweye rockfish, was a higher OY option chosen (i.e., the ramp down strategy) and the justification for that OY choice was clearly articulated in the DEIS as necessary to avoid short-term disastrous consequences to West Coast fishing communities. More liberal management measures could have been considered for the higher OYs in the range for the other six overfished species, but were eliminated from consideration by the Council's choice of OYs for those species.

NMFS agrees with the comment addressing the need to take a precautionary approach when there is a high degree of stock assessment uncertainty. This is a mandate in section 4.6 of the FMP, which calls for precautionary reductions in specified OYs when stock assessment uncertainty is high. The proposed actions analyzed in this DEIS maintain many precautionary reductions due to stock assessment uncertainty (e.g., lower OYs for the Other Flatfish complex).

The DEIS comment period should be extended because the document was not readily available: *Two commenters (Ms. Ann Maurice and Ms. Ellen Faulkner) provided this comment.*

Response: The DEIS was made available on July 28, 2006, for a 45-day public comment period, as required by federal regulations and agency guidance. At this time the Environmental Protection Agency published a notice of availability in the Federal Register. In addition, the DEIS was made available on the Council's website in electronic form. Council staff distributed a notification through an email distribution list maintained by the Council. The commenters note that they had difficulty downloading the electronic version from the website. However, the website also notes that interested persons may contact Council staff by email or telephone to obtain either an electronic copy on CD-ROM or a paper copy.

Furthermore, the publication of the DEIS was preceded by a lengthy public process during which the contents of the DEIS were developed. A detailed schedule for the development of the DEIS, including the dates for the public comment period, was distributed as part of Council meeting briefing materials in September 2005. Thus there was information available well in advance of the public comment period about when it would occur, and information on how to obtain copies of the DEIS and comment on it was provided at the beginning of the public comment period. Yet the commenters submitted their request on the last day of the 45-day public comment period (September 11, 2006).

It would be neither reasonable nor feasible to extend the public comment period based on these requests. It is not reasonable because substantial advance notice was provided relative to commenting. It is not feasible because the request was not timely, and extension of the public comment period would make it difficult or impossible to complete the rulemaking process by January 1, 2007, the start of the next biennial management cycle.

The DEIS failed to disclose Klamath Fall Chinook mortality in groundfish fisheries: *Two commenters (Ms. Ann Maurice and Ms. Ellen Faulkner) commented the DEIS should have disclosed the number of Klamath Fall Chinook natural spawners killed as bycatch in the groundfish fishery, the age distribution and fertility of the bycatch, and the potential impact on Klamath River Fall Chinook natural spawning.*

Response: Including information in the DEIS on the proportion of groundfish trawl bycatch composed of Klamath River Fall Chinook natural spawners was considered. (It is presumed that the commenters are, in particular, concerned with the Klamath River Fall Chinook stock since its conservation objective is not being met, requiring management measures that preclude target fisheries from harvesting other, more robust salmon stocks.) Coded wire tag (CWT) data are available for salmon bycatch in groundfish trawl fisheries (principally the whiting fishery, which has a high level of observer coverage) and Klamath River Fall Chinook have been recorded based on CWT returns. However, currently the appropriate expansion factors necessary to accurately estimate the total take of any stock, including Klamath River Fall Chinook, have not been developed. Reporting raw data was deemed misleading and would not contribute materially to evaluating the impacts of the proposed action. Furthermore, given information from evaluations in biological opinions for the groundfish trawl fishery, the impact is likely modest. Age distribution was not reported in the DEIS because it was also not considered germane to the evaluation, given the consultation thresholds derived from previous biological opinions. Presumably these thresholds are based on a consideration of the age distribution of bycatch and the resulting effect on spawning escapement (discussed further below). (It is unclear what is meant by "fertility"; generally, spawning potential correlates with the age of the fish, but the relative spawning potential of the bycatch cannot be assessed separately from its age structure.)

Despite this lack of information, it is reasonable to surmise that a small proportion of the Chinook taken in any given year comprises adult Klamath River Fall Chinook that would otherwise be available for spawning escapement. First, the area of operations for whiting and groundfish trawl fleets encompasses most of the West Coast and Klamath River Fall Chinook represent a small proportion of Chinook vulnerable to trawl fisheries on a coastwide basis. In fact, one would expect more abundant stocks, such as Sacramento River Chinook, to represent a larger proportion of vulnerable fish. For these reasons, Klamath River Fall Chinook would not be expected to comprise a disproportional component of total Chinook bycatch. Impacts to this stock may be further reduced because the Council and NMFS have implemented a closed area for Pacific whiting fisheries at the mouth of the Klamath River to reduce bycatch of adult fish returning to that river. Also, not all of the bycatch comprises adult, potentially spawning fish. Since a proportion of younger fish would be lost to other sources of mortality, the actual impact of juvenile mortality in terms of potential spawning escapement must be further discounted. For example, according to the Shoreside Hake Observation Program 2005 Annual Report (Oregon Department of Fish and Wildlife, November 2005), "Forty-two percent of the Chinook measured were less than 60 cm, generally representing fish two or less years in age." (Although tabular data are not reported, a graph indicates that for California ports the size frequency distribution is concentrated around a maximum at 55 cm.) Age-specific annual survival rates range from about 60 to 80 percent, increasing with age. Thus a large proportion of the Chinook bycatch will succumb to other sources of mortality before they become available to the target fishery and then to spawning escapement.

Bycatch in trawl fisheries also represents a very small proportion of total fishing mortality across all Chinook stocks. For example, commercial salmon troll fisheries on average caught 650,837 Chinook per year south of Cape Falcon 2000–05 (Table A-21, Review of 2005 Ocean Salmon Fisheries, PFMC, February 2006). The consultation standards of 11,000 and 9,000 Chinook for the whiting and groundfish trawl fisheries, respectively, represent together about 3 percent of this catch. And the consultation standards represent thresholds which trigger a reevaluation of management measures and potential imposition of additional restrictions to mitigate take of ESA-listed Chinook salmon, which would have a similar effect on non-listed stocks such as Klamath River Fall Chinook. For example, as discussed in this EIS, an Ocean Salmon Conservation Zone will be implemented for the 2007–08 period; if monitoring indicates that the 11,000 fish threshold is likely to be exceeded in the whiting fishery, the Conservation Zone would go into effect, prohibiting whiting trawl shoreward of 100 fm, the zone where bycatch tends to be more prevalent. Chinook bycatch over the consultation thresholds in any subsequent year would trigger a re-initiation of consultation under section 7 of the ESA, likely resulting in further mitigation measures to reduce bycatch to acceptable levels.

One of the commenters makes a comparison between coastwide bycatch in groundfish fisheries and the 2006 "allotment" (presumably, realized catch based on time/area restrictions) of salmon target catch for sub-areas on the northern California coast. But this compares total bycatch coastwide to targeted catch in specific areas where restrictive management measures were applied to target fisheries. A more reasonable comparison would be of bycatch and target catch in like areas and years. Implicit in such a comparison is the issue of equity between fisheries under different management regimes, which is beyond the scope of the analysis in this EIS because it is essentially a matter of policy in terms of the relative effect of management measures imposed on different fisheries.

The DEIS should have discussed closure of the groundfish trawl fishery: *Two commenters (Ms. Ann Maurice and Ms. Ellen Faulkner) commented the bycatch of Chinook salmon, in particular Klamath River Fall Chinook natural spawners, in the groundfish trawl fishery is an unacceptable waste and for that reason the DEIS should have discussed closure of the groundfish trawl fishery.*

Response: The DEIS did evaluate closure of the trawl fishery in the context of considering strategies to rebuild depleted rockfish stocks. Although not presented as a mitigation measure for the impact of groundfish trawl fisheries on Chinook salmon bycatch, this does provide information on the economic cost of such a mitigation measure. Section 7.2.10.2 in this EIS discusses the impacts of "zero harvest alternatives"; 2005 revenues are used as an indicator and the analysis estimates \$22.3 million would be lost from the groundfish bottom trawl fishery and \$27.1 million from the non-tribal whiting trawl fishery. Given the mitigation measures already in place or to be implemented as part of this action, as described above, and the tradeoff between these costs and the impacts to Chinook salmon, which this EIS concludes are not significant, closure of the fishery is not a reasonable mitigation measure.

13.3 Responses to DEIS Comments on Socioeconomic Analyses

The following responses are to the critique authored by Carroll-Larson (2006) titled, "A Critique of the Economic Analyses in the 2007-2008 DEIS and the GAP Report" which questioned the economic analysis used in the DEIS, particularly the use of Input-Output Regional Impact (IO) modeling and the lack of use of econometric modeling.

Lack of Use of Econometric Modeling: *The input-output (I/O) method underlying the economic impact assessment model used by the council is an inferior technique given other available methods, mainly dynamic econometric models. Econometric models can be easily and effectively applied to the existing datasets and can produce empirically grounded results. Comparatively, I/O models are ad hoc, have little empirical grounding, and are not effective in solving complex resource constraint problems. While the current analyses rely almost entirely on I/O impact estimates to measure policy performance, these numbers lack a connection to the economic payoff and tradeoff between the broader slate of policies regulating the Pacific Groundfish fishery.*

Response: Taking into consideration Carroll-Larson (2006) and other comments raised, NMFS still concludes that the economic analyses used in the DEIS constitute the best available science. There are no econometric studies available for use in addressing the central theme of the DEIS: rebuilding overfished species in the shortest time possible, taking into account the status and biology of the species and the needs of fishing communities by considering the impacts of allowing some access to healthy fish stocks in order to avoid disastrous consequences to fishing communities. (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.")

NOAA's "Guidelines for Economic Analysis of Fishery Management Actions" (NOAA Office of Sustainable Fisheries 2000) do not prescribe particular methods and do not require the use of quantitative analyses. Rather, the Guidelines identify analytical elements that should be addressed and identify the scope of analysis required under applicable law. Recognizing the fact that there may be a lack of data and the complexity associated with developing economic models such as dynamic econometric models, the Guidelines state that: "Embodied in these guidelines is the principle that a well developed qualitative analysis may be preferable to a poorly specified complex analytical model."

The main factor constraining the ability to improve economic modeling of the fishery and its linkages (e.g., time-series regression analyses, estimation of resource efficiency and productivity, application of non-static models, etc.) with the rest of the economy is the absence of annual observations of employment, and cost and earnings data for vessels and processors. As acknowledged by the commenter, improved modeling requires data from fishermen and companies regarding their purchases of capital and labor and the selling of fish in addition to demographic information such as age, education level and job experience. Such data are not currently available. Further, even if such data were available, econometric studies, particularly dynamic econometric studies, are not easily undertaken, as such modeling requires knowledge of the fishing industry and fish populations, advanced expertise in econometric theory and methodologies, and the ability to translate complex relationships into representative and statistically valid functions. Currently the groundfish industry cost and earnings profiles used within the FEAM model are based on a year 2000 snapshot of the West Coast fishery. Since 2000, among other things, the fishery has seen a significant increase in the cost of fuel. The EIS address this issue qualitatively in its discussion of the results, where appropriate.

In the absence of econometric models, the EIS relies on the best available science for its economic analyses, including, among other things, the Fishery Economic Assessment Model (FEAM). This model generates income impacts using IMPLAN input-output (IO) model coefficients that show the relationship between various sectors of the economy—how each industry sells its output to other industries and final consumers and in turn purchases goods and services from other industries. (IMPLAN—Impact Analysis for Planning—is a computer software package that consists of procedures for estimating local input-output models and associated databases. IMPLAN was originally developed by the U.S. Forest Service in cooperation with the Federal Emergency Management Agency and the U.S. Department of the Interior's Bureau of Land Management to assist in land and resource management planning.) The commercial fishery FEAM generates marginal income impacts per landed pound resulting from harvesting and processing activities. (There is an analogous process for estimating impacts from recreational fishing.) The FEAM version currently available incorporates response coefficients based on 1998 IMPLAN regional IO models constructed for 17 port areas, observed landings in 2000 for those port areas from the PacFIN database, and the results of informal interviews with vessel owners and processors conducted over the years by consultants to understand the structure of industry costs and earnings. The mix of vessel types, historical landings, and processing activities in each port combined with the region-specific response coefficients, means that a great level of detail is available, with each harvesting and processing activity in each port area contributing a (potentially) different economic effect. While some elements of the FEAM model could benefit from updating, the process used to generate the FEAM regional, per-pound marginal income impacts is time consuming and resource-use intensive; thus, the FEAM can only be updated periodically. In any event, the difference in the values of the multipliers derived from the regional models constructed using 1998 data versus 2002 data is not likely to be large. Although we don't expect the updating of these multipliers will have much effect, we do expect that updating information associated with the costs and revenues of groundfish harvesting and processing will have a significant effect.

Although IO modeling is a prominent feature of the analysis, NMFS and the Council considered other economic and socio-economic analyses in their decision making: projections of commercial catch; recreational trips, ex-vessel revenues, and recreational trip expenditures; bycatch models that relate the harvest of overfished species to fishing sectors and associated communities; indicators of community dependency, resiliency, and vulnerability; and historical trends in the fishery. The tables and figures in Chapter 2.3.3 of the EIS, Effects on West Coast Fishing Communities, link these analyses qualitatively:

> Table 2-29. Estimated rebuilding duration for depleted groundfish species and predicted socioeconomic impacts under the No Action Alternative, 2007-08 Action Alternatives, and a "no fishing" scenario. This table includes information on rebuilding times, ex-vessel revenues, and recreational trips for alternative OY levels.
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> Table 2-30. Summary of estimated income impacts resulting from combined recreational angler expenditures and commercial fisheries landings by region under the management alternatives (million $). This table provides the FEAM estimates of income impacts.

> Table 2-32. The vulnerable and most vulnerable counties to change in groundfish management measures. This table summarizes the communities and associated counties classified as vulnerable according to the analysis in the DEIS. A "vulnerable" community or county is one that is highly dependent on the groundfish fishery and has low resilience or ability to adapt to change.
>
> Figure 2-13. Trends in exvessel revenues from the West Coast groundfish fishery and projected revenues under the final Council-preferred alternative which shows long term declining trends in the commercial fisheries and the 2007-08 forecast of Council's preferred alternative.

The IO analysis in Chapter 7 of the DEIS provides a detailed community-level comparison of income and employment impacts resulting from commercial fish harvesting, processing, and recreational fishing in the near term (i.e., each year during the two year period covered under the proposed management specifications.) Chapter 10 presents a net benefit analysis. In Section 10.3.1.2 Social Net Benefit Analysis, the analysis is extended to compare the relative performance of the alternatives with respect to their effect on a broader set of affected sectors, including commercial and tribal fishers, buyers and processors, recreational fishers, non-consumptive users, nonusers, and the general public. While there is a lack of data and models to conduct a quantitative analysis, the Social Net Benefit Analysis qualitatively compares the impacts under the alternatives on the full range of affected groups.

Carroll-Larson (2006) also raised the criticism of bias and leakage in that I/O models are extremely volatile—slight changes in assumptions can cause extremely different impacts, especially with respect to the concept of "leakage." (The concept of "leakage" refers to assumptions about how much activity is local versus how much "leaks" out of the local economy because of such things as taxes, savings, payments to non-resident workers, and for non-locally supplied goods and services.) However, this critique can be leveled at any type of model. The greater the number of structural parameters that must be estimated or calibrated in a model, the greater the potential volatility to slight changes in assumptions. However, using a consistent and representative set of assumptions to analyze the full set of alternatives will minimize the scope for bias. In this case, all of the alternatives were modeled using the same, neutral set of assumptions. Impacts are then measured by comparing modeled results for the action alternatives against the modeled results for the No Action alternative. No attempt was made to tailor model assumptions to favor a particular alternative or obtain a particular result. Any bias in assumed leakage of expenditures for goods and services "imported" into the local economies was controlled by using the standard IMPLAN regional purchase coefficients for each regional model. Net leakage of wages paid to nonresident workers is based on U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (REIS) accounts. Expenditures on input supplies by vessels and processors, including payments to harvesting and processing crews, were assumed to go to the port of landing. While it is true that this assumption may tend to overstate impacts in certain port areas, the same assumption was used to analyze all of the alternatives, so no bias is betrayed.

Alternative Models Should Have Been Used in the Analyses: *Carroll-Larson (2006) suggests various alternative or additional models would better reflect the benefits and costs of rebuilding policies, including a proposed rebuilding model, a proposed methodology for using an existing study to estimate the ecosystem effects of rebuilding, and critiques for not accounting for the changing species assemblage of harvests.*

Response: Carroll-Larson (2006) suggests an alternative method for calculating the economic benefits of rebuilding the darkblotched rockfish population and estimate that the value of rebuilding the darkblotched rockfish population is worth $8 million. While there are sure to be future benefits accruing from the rebuilding of darkblotched rockfish, the proposed approach fails to take into account the multi-species nature of the West Coast groundfish fishery and also assumes that current harvest levels result in no rebuilding.

The multi-species nature of the groundfish fishery means that multiple species are often caught in conjunction with one another. To lower the take of a rebuilding species, regulations must be designed to discourage targeting on rebuilding species as well as to diminish the take of more abundant species that co-occur with rebuilding species. In other words, decreasing the amount of fishing-related mortality attributed to darkblotched rockfish means reducing the take of sablefish, Dover sole, slope rockfish, shortspine thornyheads, longspine thornyheads, and petrale sole, among other species. Over the past several years these species have made up the majority of exvessel revenue attributed to the West Coast groundfish fishery, outside the Pacific whiting fishery. Reducing the darkblotched OY to zero would require that the Council and NMFS reduce the catch of these more abundant target species substantially. Information within the EIS clearly shows this concept. Appendix A shows that reducing the take of darkblotched rockfish in the bottom trawl fishery from 150 mt to 40 mt in a year would reduce revenues in that fishery by approximately $15 million in a single year.

The analysis that Carroll-Larson (2006) provides to support the claim that rebuilding darkblotched is worth $8 million fails to account for diminished harvest of more abundant co-occurring species that would be necessary to reduce the take of darkblotched rockfish. Therefore, while there are certain to be benefits in the future when the darkblotched rockfish stock is rebuilt, in order to follow the quickest rebuilding path for all overfished groundfish species (i.e., setting all OYs to zero), it would be necessary to eliminate the majority of commercial groundfish fishing activities on healthy species until the overfished species are rebuilt. Following the quickest rebuilding path for darkblotched rockfish alone would eliminate most exvessel revenues generated in the commercial fishery and only reduce the median time to rebuild by one year compared to the Council-preferred alternative. This means that contrary to Carroll-Larson's assertion, the net present value of rebuilding the darkblotched rockfish population as quickly as possible will be less than the net present value of rebuilding the darkblotched rockfish population under the Council-preferred alternative. To illustrate this concept, we can use readily available information including: 1) the results from the latest darkblotched rockfish stock assessment, 2) information in Appendix A of the EIS showing reductions in exvessel revenue necessary to reduce impacts to darkblotched rockfish based on the co-occurrence of darkblotched and more abundant target species, 3) the assumption of the same discount rate as the commenter, and 4) the assumption that the Council-preferred OYs are in place for other species. Using this information, analyses reflect that rebuilding darkblotched rockfish in the quickest time (zero fishing-related mortality until that stock is rebuilt) would result in cumulative discounted revenues that are $76 million less for the bottom trawl sector alone when compared to the Council-preferred OY. For further comparison, if some fishing of darkblotched were allowed and the bottom trawl sector took 40 mt of darkblotched per year, there would be $57 million less in cumulative exvessel revenue over 6 years compared to the Council-preferred OY. Therefore, NMFS disagrees that rebuilding the darkblotched rockfish population as quickly as possible without taking into account the near-term needs of fishing communities will result in a gain in net present value to the commercial fishery over the long run.

With regard to ecosystem effects, the MSA clearly states that rebuilding take into account the interaction of the overfished stock with the marine ecosystem and section 3.2 of the EIS (The Role of Rebuilding Species in the Marine Environment) discusses the role that rebuilding species play within the ecosystem. NMFS is encouraged by continued efforts to develop new ways of measuring natural resource values. While the application of past research could be used to estimate values associated with a healthy groundfish population, Carroll-Larson (2006) suggests that such values could be extrapolated though the "beach mile" approach as used in Hall, et al. (2002) and that this is in some way indicative of the value that society places on a healthy groundfish population. Hall, et al. (2002) is a study that developed estimates of the benefits of protecting rocky intertidal ecosystems based on surveys of day visitors to sandy beaches or adjacent rocky habitats in Orange County, California. NMFS disagrees that the values in Hall, et al. (2002) can be homogenously applied on a coastwide basis, as demographics vary substantially along the Pacific coast. While geographic area can be used in some instances to expand value estimates, NMFS believes the use of beach miles to estimate society's values would be an inappropriate expansion technique in this case due to the extremely diverse nature of the shoreline along the entire west coast.

Carroll-Larson (2006) asserts that the EIS should evaluate and incorporate the costs of assemblage shifts caused by fishing. The data used to show this concept are fishery-dependent landings data, which do not include all sources of fishing mortality and do not reflect changes in effort and target behavior on the part of fishermen. In addition, Carroll-Larson's comments fail to acknowledge the fact that changes in the fishery have occurred as the Council and NMFS have imposed regulations to move fishing effort away from longer lived rockfish species, and toward more fecund flatfish and roundfish species. For example, landings have included an increasing proportion of roundfish, a result that was intended by the management measures implemented. Increasing rockfish landing limits so that the composition of landings data is more heavily composed of rockfish would be counterproductive to the rebuilding of some of those depressed rockfish populations.

In specific reference to Figure 5 in the NRDC, et al. comment: This figure does not provide an informative comparison between the value of current harvests and the potential value of harvests with stock biomasses and harvest near levels at which long-term maximum sustainable yield would be achieved. The 1983 "assemblage" reflects the removals that characterize the harvest of a substantial pool of rockfish biomass available only once in the development of fishing. The removals from many stocks during this period of "fishing down" stocks from lightly exploited to fully exploited are much larger than MSY or other metrics of sustainable harvest. In addition, current assessments now suggest that harvest amounts for many rockfish in 1983 were higher than NMFS and the Council would have set had NMFS and the Council possessed our current understanding of stock dynamics and been applying the current harvest policy. Furthermore, in 1983, the U.S. whiting fishery was years away from being able to harvest the full whiting OY—it was not until the 1990s that this fishery had finished its transition from a foreign fishery, to a joint-venture fishery, and then to a fishery completely harvested and processed through U.S. companies.

Additionally, application of 2005 average rockfish prices is inappropriate for comparing the value of catches between these years. In 2005, nearly a fifth of the remaining commercial rockfish landings were made with line or pot gear. The average rockfish price for line and pot gear was roughly five times that for trawl, due to the development of live-fish markets for near-shore species, which can bring more than $5/lb. In 1983, less than 6 percent of rockfish were harvested with line and pot gear. Trawl catches of species such as bocaccio, canary, chilipepper, widow, and yellowtail dominated landings data. Because of the depths at which these species are caught and the fact that they have closed swim bladders (which makes them prone to mortality through barotrauma), even if catches of these species could be restored to 1983 levels, they would not be suitable for live fish delivery. Hence, Figure 5 greatly distorts the value of restoring harvest levels for species that comprised the bulk of 1983 rockfish landings.

The California Current ecosystem is highly complex and made up of a diverse set of species and recent research has attempted to identify the linkages between the various elements of the ecosystem. While linkages can be made between the rebuilding species and the role that those rebuilding species play within the ecosystem, quantifying the nature and the importance of that role to each rebuilding species is extremely difficult. Indeed, assessing the economic benefits to the ecosystem that may result from changes in the populations of overfished groundfish is not possible given available information.

The DEIS Has Misinterpreted the Ninth Circuit Court Decision: *NRDC, et al. claim that the DEIS misinterprets NRDC v. NMFS, 421 F.3d 872 (9th Cir. 2005), which requires the prioritization of rebuilding unless there are short-term disastrous economic consequences. As a result, the DEIS impermissibly prioritizes economic gain over shorter rebuilding time and uses more optimistic stock assessment results to increase short-term catch levels instead of rebuilding more quickly.*

Response: NRDC, et al. assert that: "'disastrous short-term consequences for fishing communities' are illustrated by a total moratorium on all fishing due to an absolute ban on any bycatch of overfished species." NMFS disagrees that short-term disastrous consequences can only occur if there is a total ban of fishing for overfished species, or in other words, only if OYs are set to zero. Disastrous consequences can occur at OY levels that are so low that allowed economic activity levels are insufficient to maintain basic community infrastructure during the time of rebuilding.

The EIS focuses on rebuilding overfished species in as short as time as possible while taking into account the status and biology of the species and the needs of fishing communities with the recognition that fishing communities have already for a number of years seen their economic activities curtailed in order to rebuild overfished species. The analysis within the EIS provides information on individual community impacts and broader coastwide fishery impacts. The analyses within the EIS also identify classes of communities according to attributes of fishery dependence, resilience, and vulnerability. In comparing these attributes to amounts of overfished species, target groundfish species and other target species (crab, shrimp, etc.) associated with these communities, we found that there were few regions on the West Coast that did not contain a community that was not highly dependent or vulnerable.

As stated in DEIS section 8.3, Rationale for Preferred Alternative, the key decision evaluated in this EIS is the adoption of rebuilding plans for depleted species and adoption of associated OYs and management measures for the 2007–08 management period. For depleted stocks, the basic approach that guides the adoption of a rebuilding strategy comes from the MSA as reiterated by NRDC v. NMFS, 421 F.3d 872 (9th Cir. 2005): "…a time period for … rebuilding … as short as possible, taking into account…the status and biology of the stocks [and] the needs of fishing communities…. (MSA §304(e)(4)(A))." Thus, the evaluation of the alternatives considered rebuilding in as short a time as possible, while also taking into account both the status and biology of overfished stocks and 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 short-term economic consequences because it would result in complete closure of a range of groundfish and nongroundfish fisheries. As a result, it would have disastrous consequences 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): to prioritize stock rebuilding while taking into account the needs of fishing communities, consistent with the Ninth Circuit Court of Appeal'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.

In developing the preferred Alternative, the Council took into account the information contained in the EIS and public testimony. Much of the public testimony concerned trends in commercial fishing revenues to the fishing communities. Since the mid-1990s, fishing communities have seen declining revenues from groundfish activities. As a result of these declines and forecasts of further declines, the Secretary of Commerce declared a disaster in 2000. After 2000, fishing communities have continued to see declining or low levels of groundfish revenues because of resource declines and because of increasing regulatory restrictions to arrest these resource declines (see DEIS Figure 2-13, Trends in exvessel revenues from the West Coast groundfish fishery and projected revenues under the Council-preferred alternative). During the public comment processes associated with this EIS, there was much testimony from the public about communities and associated fishing businesses being at the “breaking” or “tipping” point and not being able to withstand additional revenue losses. In reviewing this public testimony and in reviewing the analysis found within the DEIS, the Council voiced concerns that further reductions in groundfish opportunities would have disastrous short term consequences. Therefore, in following the Court’s direction, the Council considered the shortest rebuilding periods for five of the overfished species and whether modest and minor increases in rebuilding periods would significantly mitigate the adverse economic situation fishing communities are now experiencing. In recognition that yelloweye rockfish and canary rockfish are found in almost every fishery on the West Coast (see DEIS Table 2-5, Projected mortality [mt] of depleted groundfish species by fishing sector in 2006), the Council adopted strategies that achieve the rebuilding effects of low OYs, but also takes in account the needs of fishing communities. The Council-preferred alternative for the yelloweye rockfish OY is based on a strategy that “ramps down” catch levels from current amounts in order to give managers and industry time to adapt and develop more refined tools for decreasing the catch of yelloweye while allowing some access to healthier co-occurring target species. Management measures designed to reduce the bycatch of yelloweye rockfish will also result in reductions of canary rockfish catch, and therefore, management measures that are motivated by reductions in the yelloweye OY are expected to be sufficient to also reduce incidental catch of canary rockfish. The ramp down approach is expected to avoid some disastrous short-term economic consequences and still rebuild the stock quickly. An immediate reduction in the yelloweye OY to 12.6 mt is expected to result in substantial and adverse economic impacts. Because those impacts are expected to be heavily centered on some of the most vulnerable communities (rural coastal communities in Oregon and Washington), the Council believes that shifting from current yelloweye levels of 27 mt to levels of 12.6 mt or less next year would be disastrous for fishing communities. For perspective, based on current stock assessments, the rebuilding period for yelloweye with a zero OY would end in 2048; with an OY of 12.0 mt, rebuilding would occur in 2078, with an OY 0f 12.6 mt rebuilding would occur in 2083, and with the ramp down strategy rebuilding would occur in 2084. (Also see comment response on yelloweye rockfish management in section 13.2.)

14.0 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
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.

Acronym	Definition
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
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.

Acronym	Definition
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
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

Acronym	Definition
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.
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.

Acronym	Definition
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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16.0 INDEX

APPENDIX A

ADDITIONAL SOCIO-ECONOMIC ANALYSIS

PROPOSED ACCEPTABLE BIOLOGICAL CATCH AND OPTIMUM YIELD SPECIFICATIONS AND MANAGEMENT MEASURES FOR THE 2007-2008 PACIFIC COAST GROUNDFISH FISHERY
AND
AMENDMENT 16-4: REBUILDING PLANS FOR SEVEN DEPLETED PACIFIC COAST GROUNDFISH SPECIES

DRAFT ENVIRONMENTAL IMPACT STATEMENT

JULY 2006

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A.1 TRENDS IN FISHING AND SEAFOOD PROCESSING RELATED ESTABLISHMENTS AND EMPLOYMENT IN WEST COAST FISHING COMMUNITIES (1997-2005)

Based on U.S.-Census Bureau[1] data, trends in the number of fishing and seafood processing related establishments and employment (estimated) were determined for fishing communities in the states of California, Oregon and Washington. Using the ZIP Code Business Patterns[2] (CPB) data on the total number of establishments and employment, we will be able to provide information on the number of establishments per nine employment-size categories by industry category between 1997 and 2005.

At the same time we used the Economic Census[3] to take into account the Nonemployer Statistics which provide U.S. and sub-national economic data by industry for businesses that have no paid employees and are subject to Federal income tax. This series is useful for studying the economic activity of small businesses at various geographic levels.

The classification for fishing and seafood processing related activities, used by the CPB, is based on the North American Industry Classification System (NAICS) which assigns the industry code 1141—for Fishing, and 3117—for Seafood Product Preparation and Packaging. For the latter we will include Seafood Canning and Fresh and Frozen Seafood Processing together.

Regarding the reliability of the CPB data, it is important to state, that according to the Census Bureau, "all data are tabulated from universe files and are not subject to sampling errors. However, the data are subject to non-sampling errors. Non-sampling errors can be attributed to many sources: inability to identify all cases in the universe; definition and classification difficulties; differences in interpretation of questions; errors in recording or coding the data obtained; and estimation of employers who reported too late to be included in the tabulations and for records with missing or misreported data. The accuracy of the data is determined by the joint effects of the various non-sampling errors. No direct measurement of these effects has been obtained; however, precautionary steps were taken in all phases of collection, processing, and tabulation to minimize the effects of non-sampling errors."

At the end of this report, a preliminary overview of quarterly trends in employment and salaries is addressed using Census Bureau Local Employment Dynamics[4] data starting in 2001. This data also included age and gender distribution among the employees population, among other Quarterly Workforce Indicators (QWI).

The data presented in this paper is still under analysis at the city and county level, therefore we are only able to present it at the state level.

A.1.1 Establishments

The Census Bureau defines establishment as "a business or industrial unit at a single location that distributes goods or performs services." It is not necessarily identical with a company, firm or enterprise, which may consist of one or more establishments. When two or more activities are carried on at a single

[1] : http://www.census.gov/
[2] : http://censtats.census.gov/
[3] : http://www.census.gov/econ/census02/
[4] : http://lehd.dsd.census.gov/led/

location under a single ownership, all activities generally are grouped together as a single establishment. The entire establishment is classified on the basis of its major activity and all data are included in that classification.

In the case of the Nonemployer Statistics, it counts each distinct business income tax return filed by a nonemployer business as an establishment. Nonemployer businesses may operate from a home address or a separate physical location. Therefore, special note must be taken since most geography codes are derived from the business owner's mailing address, which may not be the same as the physical location of the business.

A.1.2 Employment estimation

Based on the number of establishments per employment-size category, we established the minimum and maximum number of employees per category and calculated an average to provide an estimation of total employment. For example, in Table A.1-1 the total average number for the 114111 industry would be 54.5, which is the results of estimating an average from a total minimum number of employees of 26 (16 + 10) and total maximum of 83 (64 + 19).

Table A.1-1. Example of table provided the Zip CPB data.

Industry Code	Industry Code Description	Total Est.	Number of Establishments by Employment-size class								
			1-4	5-9	10-19	20-49	50-99	100-249	250-499	500-999	1000 or more
114111	Finfish Fishing	17	16	0	1	0	0	0	0	0	0
311712	Fresh and Frozen Seafood Processing	3	0	0	2	0	1	0	0	0	0

A.1.3 Results

These preliminary results will include the trends observed for each state and a list of the communities and/or counties included in the total estimations. The listed communities are those that have Census data for fishing and seafood processing related activities. At this time, Nonemployer Statistics are only available for the fishing-related activities.

A.1.3.1. Fishing (BCP)

According to NAICS, this industry comprises establishments primarily engaged in the commercial catching or taking of finfish, shellfish, or miscellaneous marine products from a natural habitat, such as the catching of bluefish, eels, salmon, tuna, clams, crabs, lobsters, mussels, oysters, shrimp, frogs, sea urchins, and turtles. For the purpose of this study, we are only including establishments primarily engaged in the commercial catching or taking of finfish (e.g., bluefish, salmon, trout, tuna) from their natural habitat.

The list of communities that take at least one finfish included:

California: Bodega Bay, Crescent City, Dana Point (Capistrano Beach), Eureka, Fort Bragg, Los Angeles, Monterey, Morro Bay, Oakland, Oceanside, Oxnard, Port Hueneme, Richmond, San Diego, San Francisco, Santa Barbara, Trinidad, and Ventura.

Oregon: Astoria, Brookings, Cannon Beach, Coos Bay, Florence, Garibaldi, Seaside, Hood River, Newport, Port Orford, Portland, Siletz, Waldport, Warrenton, and Reedsport (Winchester Bay).

Washington: Anacortes, Bellingham, Blaine Chinook, Everett, Friday Harbor, Ilwaco, La Conner, Port Angeles, Port Townsend, Sequim, and Westport. In order to avoid inflating the data with the Alaska fisheries, the ports of Olympia, Seattle and Tacoma were not included in this study.

For the three states comparison we use California data with the info of metro communities (Los Angeles – Long Beach, Oakland, San Diego, San Francisco and Ventura) that probably were misrepresented by the data collected by zip-code only.

Based on the trends observed in Figures A.1-1 and A.1-2, it could be inferred that after year 2000 there is a slight reduction in the number of establishments for California and Washington. Although no statistical analysis has been performed yet for this study, Oregon data seems to be no significant.

In the case of employment, the pattern seems to be the same for all these states.

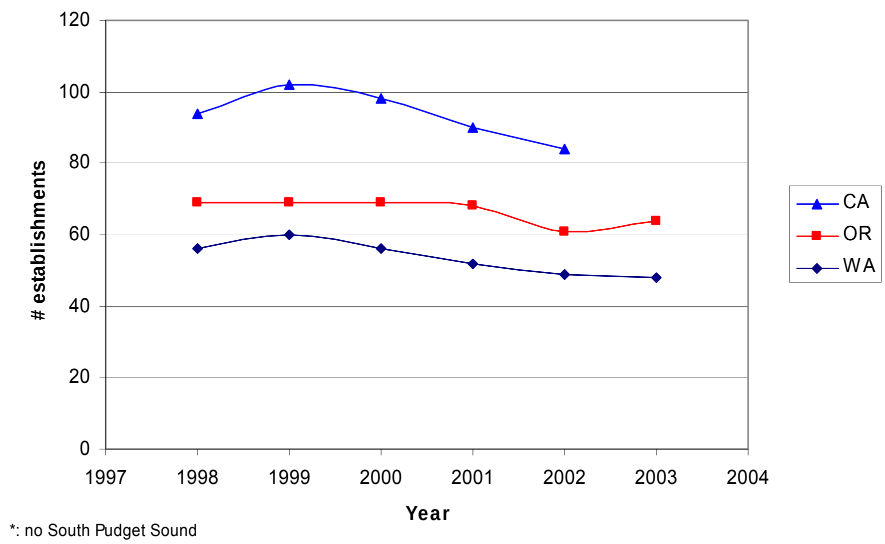

Figure A.1-1. California (CA), Oregon (OR), and Washington (WA) fishing-related establishments (1998–2003).

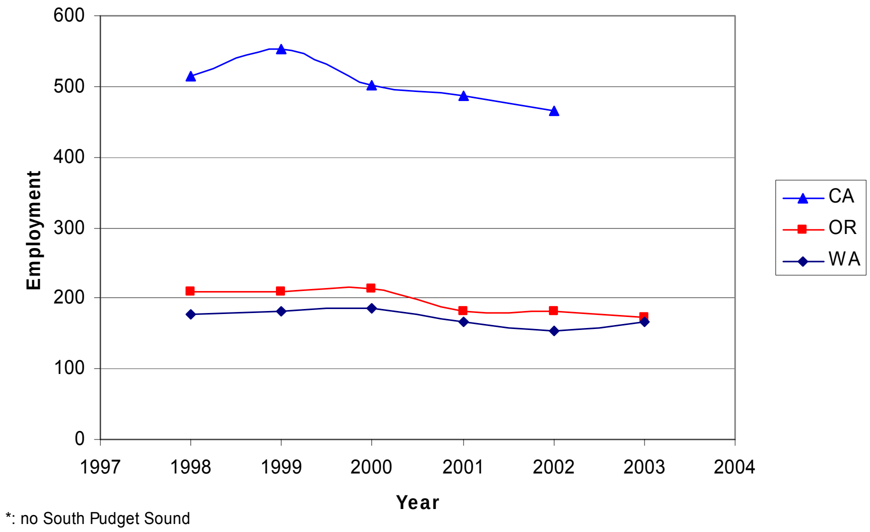

Figure A.1-2. California (CA), Oregon (OR), and Washington (WA) fishing-related employment (1998-2003).

A.1.3.2 Fishing (Nonemployer Statistics)

Besides the number of the establishments, the Nonemployer Statistics include the receipts, which are the gross receipts, sales, commissions, and income from trades and businesses, as reported on annual business income tax returns. Business income consists of all payments for services rendered by nonemployer businesses, such as payments received as independent agents and contractors.

The list of counties that take at least one finfish included:

California: Alameda, Contra Costa, Del Norte, Humboldt, Los Angeles, Marin, Mendocino, Monterey, Orange, San Diego, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Cruz, Solano, Sonoma, and Ventura.

Oregon: Clatsop, Columbia, Coos, Curry, Douglas, Hood River, Lane, Lincoln, Multnomah, and Tillamook.

Washington: Clallam, Clark, Cowlitz, Grays Harbor, Island, Jefferson, Kitsap, Lewis, Pacific, Sam Juan, Skagit, Skamania, Snohomish, Thurston, Wahkiakum, and Whatcom.

With this data, we observe that despite a decline in the number of establishments (Figure A.1-3) the gross receipts are increasing (Figure A.1-4). From this result it could be implied that less people are getting more profits from this activity (Figure A.1-5).

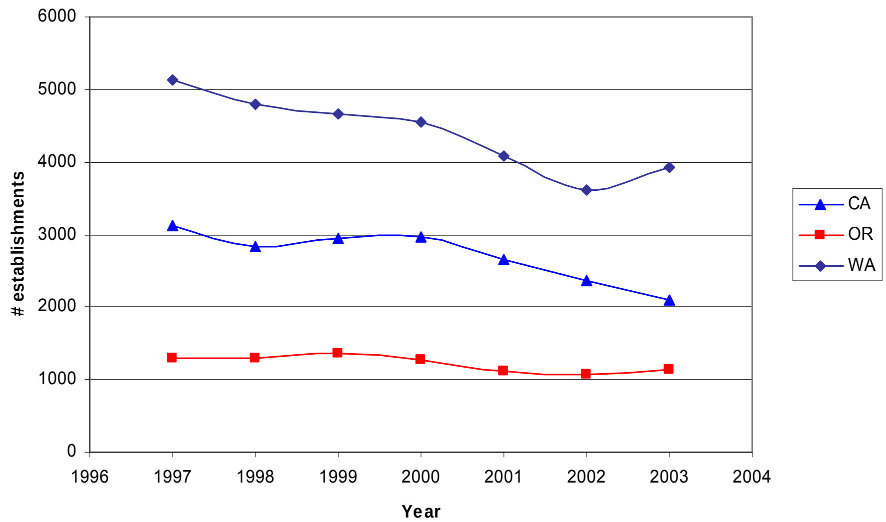

Figure A.1-3. California (CA), Oregon (OR), and Washington (WA) Nonemployer fishing-related establishments (1997-2003).

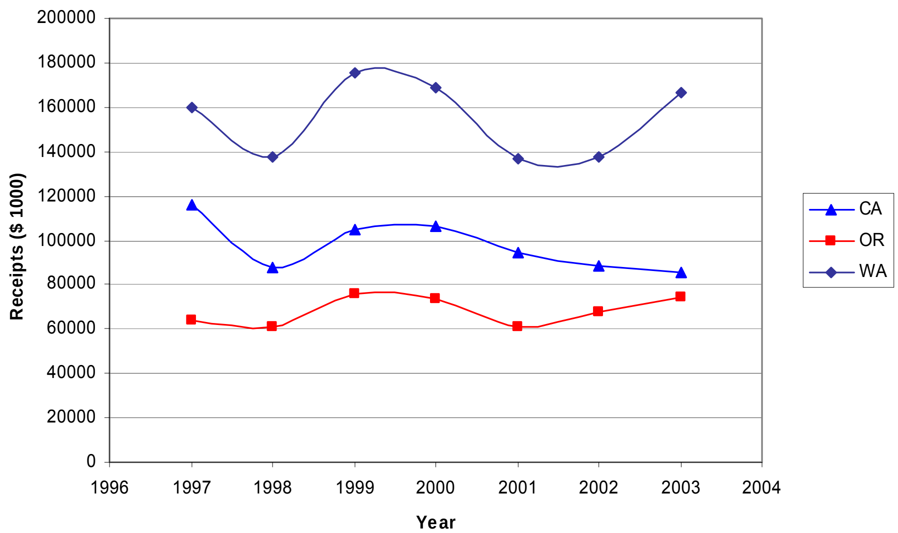

Figure A.1-4. California (CA), Oregon (OR), and Washington (WA) Nonemployer fishing-related receipts (1997-2003).

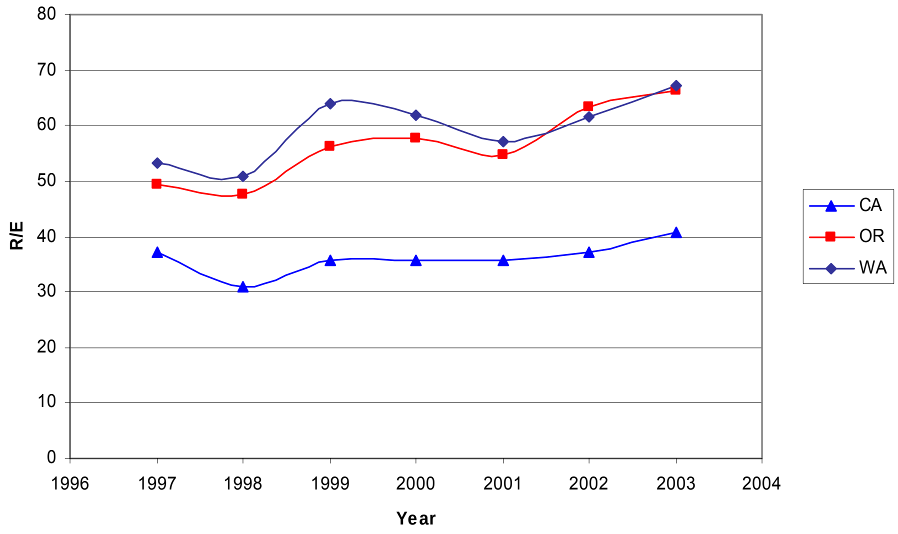

Figure A.1-5. California (CA), Oregon (OR), and Washington (WA) Nonemployer fishing-related Receipts ($1000) per Establishment (1997-2003).

A.1.3.3 Seafood Product Preparation and Packaging

According to the NAICS, this industry comprises establishments primarily engaged in one or more of the following: (1) canning seafood (including soup); (2) smoking, salting, and drying seafood; (3) eviscerating fresh fish by removing heads, fins, scales, bones, and entrails; (4) shucking and packing fresh shellfish; (5) processing marine fats and oils; and (6) freezing seafood. Establishments known as "floating factory ships" that are engaged in the gathering and processing of seafood into canned seafood products are included in this industry.

The list of communities that have at least one establishment:

California: Crescent City, Eureka, Fort Bragg, Long Beach, Los Angeles, Monterey, Oxnard, Port Hueneme, Richmond, San Diego, San Francisco, Santa Barbara, and Ventura.

Oregon: Astoria, Brookings, Coos Bay, Florence, Garibaldi, Newport, Port Orford, Portland, Warrenton, and Reedsport (Winchester Bay).

Washington: Anacortes, Bellingham, Blaine Chinook, Everett, Friday Harbor, Ilwaco, La Conner, Neah Bay, Port Angeles, Sequim, and Westport. In order to avoid inflating the data with the Alaska fisheries, the ports of Olympia, Seattle and Tacoma were not included in this study.

With this data, we observe that the trends in number of establishment and employment are very similar within each state (Figures A-1.6 and A-1.7).

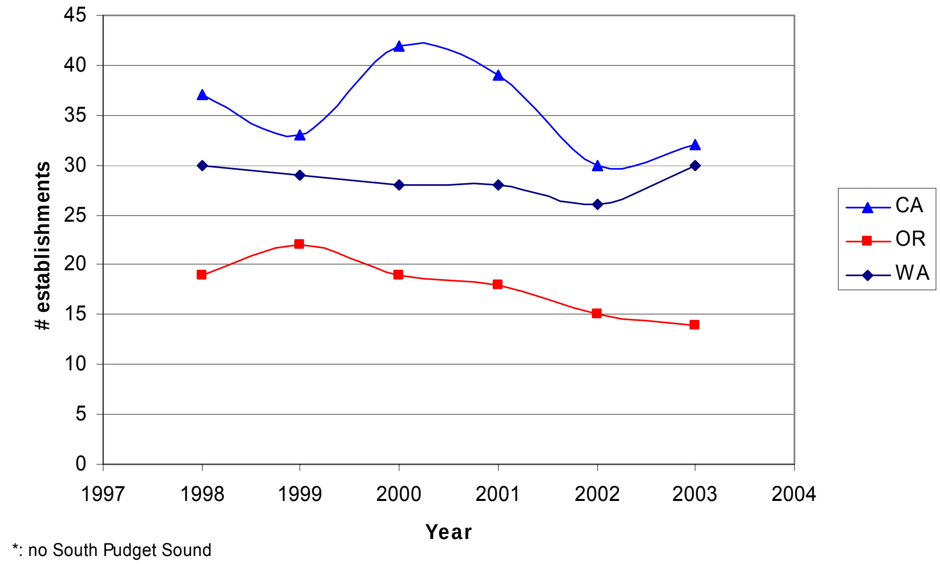

Figure A.1-6. California (CA), Oregon (OR), and Washington (WA) Seafood processing-related establishments (1998-2003).

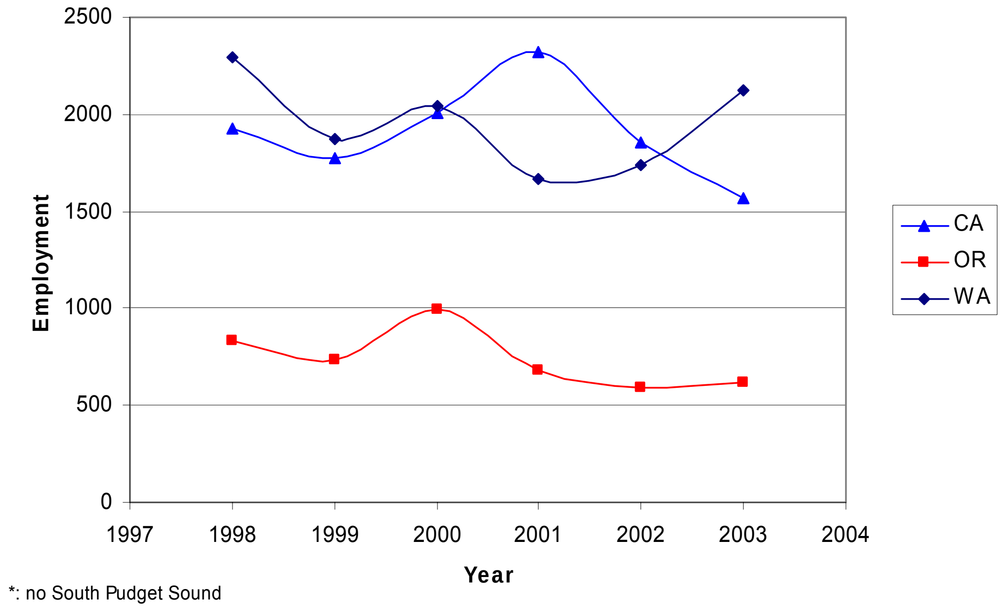

Figure A.1-7. California (CA), Oregon (OR) and Washington (WA) Seafood processing-related employment (1998-2003).

A.1.3.4 Local Employment Dynamics (LED)

The Census Bureau publishes eight (out of 29) labor force indicators in its QWI online. The eight indicators include total employment measures of change such as job flow, new hires, separations, and average earnings. In this preliminary report we take into consideration two of them: total employment and average earnings.

In Figures A.1-8a, b, and c we present the quarterly trends in employment and salary in the fishing industry for the three states between 2001 and 2004 (actual years varies according the data availability for each state). For California and Oregon it could be noted that there was a decreasing trend in employment more noticeable in the former until the second quarter of 2003 (Fig. A.1-8a). At the same time, the state of Oregon (Figure A.1-8.b) presents a seasonal trend in which the third quarter of each year shows a peak in high salaries. This trend could be based on the small nature of the industry for Oregon if it were compared with the one of Washington in which a high amount of fishing comes from Alaska waters and does not necessarily reflect a seasonal pattern.

The same observation is applicable to the seafood processing industry in which Oregon shows the same patterns in employment and salaries (Figure A.1-9b), while the other two states do not. In the case of California, there are high levels of imports that do not necessarily reflect the seafood processing of local fisheries catches.

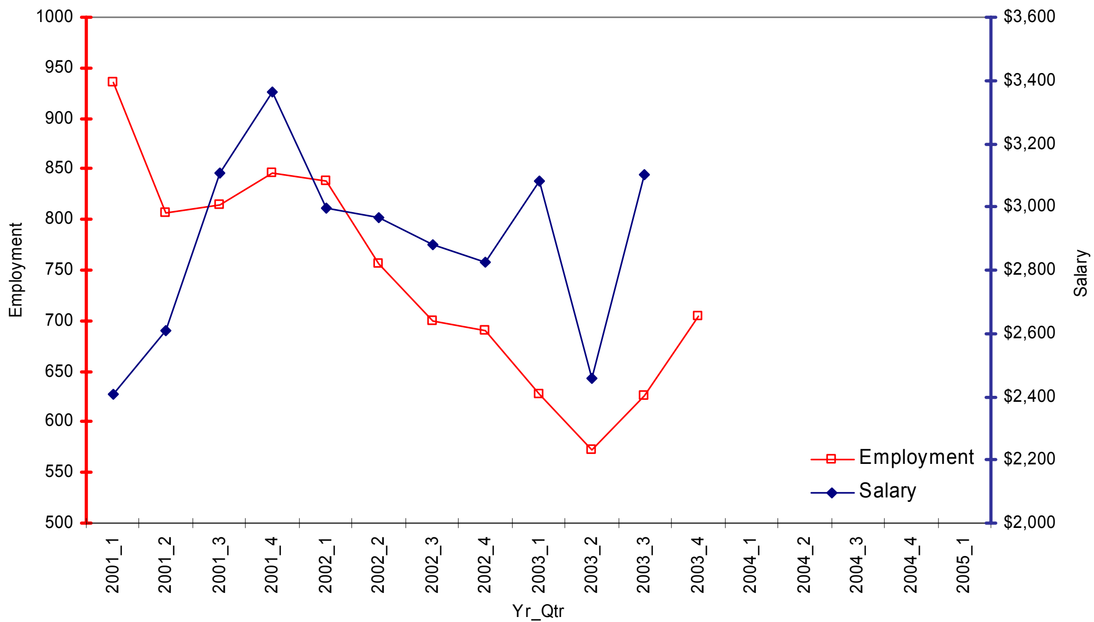

Figure A.1-8a. Quarterly fishing related employment and salaries for California (2001–2005).

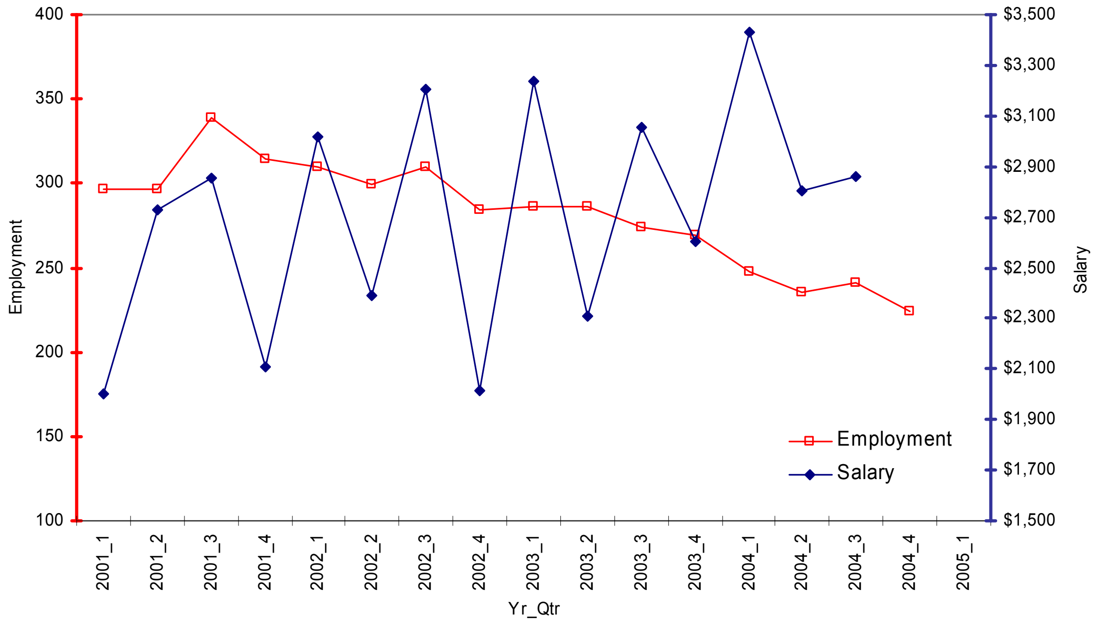

Figure A.1-8b. Quarterly fishing related employment and salaries for Oregon (2001–2005).

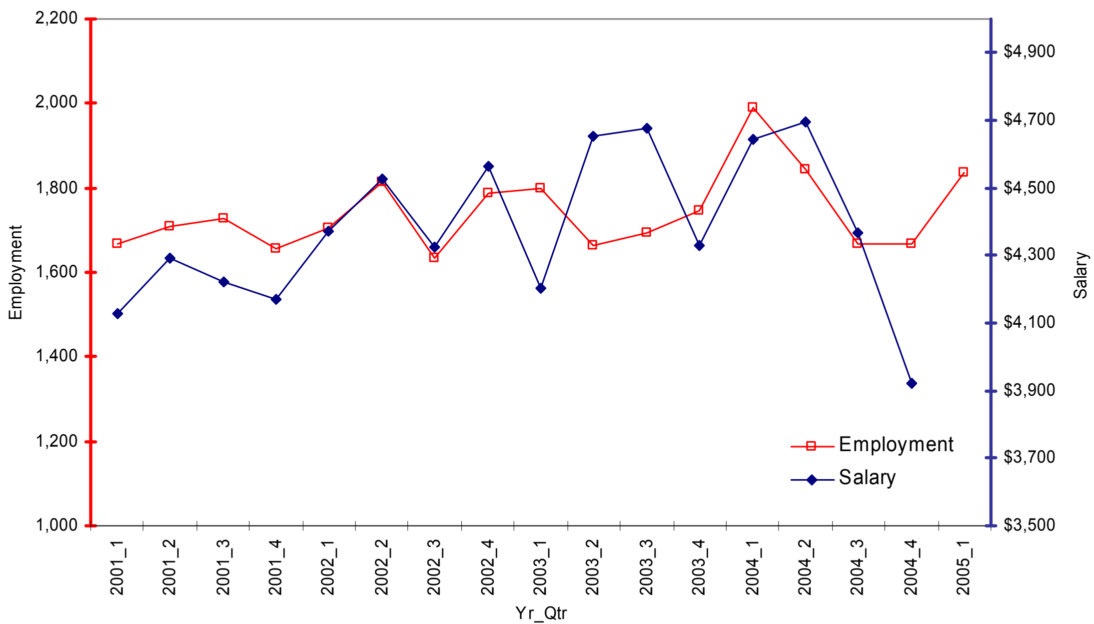

Figure A.1-8c. Quarterly fishing related employment and salaries for Washington (2001–2005).

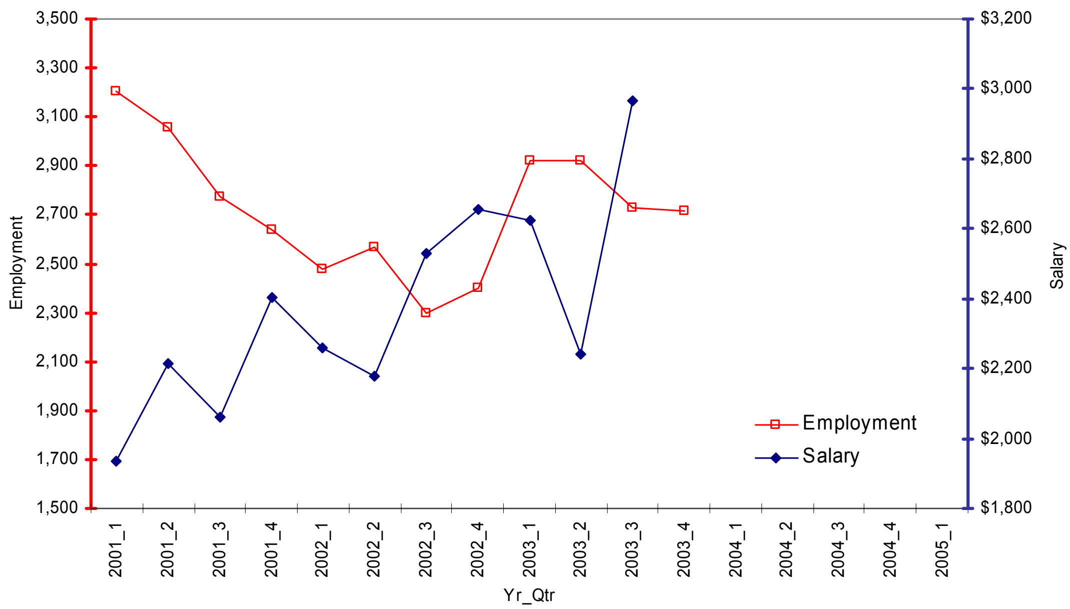

Figure A.1-9a. Quarterly seafood processing employment and salaries for California (2001–2005).

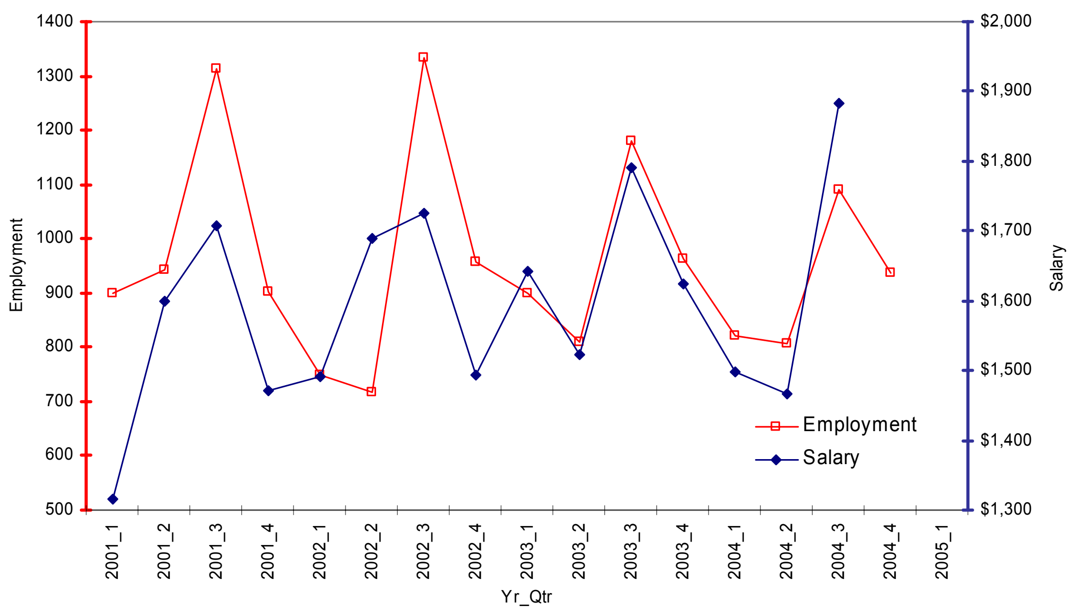

Figure A.1-9b. Quarterly seafood processing employment and salaries for Oregon (2001–2005).

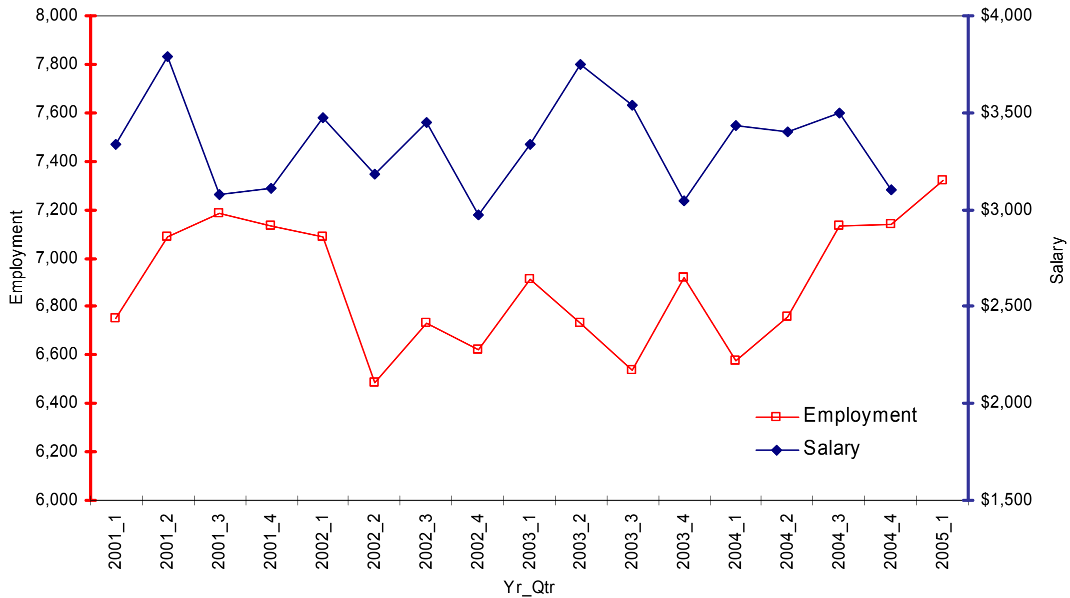

Figure A.1-9c. Quarterly seafood processing employment and salaries for Washington (2001–2005).

<u>Age distribution among employees.</u>

For both industries, the 35–44 age group is the predominant workforce in all three states with a 30–35 percent (Figures A.1-10 and A.1-11). It is followed by the 45–54 age group with the exception of the state of Washington, where the 24–25 group is the second highest.

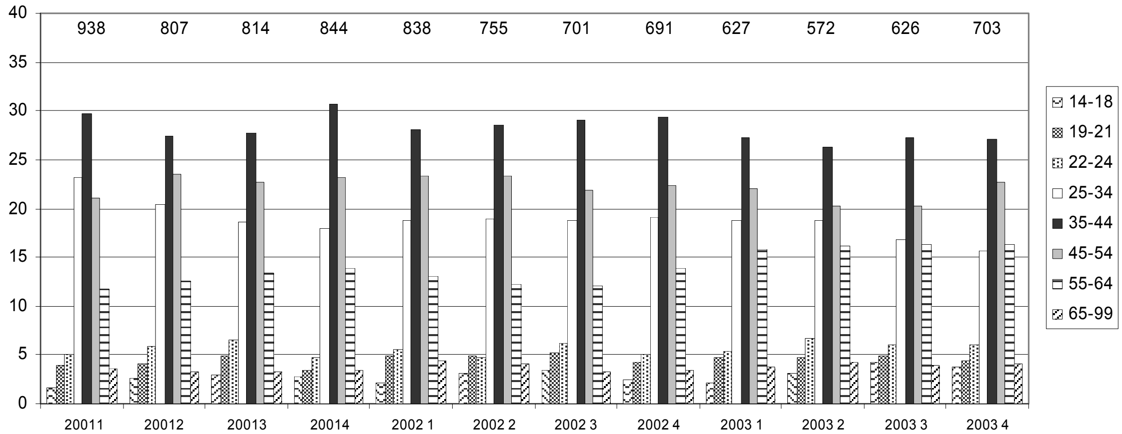

Figure A.1-10a. Age distribution (percent) among employees in the fishing related industry for California (2001–2005).

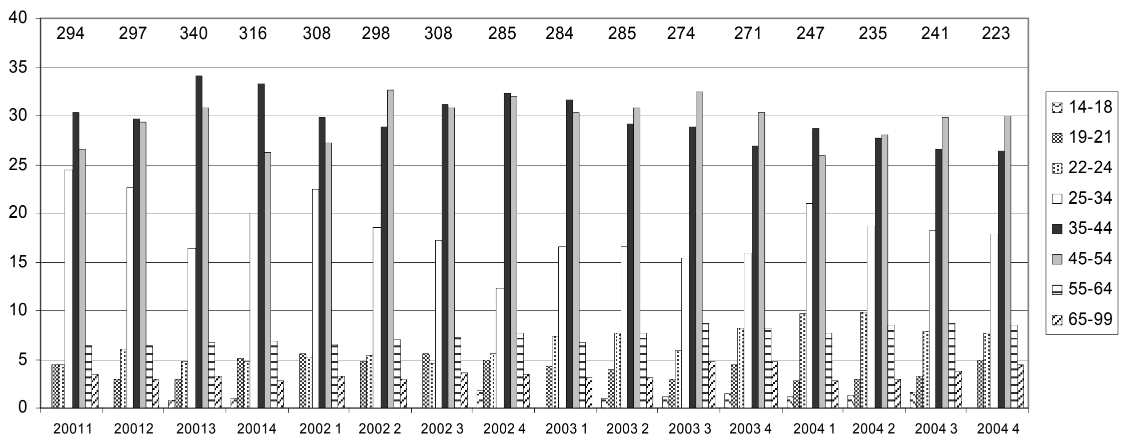

Figure A.1-10b. Age distribution (percent) among employees in the fishing related industry for Oregon (2001–2005).

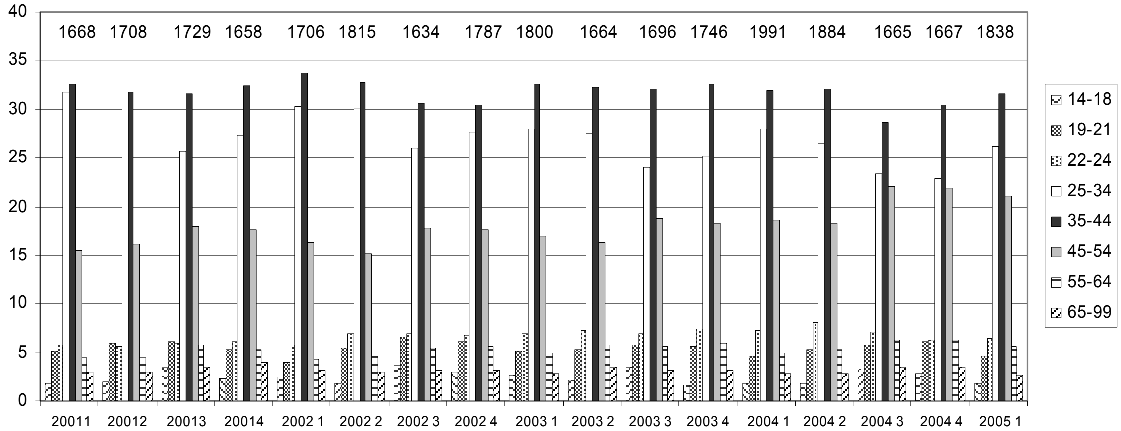

Figure A.1-10c. Age distribution (percent) among employees in the fishing related industry for Washington (2001–2005).

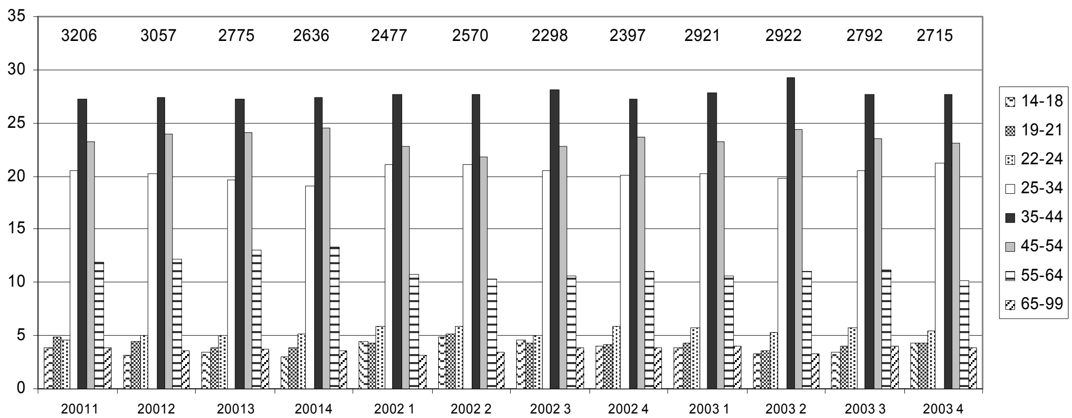

Figure A.1-11a. Age distribution (percent) among employees in the seafood processing related industry for California (2001–2005).

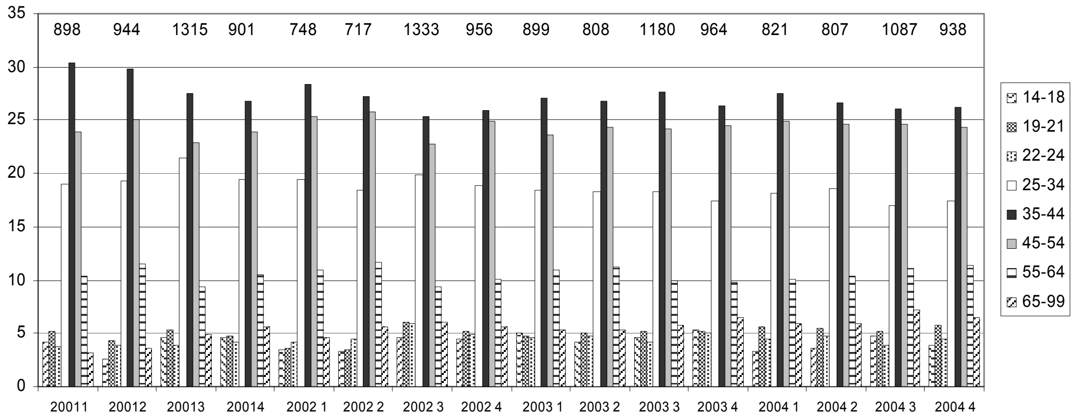

Figure A.1-11b. Age distribution (percent) among employees in the seafood processing related industry for Oregon (2001–2005).

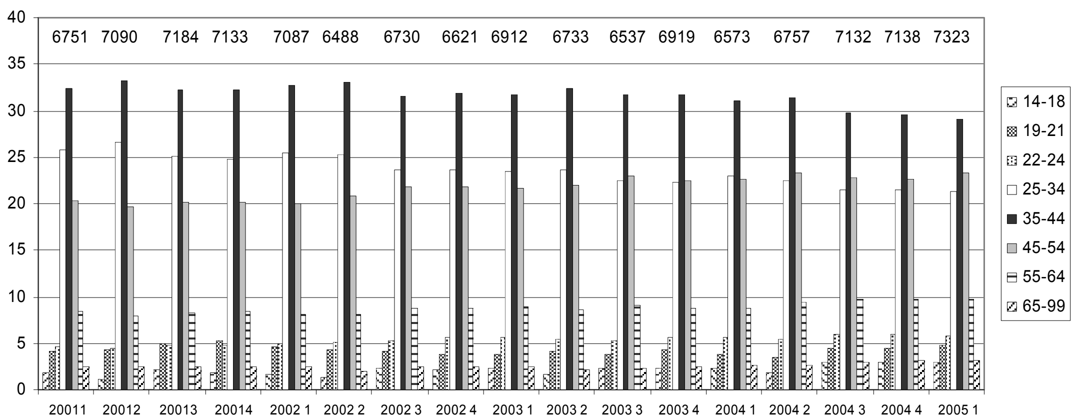

Figure A.1-11c. Age distribution (percent) among employees in the seafood processing related industry for Washington (2001–2005).

Gender distribution

Male employees accounts for about 80 percent of the workforce in the fishing industry for all three states (Figure A.1-12). California is the only state with quarters in which the female population overpasses the 20 percent mark without an apparent discrimination between high or low employment periods.

In the case of the seafood processing sector, the distribution varies according to the state. In California, there are more female workers in an almost a 50-50 distribution (Figure A.1-13a). Nevertheless, in Oregon and Washington the majority corresponds to male workers (60 and 70 percent, respectively).

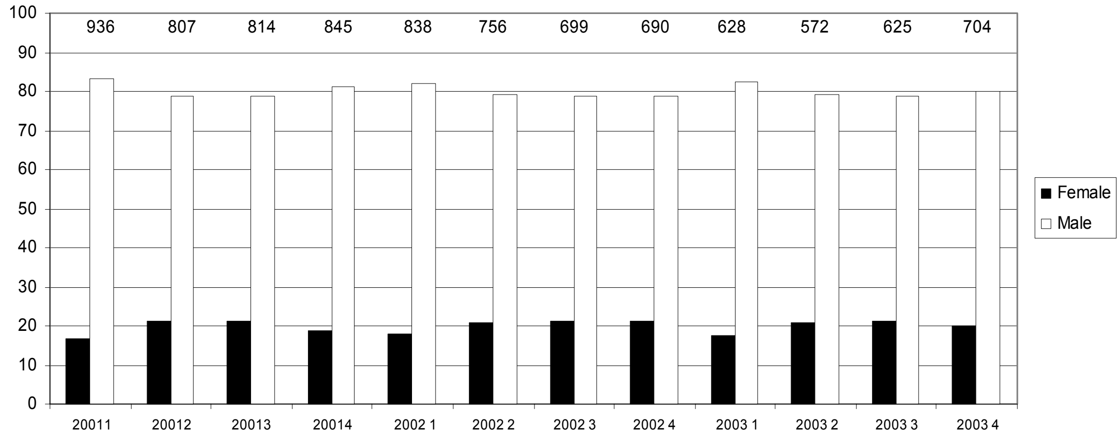

Figure A.1-12a. Gender distribution (percent) among employees in the fishing related industry for California (2001–2005).

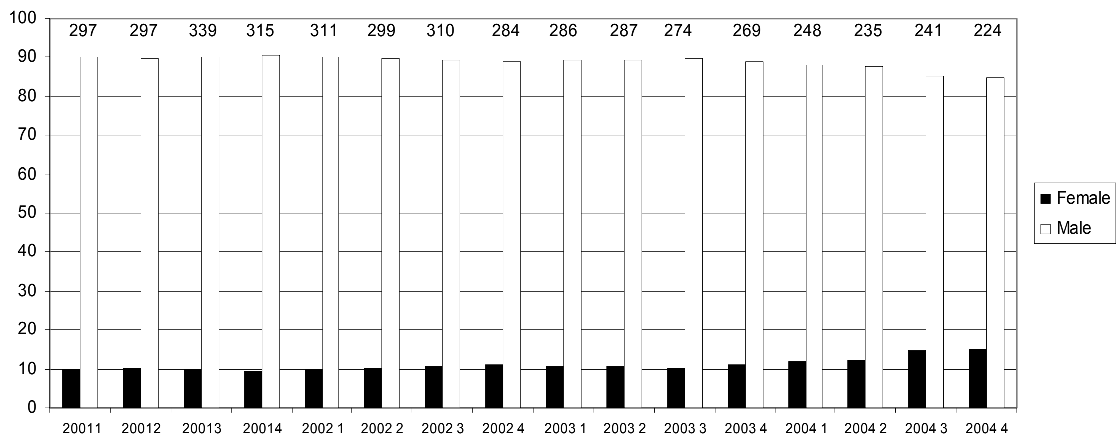

Figure A.1-12b. Gender distribution (percent) among employees in the fishing related industry for Oregon (2001–2005).

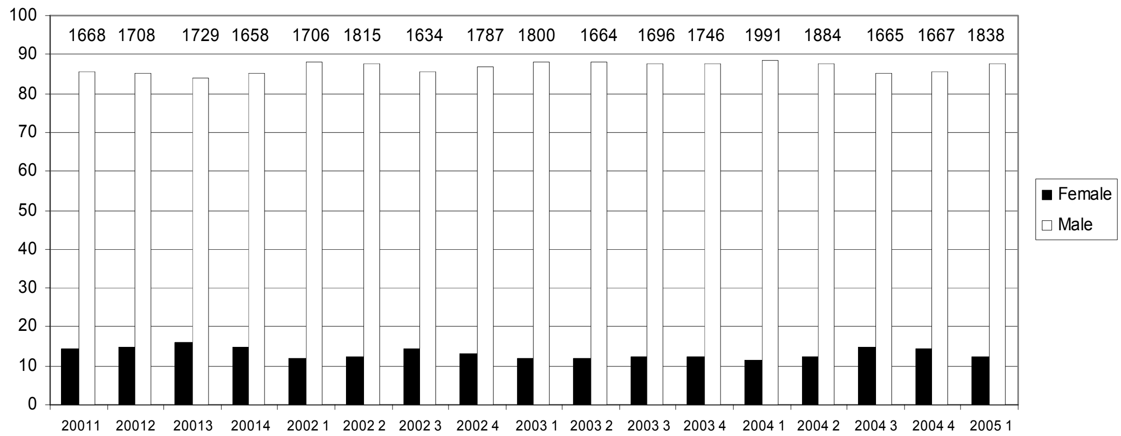

Figure A.1-12c. Gender distribution (percent) among employees in the fishing related industry for Washington (2001–2005).

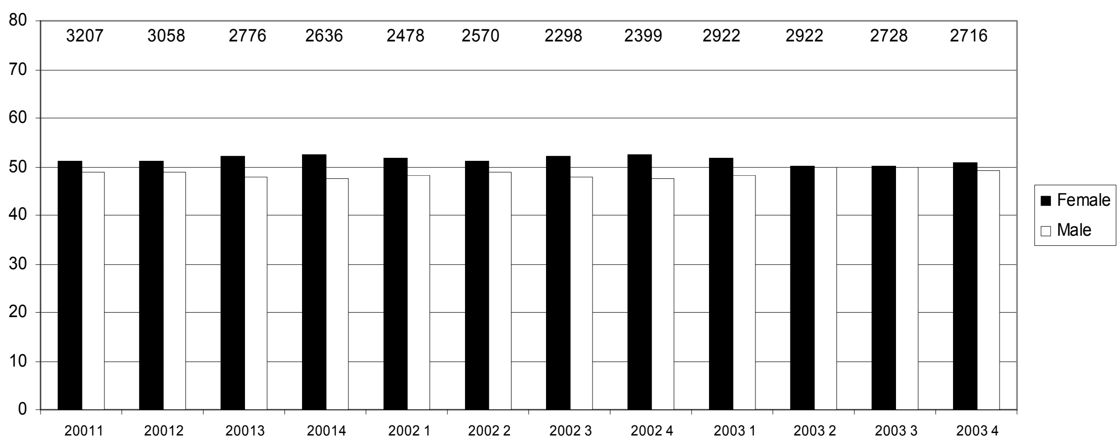

Figure A.1-13a. Gender distribution (percent) among employees in the seafood processing related industry for California (2001–2005).

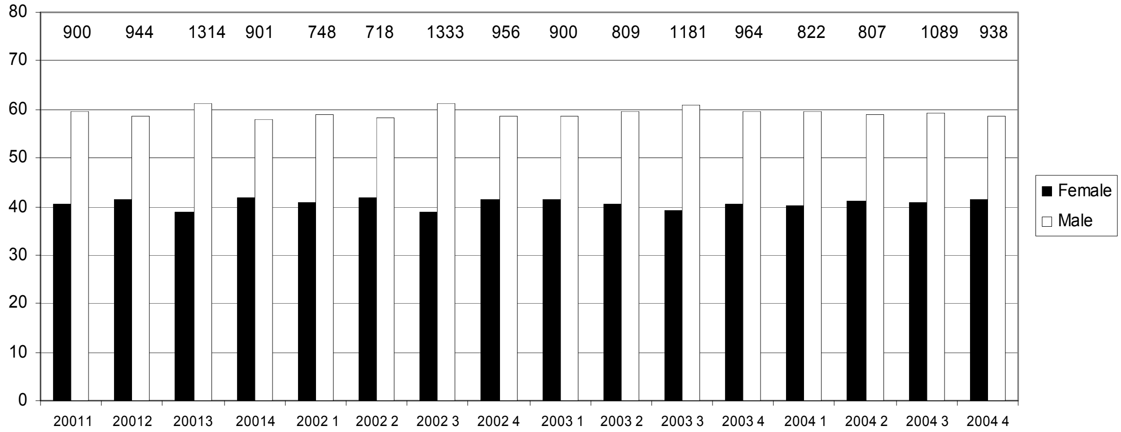

Figure A.1-13b. Gender distribution (percent) among employees in the seafood processing related industry for Oregon (2001–2005).

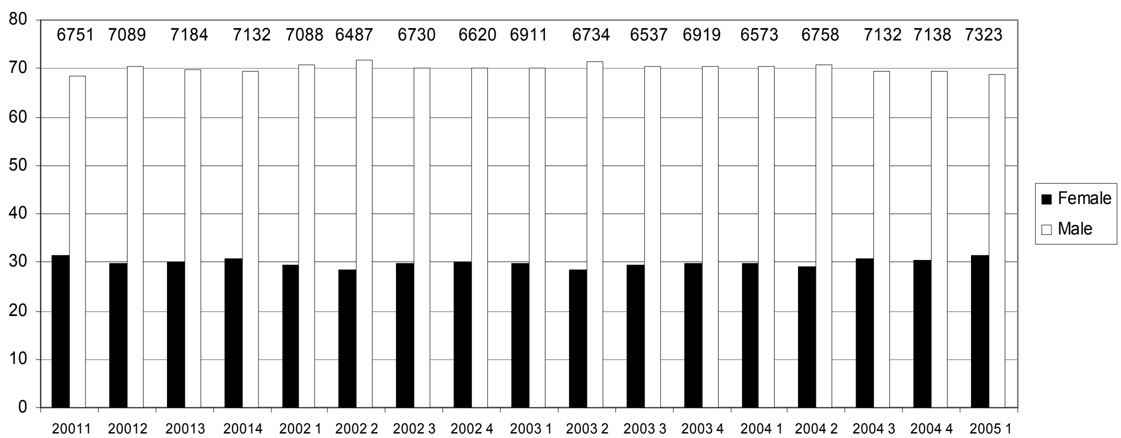

Figure A.1-13c. Gender distribution (percent) among employees in the seafood processing related industry for Washington (2001–2005).

A.1.4 Future steps

The information presented in this report is not intended to produce any major conclusions. It is more an illustration of the steps that we are following to address the socio-economic issues involving fishing communities on the West Coast. We are currently processing more information at the county and community level; however the data does not always have the same level of resolution that is required. Sometimes socioeconomic indicators only reach the county level, leaving communities without a closer look.

At the same time the information gathered on employment combined with other demographic, social, and economic data will allow us to develop the dependency analysis on fishing related industries by the communities, as well as to evaluate their resiliency.

A.2 ECONOMIC REVENUE AND DISTRIBUTIONAL IMPACTS ASSOCIATED WITH OVERFISHED SPECIES MANAGEMENT IN WEST COAST COMMERCIAL GROUNDFISH FISHERIES

A.2.1 Introduction

The management of West Coast groundfish fisheries is heavily centered on the need to rebuild seven overfished groundfish species. A species is considered overfished when its biomass is below 25 percent of estimated un-fished 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, which could have been derived from both overfished species and many target species that co-occur with those overfished species.

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

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

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

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

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

A.2.2 Approach

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

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

1. LE bottom trawl – deep;
2. LE bottom trawl –shelf;
3. LE midwater trawl – Pacific whiting;
4. LE fixed gear – sablefish;
5. LE fixed gear – nearshore;
6. LE fixed gear – dogfish;
7. open access fixed gear – sablefish;
8. open access fixed gear – nearshore; and
9. open access fixed gear – dogfish.

Although other commercial sectors arguably exist, one can reasonably assume that these other sectors are minor compared to those listed, or can be considered a component of one of those sectors listed. Our data set further divided sectors by coastal management area where different overfished species commonly occur: north of 40˚ 10’ N 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 Pacific ocean perch (POP). In the area between 38˚ N latitude and 40˚ 10’ N latitude, darkblotched rockfish populations are more moderate, POP is nearly non-existent, and the assessed portion of bocaccio rockfish 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 in the area, as well as more southern oriented stocks such as bocaccio rockfish. Few canary rockfish occur south of 36˚ N latitude, but this area contains both bocaccio rockfish and cowcod.

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

A.2.3 Exvessel Revenue – Overfished Species Catch Tradeoffs in Commercial Fisheries

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

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

A.2.3.1 Revenue – Overfished Species Catch Tradeoffs in the Pacific Whiting Fishery

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

Figure A.2-1 shows the relationship between exvessel revenue and overfished species caught in the Pacific whiting fishery. From this figure it is evident that widow rockfish is the predominant overfished species caught in this sector, and that a reduction in the catch of widow that is on the order of 25 metric tons (mt) without area-based management would correspond to a reduction in Pacific whiting revenues of $5.8 million. Because the catch of overfished species is predicted to be proportional to the catch of Pacific whiting, reductions in the metric tonnage catch of widow rockfish appear to be less costly per ton than reductions in the metric tonnage catch of other overfished species.

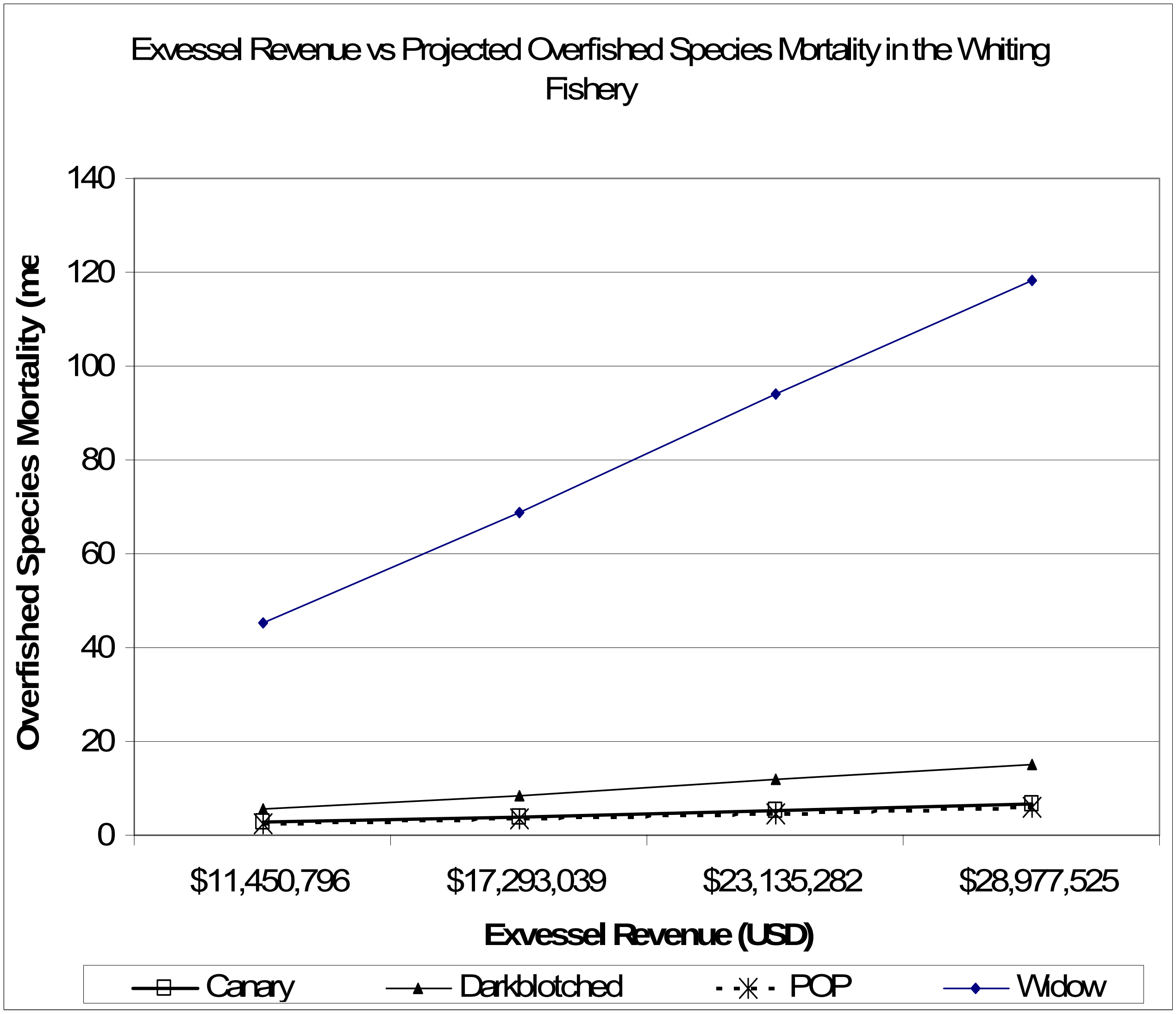

Figure A.2-1. Exvessel revenue vs. projected overfished species catch in the Pacific whiting fishery.

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

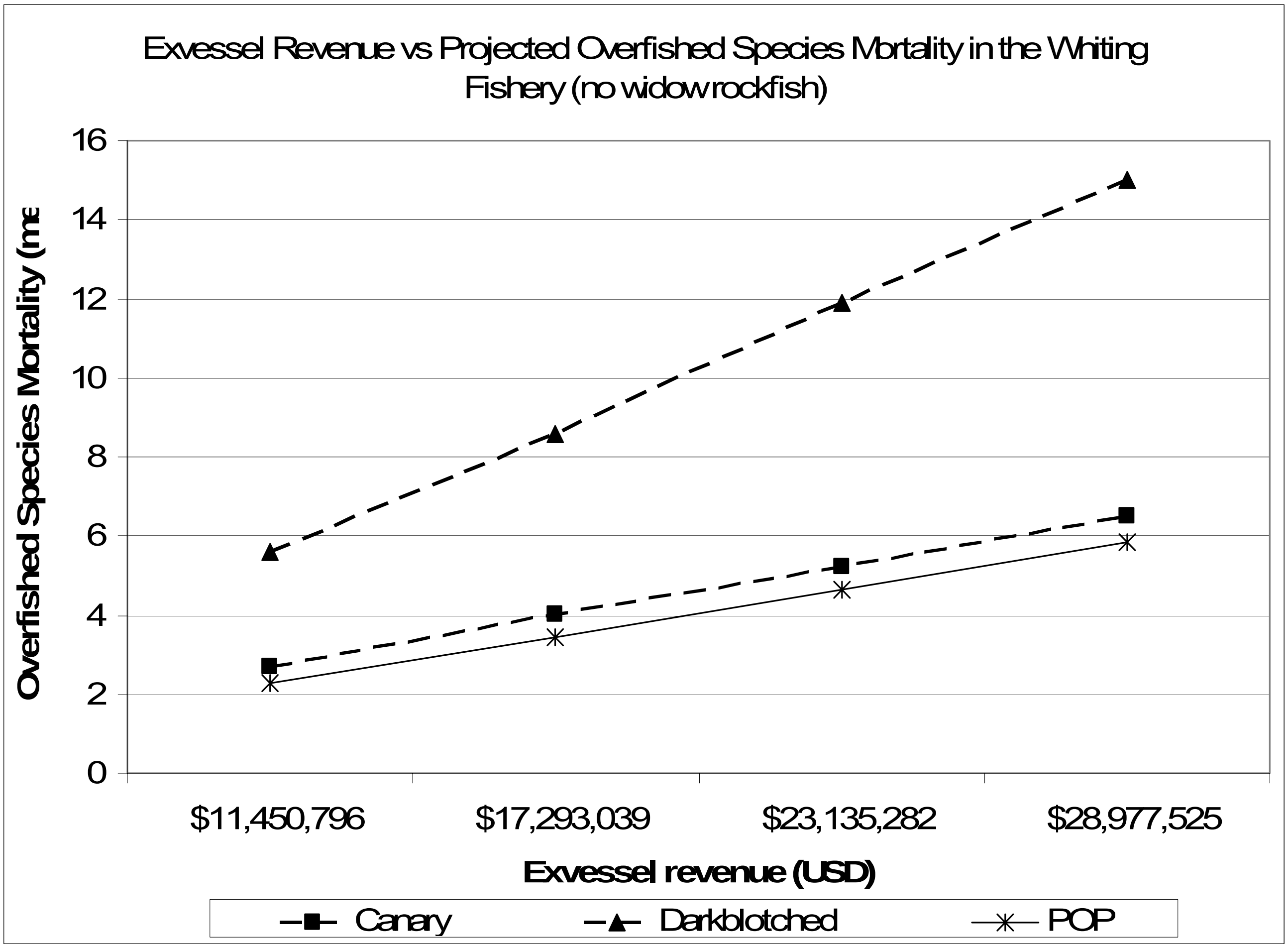

Figure A.2-2. Exvessel revenue vs. projected overfished species catch in the whiting fishery (no widow rockfish).

A.2.3.2 Revenue – Overfished Species Catch Tradeoffs in the Fixed Gear Sablefish Fishery

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

Figure A.2-3 shows the predicted relationship between overfished species mortality and exvessel revenue. Based on these predictions, yelloweye rockfish is the largest component of overfished species mortality in this sector, and a reduction of approximately 0.2 mt of yelloweye rockfish in this sector would correspond to a reduction of approximately $1.8 million in exvessel revenues (holding area closures constant), while a reduction of 0.1 mt of darkblotched would correspond to a reduction of $1.8 million in exvessel revenue.

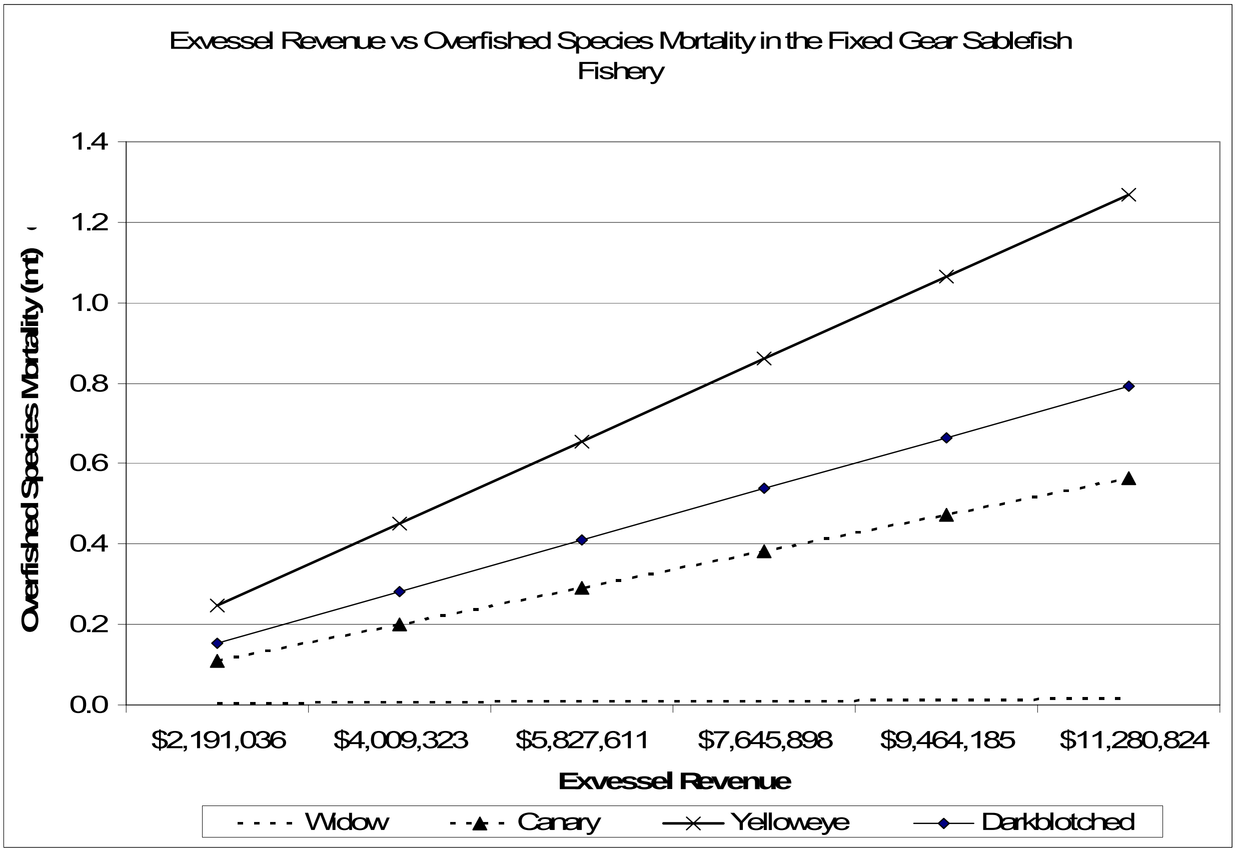

Figure A.2-3. Exvessel revenue vs. overfished species mortality in the fixed gear sablefish fishery.

A.2.3.3 Revenue – Overfished Species Catch Tradeoffs in the Nearshore Open Access Groundfish Fishery

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

Figure A.2-4 shows the relationship between exvessel value and the mortality of canary rockfish in areas south of 40˚ 10' N latitude. Based on West Coast groundfish observer data, canary rockfish is the only overfished species that is caught in this sector and region. The figure shows that a reduction in the catch of canary rockfish from 0.33 mt to 0.07 mt would cost approximately $400,000 (holding area closures constant), while a reduction in the catch of canary rockfish from 0.07 mt to 0.01 mt would cost over $1 million. However, over a range of values (approximately $1.3 million to $800,000) there is little or no reduction in the catch of canary rockfish. This is because over this revenue range, the approach taken to reduce the catch of overfished species is mostly being attributed to reductions in the catch of cabezon. Based on the depth range where cabezon is primarily caught, there is very little incidental catch of canary rockfish, and discard survival is high relative to deeper depths. Therefore, reducing the allowable cabezon catch in the area south of 40˚ 10’ N latitude may not be necessary to achieve reductions in overfished species mortality.

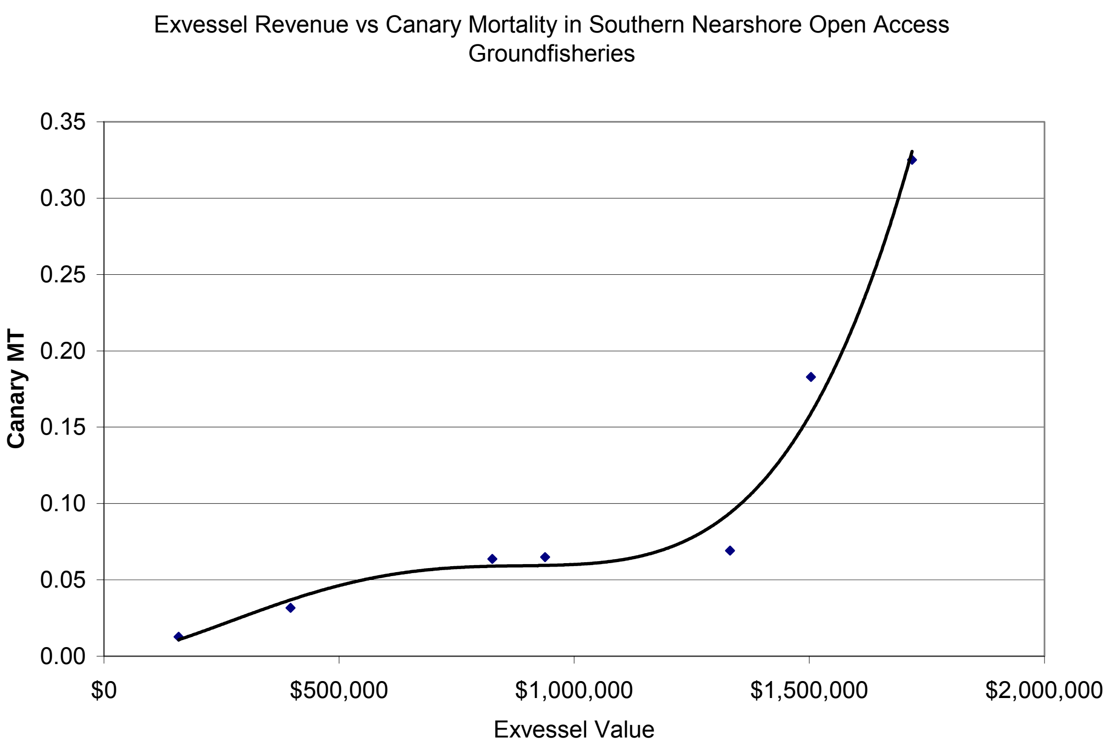

Figure A.2-4. Exvessel revenue vs. canary mortality in southern nearshore open access fisheries.

Figure A.2-5 shows the relationship between the catch of overfished species and exvessel revenue in areas north of 40˚ 10’ N latitude. This figure shows that yelloweye rockfish is the most frequently caught overfished species, followed by canary rockfish, and–although not shown on the figure–there are also small amounts of widow rockfish caught in the fishery. Information shown in this figure suggests that a reduction of yelloweye catch from 1.9 mt to 1 mt while holding area closures constant would decrease exvessel revenue by $400,000, while a reduction from 1 mt to 0.25 mt would decrease exvessel revenue by $500,000. A reduction in the catch of canary from 1.5 mt to 0.75 mt would decrease revenues by $400,000, and a reduction in the catch of canary from 0.75 mt to 0.25 mt would decrease exvessel revenues by approximately $500,000.

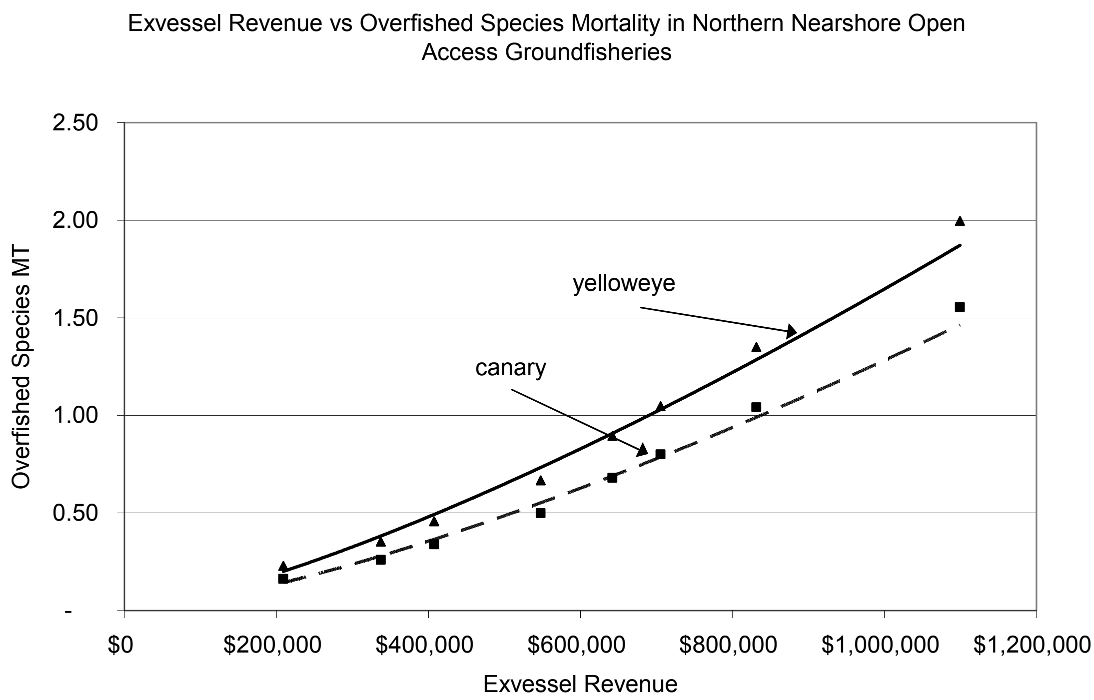

Figure A.2-5. Exvessel revenue vs. overfished species mortality in northern nearshore open access fisheries.

A.2.3.4 Revenue – Overfished Species Catch Tradeoffs in the LE Bottom Trawl Fishery

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

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

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

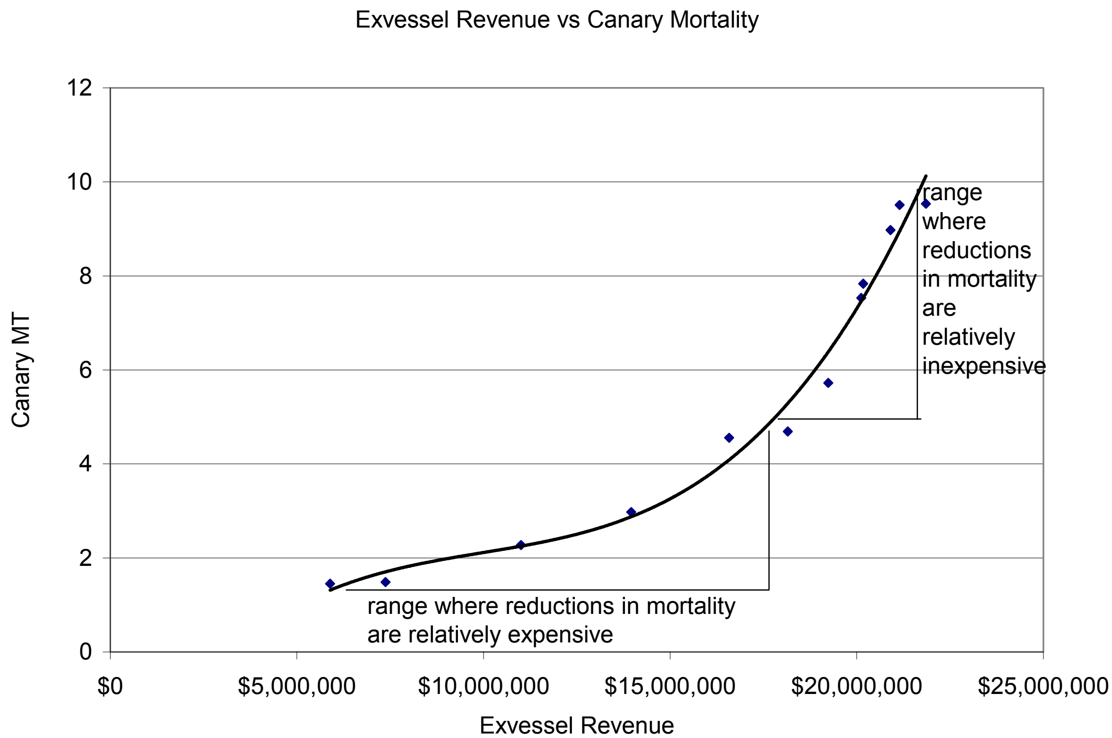

Figure A.2-6. Exvessel revenue vs. canary mortality in the LE bottom trawl sector.

Figure A.2-7 shows the relationship between POP and exvessel revenues. According to Figure A.2-7, reducing the catch of POP in the bottom trawl sector from 100 mt to 80 mt would decrease revenues by approximately $3 million, while a reduction from 45 mt to 25 mt would decrease revenues by approximately $7 million. This shows that initial reductions in the catch of POP in the bottom trawl fishery are relatively inexpensive per mt compared to the cost per mt of more dramatic reductions.

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

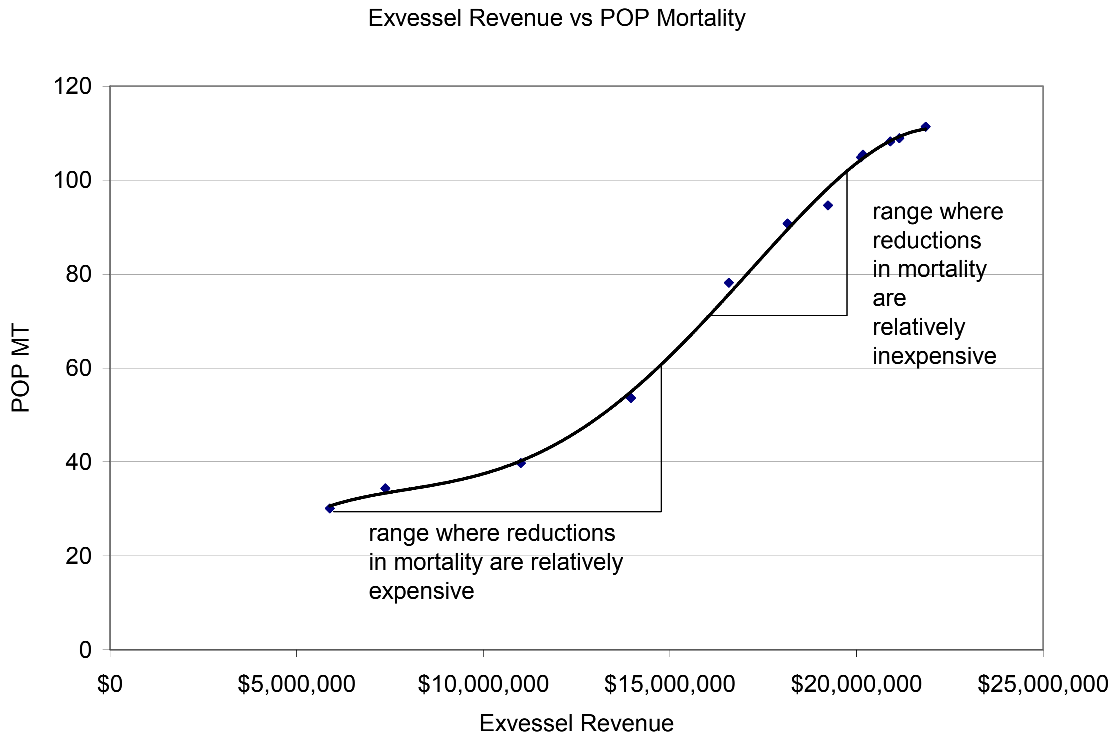

Figure A.2-7. Exvessel revenue vs. POP mortality in the LE bottom trawl sector.

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

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

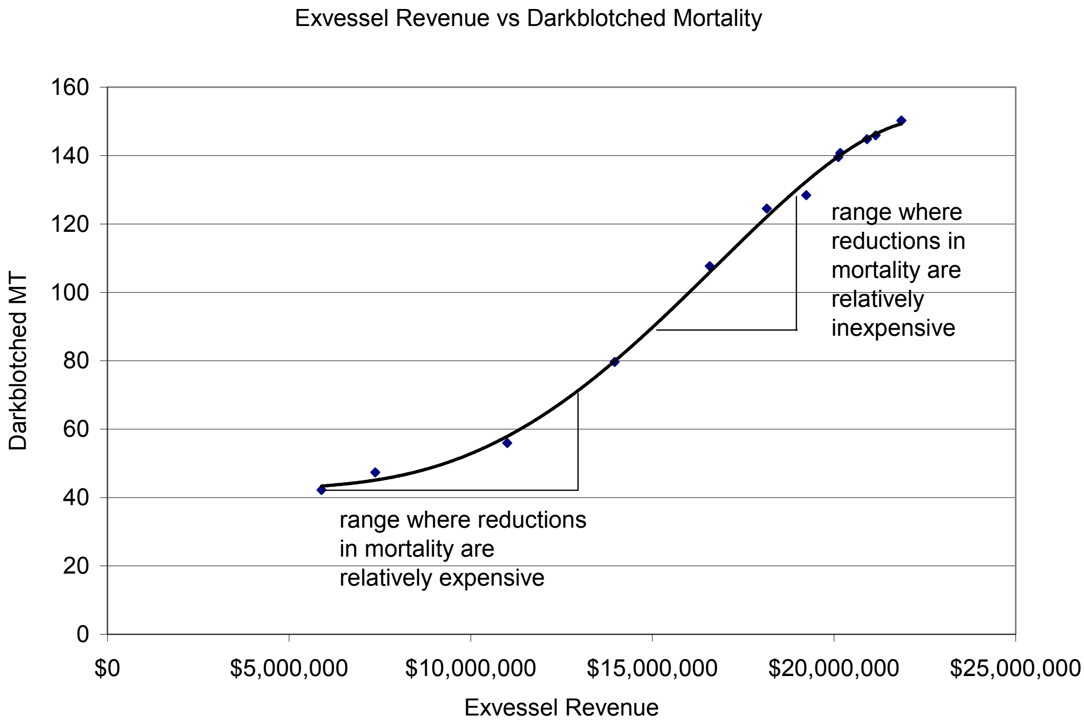

Figure A.2-8. Exvessel revenue vs. darkblotched rockfish mortality in the LE bottom trawl sector.

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

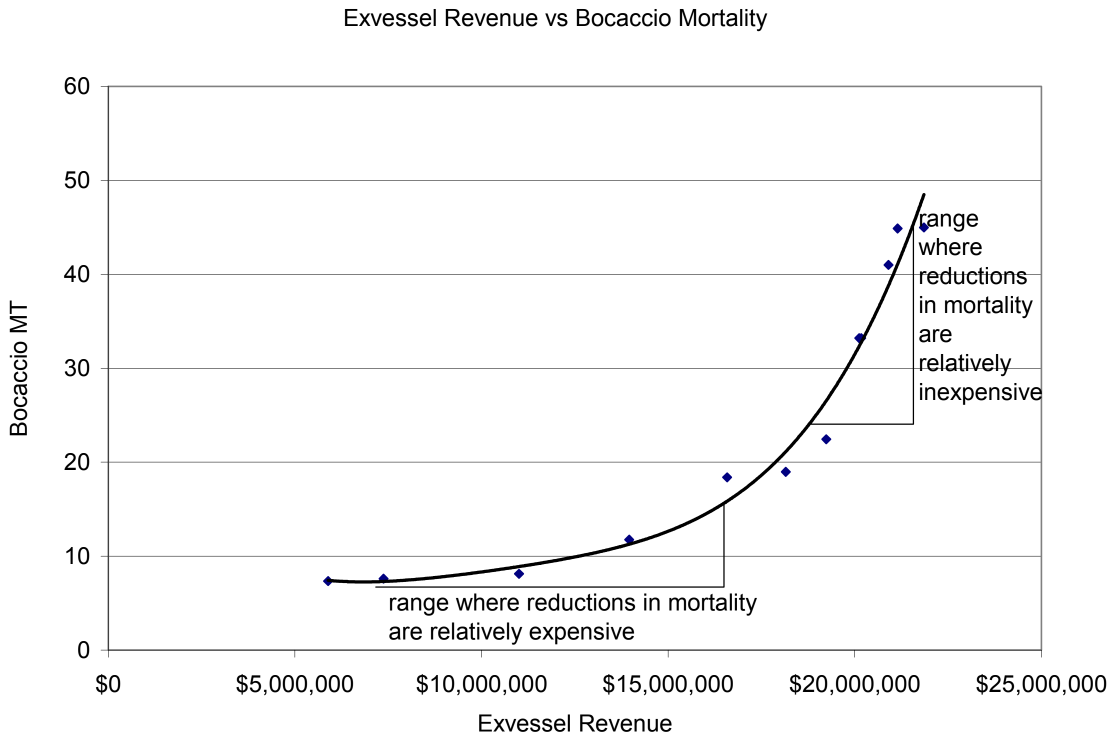

Figure A.2-9. Exvessel revenue vs. bocaccio mortality in the LE bottom trawl sector.

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

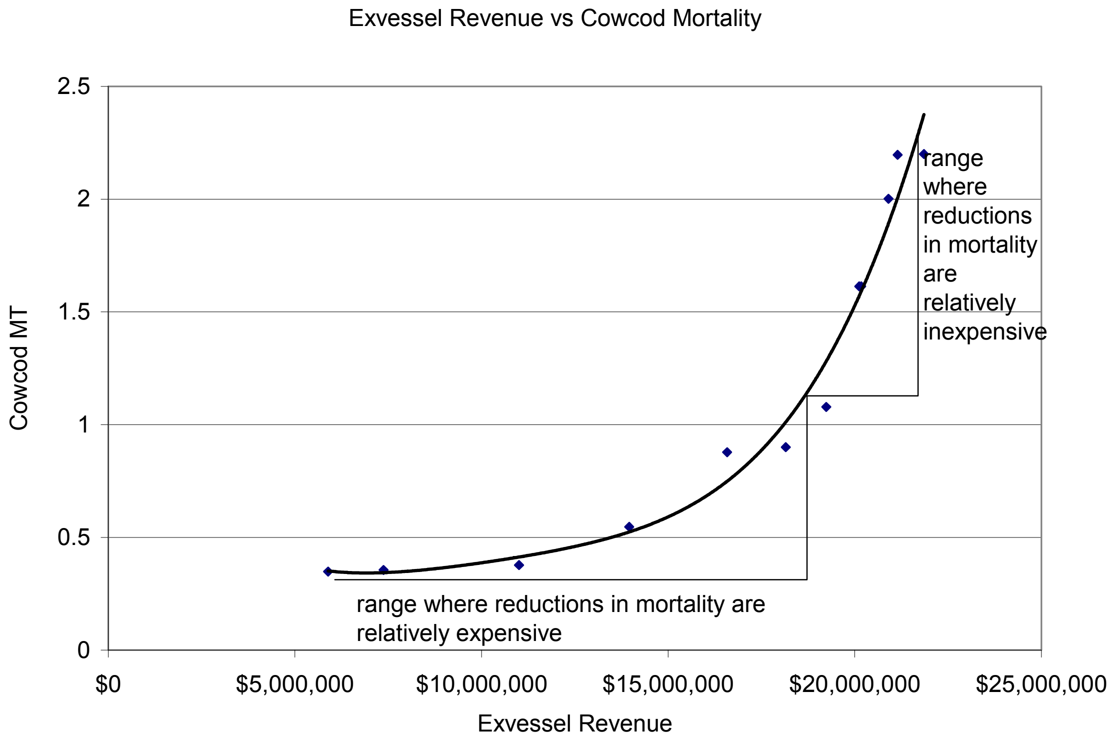

Figure A.2-10. Exvessel revenue vs. cowcod mortality in the LE bottom trawl sector.

Figure A.2-11 plots the mortality of all overfished species (in percentage terms) against exvessel revenue. In this case, the mortality of overfished species is normalized by estimating it as a percentage of initially predicted mortality in the 2006 fishery. The 100 percent mark is equivalent to predicted 2006 mortality. The difference between Figure A.2-11 and other figures is that mortality is expressed on a percentage basis and compared to exvessel revenues, thus making changes in the mortality of overfished species more comparable.

Based on the information shown in Figure A.2-11, percent reductions in the catch of darkblotched rockfish and POP are generally more costly than percent reductions in the catch of bocaccio rockfish and cowcod, while percent reductions in the catch of canary rockfish can be considered more moderate. The reason percent reductions in the catch of darkblotched and POP are more expensive than bocaccio, canary, and cowcod is because darkblotched and POP are caught in deep areas where more valuable species tend to be caught. Bocaccio rockfish and cowcod are caught largely on the shelf where less valuable flatfish are typically found. Canary rockfish on the other hand are primarily caught in the shelf areas, but small amounts of canary are also caught in deeper areas, thus making the value of a percent change in the catch of canary in-between the values of darkblotched and POP, versus bocaccio and cowcod. It is important to note that while some overfished species are caught together, many are not. Therefore, the information shown in Figure A.2-11 should not be misinterpreted to mean that reductions in the mortality across multiple overfished species need to happen simultaneously.

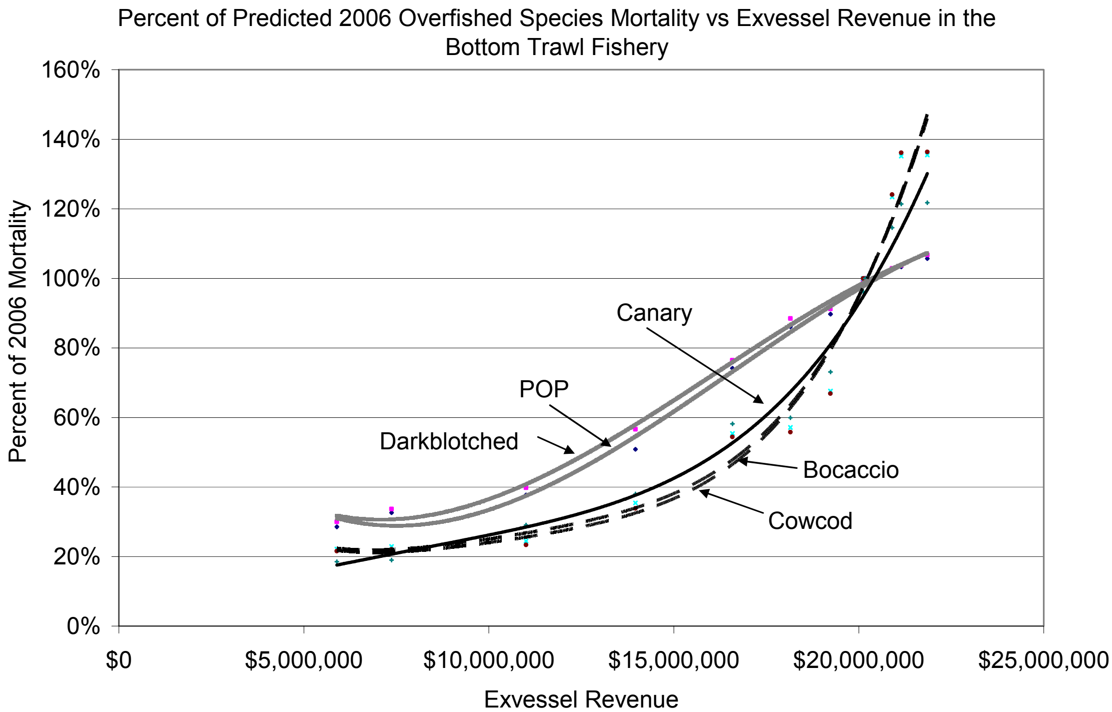

Figure A.2-11. Exvessel revenue vs. mortality for all overfished species in the LE bottom trawl sector.

A.2.4 Distributional Impacts of Changes in Overfished Species Catch in Commercial Groundfish Fisheries

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

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

Table A.2-1. Range where overfished species are currently caught in the commercial fishery.

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

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

Table A.2-2. Range where overfished species are potentially caught in the commercial fishery.

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

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

The following tables separate fishing sectors on a latitudinal basis and by the degree of impact on overfished species. We characterize each sector’s overfished species effects as having one of four different possible degrees-of-impact: high, medium-high (MH), medium-low (ML), and low or no impact. The degree of impact was assigned relative to the ABC, the 2006 OY, and the relative 2004 and 2005 catch of overfished species estimated to have been taken in each sector. Table A.2-3 shows the assigned level of impact criteria by region, sector, and overfished species. The criteria that were assigned are based partially on the catch of overfished species estimated to have been taken by sector in the 2004 and 2005 fisheries. If area boundaries and targeting opportunities were to be changed, these criteria may change as well. A blank cell means that sector has no, or low impact. While multiple cells are blank, it is important to note that does not necessarily mean a particular sector/area combination is ignored when it comes to reducing the catch of overfished species. In a relatively extreme case, sectors with a low impact may be constrained in addition to sectors with high, med-high, and med-low impacts. However, for the purposes of planning in the long term (one year or more), sectors with a low impact have not traditionally been subject to constraints to protect overfished species. Constraints on low impact fisheries have traditionally been limited to inseason actions.

Table A.2-3. Level of overfished species impact by region and groundfish sector.

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

Table A.2-4 and Table A.2-5 show the relationship between fishery sectors and ports. In these tables, a check-mark identifies a port as being engaged in a particular sector. From this information it is apparent that the sablefish sectors are present in the largest number of ports, and the dogfish sectors are present in the fewest number of ports. What is not contained in this type of information is the scale and relative degree of dependence that each port has on the particular sectors in which that port is engaged. However, if one defines a fishing community as a port, or as a port-sector combination, this information can be used to identify communities that are substantially engaged in commercial groundfish fisheries.

Table A.2-4. Port engagement in groundfish sectors in areas north of 40 Degrees 10 Minutes latitude.

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

Table A.2-5. Port Engagement in Groundfish Fisheries 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	ALBION								√	
	BODEGA BAY					√			√	
	FORT BRAGG	√	√			√			√	√
	POINT ARENA								√	
	POINT REYES									√
	SHELTER COVE								√	
36 - 38	BIG CREEK								√	
	BODEGA BAY									√
	ELK									√
	MONTEREY	√	√			√			√	√
	MOSS LANDING	√	√			√			√	√
	PRINCETON / HALF MOON BAY	√	√			√			√	√
	SAN FRANCISCO	√	√		√	√			√	√
	SANTA CRUZ								√	
	SANTA CRUZ									√
S 36	AVILA					√			√	
	BERKELEY								√	
	DANA POINT					√				
	LONG BEACH					√				
	MISSION BAY					√				√
	MORRO BAY	√	√			√			√	√
	NEWPORT BEACH					√				
	OCEANSIDE					√				√
	OXNARD				√	√			√	√
	PLAYA DEL REY					√				
	POINT LOMA									√
	SAN DIEGO								√	√
	SAN PEDRO								√	
	SAN SIMEON								√	
	SANTA BARBARA				√				√	
	TERMINAL ISLAND					√				√
	VENTURA								√	√
	WILMINGTON				√					

Through the association of fishing sectors, management to achieve reductions in the catch of overfished species, and port of landing for vessels engaged in various fishing sectors, we can identify which ports would likely be affected by management designed to achieve reductions in the catch of certain overfished species. Table A.2-6 associates regional fishing sectors with greater than a “low/no” impact to identify ports potentially affected if reductions in the catch of overfished species are necessary. This information shows that canary rockfish would potentially affect the largest number of ports, followed by bocaccio, yelloweye, cowcod, darkblotched, POP, and widow rockfish, respectively. This table also shows that many ports in the north are potentially affected by up to five overfished species, while ports in the south are affected by two or three overfished species. Individual overfished species also have different regional impacts. For example, while cowcod and bocaccio may not impact the largest number of ports, they potentially affect all commercial groundfish ports south of 38˚ N latitude.

Table A.2-6. Ports potentially impacted by reductions in overfished species catch.

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

Each sector/region combination has a different level of impact on overfished species, and therefore, a different likelihood that sector would be impacted by management if reductions in the catch of overfished species are necessary. Table A.2-7 through Table A.2-10 shows the relative likelihood that a particular area/sector/port combination would need to be restricted in order to achieve reductions in the aggregate catch of overfished species. Blank cells indicate a low/no likelihood that a particular area/sector/port combination would need to be restricted to achieve reductions in the aggregate catch of overfished species.

Table A.2-7. Relative likelihood of LE trawl ports being affected by management to reduce overfished species catch.

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

Table A.2-8. Relative likelihood of LE fixed gear ports being affected by management to reduce overfished species catch.

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

Table A.2-9. Relative likelihood of OA fixed gear ports north of 40˚10' N latitude being affected by management to reduce overfished species catch.

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

Table A.2-10. Relative likelihood of OA fixed gear ports south of 40˚10' N latitude being affected by management to reduce overfished species catch.

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

A.2.5 Summary

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

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

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

A.3 COMMERCIAL FISHERIES INFORMATION GENERATED FROM PACFIN DATA

Table A.3-1. Revenue description by port, 2005.

State	Port	Total 2005 Revenue	Revenue as a share of coastwide revenue	Groundfish 2005 Revenue	Groundfish as a share of total fish revenue	Groundfish as a share of coastwide groundfish revenue
WASHINGTON						
	Anacortes	$1,940,597	0.9%			
	Bellingham Bay	$9,941,236	4.5%	$5,496,688	55.3%	10.6%
	Blaine	$2,170,655	1.0%	$802,825	37.0%	1.6%
	Everett	$766,347	0.3%	$572,328	74.7%	1.1%
	Friday Harbor	$72,068				
	Grays Harbor	*	*			
	Ilwaco/Chinook	$10,850,699	4.9%	$1,592,112	14.7%	3.1%
	La Conner	$295,191	0.1%			
	La Push	*	*	*	*	*
	Neah Bay	$945,646	0.4%	$606,119	64.1%	1.2%
	Olympia	*				
	Other North Puget Sound	$84,377				
	Other or Unknown WA	*				
	Other South Puget Sound	*				
	Other WA Coast	*				
	Port Angeles	$777,805	0.4%	$363,198	46.7%	0.7%
	Port Townsend	$467,135	0.2%	$1,364	0.3%	
	Seattle	$1,164,059	0.5%	$186,292	16.0%	0.4%
	Sequim	*				
	Shelton	*				
	Tacoma	$259,860	0.1%			
	Westport	$32,151,049	14.6%	$4,647,440	14.5%	9.0%
	Willapa Bay	$3,348,827	1.5%	$1,358		
OREGON						
	Astoria	$29,501,208	13.4%	$9,415,241	31.9%	18.2%
	Bandon	*	*	*	*	*

State	Port	Total Revenue 2005	Revenue as a share of coastwide revenue	Groundfish Revenue 2005	Groundfish as a share of total fish revenue	Groundfish as a share of coastwide groundfish revenue
	Brookings	$3,265,357	1.5%	$906,223	27.8%	1.8%
	Cannon Beach	*				
	Coos Bay	$17,141,932	7.8%	$4,218,087	24.6%	8.1%
	Depoe Bay	$105,813		$4,041	3.8%	
	Florence	$71,210				
	Gearhart - Seaside	*				
	Gold Beach	*	*	*	*	*
	Nehalem Bay	*			0.0%	
	Newport	$24,314,506	11.1%	$8,728,721	35.9%	16.9%
	Other Columbia River	$330,590	0.2%	$19,184	5.8%	
	Pacific City	$90,362		$47,964	53.1%	0.1%
	Port Orford	$2,503,640	1.1%	$1,023,236	40.9%	2.0%
	Pseudo Port Code for Columbia River	$1,880,055	0.9%			
	Tillamook/Garibaldi	$3,331,220	1.5%	$76,404	2.3%	0.1%
	Waldport	$13,654				
	Winchester Bay	$1,461,926	0.7%	$27,462	1.9%	0.1%
	Yachats	*				
CALIFORNIA						
	Alameda	*				
	Albion	*	*	*	*	*
	Avila	$555,741	0.3%	$390,150	70.2%	0.8%
	Berkeley	$69,119		$12,350	17.9%	
	Bodega Bay	$2,232,296	1.0%	$63,415	2.8%	0.1%
	Crescent City	$6,121,760	2.8%	$1,163,482	19.0%	2.2%
	Dana Point	$828,200	0.4%	$60,559	7.3%	0.1%
	Eureka	$4,865,220	2.2%	$2,566,598	52.8%	5.0%
	Fort Bragg	$4,943,778	2.3%	$2,008,275	40.6%	3.9%
	Long Beach	$443,823	0.2%	$8,117	1.8%	
	Monterey	$1,057,724	0.5%	$178,626	16.9%	0.3%
	Morro Bay	$1,799,325	0.8%	$868,220	48.3%	1.7%
	Moss Landing	$4,035,353	1.8%	$928,340	23.0%	1.8%
	Newport Beach	$260,829	0.1%	$108,500	41.6%	0.2%
	Oakland	*				

State	Port	Total Revenue 2005	Revenue as a share of coastwide revenue	Groundfish Revenue 2005	Groundfish as a share of total fish revenue	Groundfish as a share of coastwide groundfish revenue
	Oceanside	$807,963	0.4%	$233,281	28.9%	0.5%
	Other Humboldt County	$48,518		$6,502	13.4%	
	Other LA and Orange County	$839,092	0.4%	$443,034	52.8%	0.9%
	Other Mendocino County	$15,158		$1,835	12.1%	
	Other or Unknown California	$23,674		$364	1.5%	
	Other San Diego County	$1,212,387	0.6%	$264,043	21.8%	0.5%
	Other San Luis Obispo	*	*	*	*	*
	Other Santa Barbara and Ventura	*				
	Other Santa Cruz and Monterey	$29,670		$29,670	100.0%	0.1%
	Other SF Bay and San Mateo	$173,979	0.1%	$2,868	1.6%	
	Other Sonoma and Marin	$127,311	0.1%	$9,215	7.2%	
	Oxnard	$2,204,775	1.0%	$279,976	12.7%	0.5%
	Point Arena	$312,509	0.1%	$57,045	18.3%	0.1%
	Point Reyes	*				
	Port Hueneme	$5,653,285	2.6%	$77		
	Princeton/Half Moon Bay	$3,551,856	1.6%	$819,297	23.1%	1.6%
	Richmond	$25,318				
	San Diego	$766,907	0.3%	$47,966	6.3%	0.1%
	San Francisco	$4,427,387	2.0%	$1,486,200	33.6%	2.9%
	San Pedro	$5,325,844	2.4%	$22,354	0.4%	
	Santa Barbara	$4,067,231	1.9%	$124,504	3.1%	0.2%
	Santa Cruz	$1,020,599	0.5%	$80,049	7.8%	0.2%
	Sausalito	$42,417				
	Terminal Island	$4,756,695	2.2%	$127,784	2.7%	0.2%
	Tomales Bay	*				
	Trinidad	$985,034	0.4%	$26,307	2.7%	0.1%
	Ventura	$4,623,809	2.1%	$8,190	0.2%	
	Willmington	$59,164		$36,597	61.9%	0.1%
	Total Coastwide Revenue	**$219,500,864**		**$51,769,085**		

Note: An asterix(*) indicates confidential data.

Table A.3-2. Exvessel revenue in $1,000s by port and sector for 2003–05 and five-year average.

		Non-whiting Grd Trawl				Fixed-Gear				Whiting Trawl				Total Groundfish Revenue			
State	Port Name	2003	2004	2005	2000-04 Avg	2003	2004	2005	2000-04 Avg	2003	2004	2005	2000-04 Avg	2003	2004	2005	2000-04 Avg
WASHINGTON																	
	BELLINGHAM BAY	$2,419	$2,513	$1,416	$2,510	$4,288	$4,439	$4,080	$4,426					$6,707	$6,952	$5,497	$6,936
	BLAINE	$1,345	$1,527	$803	$1,461						$23		$22	$1,345	$1,550	$803	$1,478
	COPALIS BEACH								$1					$0			$1
	EVERETT					$327	$462	$572	$276					$327	$462	$572	$276
	GRAYS HARBOR		*		*	*	*		*					*	*		*
	ILWACO/CHINOOK				$201	$682	$168	$619	$225	$247	$277	$973	$186	$929	$445	$1,592	$717
	LA CONNER								$29								$29
	LA PUSH					*	*	*	*					*	*	*	*
	NEAH BAY	$1,032	$385	$491	$706	$438	$254	$115	$153					$1,471	$638	$606	$859
	OTHER OR UNKNOWN WASHI				*				*								*
	PORT ANGELES		$226	$97	$494	$103	$336	$266	$504					$103	$562	$363	$899
	PORT TOWNSEND				$6	$55		$1	$23					$55		$1	$25
	SEATTLE				$20	$278		$186	$398					$278		$186	$407
	WESTPORT	$414	$440	$366	$568	$1,097	$825	$1,046	$734	$1,167	$1,899	$3,235	$1,506	$2,679	$3,165	$4,647	$4,313
	WILLAPA BAY					$5	$6	$1	$4					$5	$6	$1	$4
OREGON																	
	ASTORIA	$5,660	$6,113	$6,021	$6,445	$952	$820	$1,225	$1,243	$1,559	$1,395	$2,169	$1,918	$8,172	$8,328	$9,415	$11,524
	BANDON					*	*	*	*					*	*	*	*
	BROOKINGS	$1,241	$581	$739	$1,115	$222	$156	$167	$162				$2	$1,463	$737	$906	$1,278
	COOS BAY	$3,760	$2,816	$2,395	$3,804	$1,014	$987	$1,406	$953	$212	$354	$416	$202	$4,986	$4,157	$4,218	$5,160
	DEPOE BAY					$7	$8	$4	$14					$7	$8	$4	$14
	FLORENCE	$23	$16		$18	$192	$1		$191					$215	$17		$209
	GOLD BEACH					*	*	*	*					*	*	*	*
	NEWPORT	$2,916	$2,550	$2,034	$3,236	$1,968	$2,159	$1,868	$1,829	$2,184	$3,284	$4,827	$2,759	$7,068	$7,993	$8,729	$10,582
	OTHER COLUMBIA RIVER P							$19								$19	
	PACIFIC CITY					$47	$48	$48	$37					$47	$48	$48	$37
	PORT ORFORD					$965	$925	$1,023	$1,092					$965	$925	$1,023	$1,092
	TILLAMOOK/GARIBALDI	$93	$53	$9	$120	$161	$146	$67	$122					$254	$200	$76	$242
	WINCHESTER BAY			$2	$1	$89	$4	$25	$81					$89	$4	$27	$81
CALIFORNIA																	
	ALBION					$24	$36	$18	$31					$24	$36	$18	$31
	AVILA	$890	$522	$8	$698	$352	$470	$382	$372					$1,242	$992	$390	$1,070
	BERKELEY				$13	$9	$8	$12	$15					$9	$8	$12	$21
	BODEGA BAY	$286	$29		$259	$47	$96	$63	$119					$333	$125	$63	$378
	CRESCENT CITY	$1,160	$473	$699	$1,370	$707	$469	$464	$622	$3	$155		$215	$1,870	$1,096	$1,163	$2,337
	DANA POINT					$211	$357	$61	$164					$211	$357	$61	$164
	EUREKA	$2,597	$1,987	$1,929	$2,461	$451	$331	$276	$493	$176	$536	$362	$234	$3,224	$2,854	$2,567	$3,421
	FIELDS LANDING				*	*			*				*	*			*
	FORT BRAGG	$1,650	$1,458	$1,390	$2,075	$836	$939	$618	$908					$2,486	$2,397	$2,008	$2,983
	LONG BEACH					$105	$35	$8	$70					$105	$35	$8	$70
	MONTEREY	$275	$325	$96	$363	$147	$155	$82	$269				$0	$422	$480	$179	$633
	MORRO BAY	$144	$562	$467	$244	$621	$560	$402	$681					$764	$1,121	$868	$925

MOSS LANDING	$993	$837	$566	$859	$1,016	$612	$358	$948	$2,009	$1,448	$928	$1,807
NEWPORT BEACH					$306	$199	$109	$254	$306	$199	$109	$254
OAKLAND								*				*
OCEANSIDE	$1			$2	$411	$108	$233	$322	$412	$108	$233	$323
OTHER DEL NORTE COUNTY						*		*		*		*
OTHER HUMBOLDT COUNTY				$3	$15	$15	$7	$20	$15	$15	$7	$20
OTHER LA AND ORANGE CNTY					$241	$385	$443	$200	$241	$385	$443	$200
OTHER MENDOCINO COUNTY	$9			$4		$4	$2	$2	$10	$4	$2	$5
OTHER OR UNKNOWN CALIF								$1				$1
OTHER S. F. BAY AND SA	$9	$1	$3	$6				$5	$9	$1	$3	$11
OTHER SAN DIEGO COUNTY					$270	$307	$264	$235	$270	$307	$264	$235
OTHER SAN LUIS OBISPO				*	*	*	*	*	*	*	*	*
OTHER SANTA BARBARA AN					*	*		*	*	*		*
OTHER SANTA CRUZ AND M					$30	$42	$30	$50	$30	$42	$30	$50
OTHER SONOMA AND MARIN		$2	$1	$1	$9	$15	$8	$12	$9	$17	$9	$13
OXNARD			$1	$12	$357	$418	$279	$527	$358	$418	$280	$537
POINT ARENA					$34	$92	$57	$68	$34	$92	$57	$68
POINT REYES				*	*	*		*	*	*		*
PORT HUENEME	$55			$107		$3		$2	$55	$3		$66
PRINCETON / HALF MOON	$715	$675	$722	$856	$127	$93	$98	$138	$842	$768	$819	$994
RICHMOND					$3			$2	$3			$2
SAN DIEGO				$3	$102	$82	$48	$169	$102	$82	$48	$170
SAN FRANCISCO	$1,153	$1,600	$1,298	$1,387	$296	$363	$188	$439	$1,449	$1,964	$1,486	$1,826
SAN PEDRO					$27	$32	$22	$41	$28	$32	$22	$41
SANTA BARBARA	$90	$13	$0	$117	$269	$203	$124	$403	$359	$216	$125	$520
SANTA CRUZ	$19	$38	$54	$52	$60	$54	$26	$63	$80	$92	$80	$116
SAUSALITO								$1				$1
TERMINAL ISLAND				$6	$97	$171	$128	$156	$97	$171	$128	$160
TOMALES BAY				*	*			*				*
TRINIDAD				$0	$10	$11	$26	$18	$10	$11	$26	$18
VENTURA	$73	$6	$1	$68	$71	$104	$7	$100	$144	$110	$8	$168
WILLMINGTON					$36	$50	$37	$44	$36	$50	$37	$44

Note: An asterix (*) indicates confidential data.

Table A.3-3. Total vessels by port, 2003–05 and five-year average.

State	Port	2003	2004	2005	2000-2004 Average
WASHINGTON					
	Anacortes	119	109	107	113
	Bellingham Bay	303	272	232	326
	Blaine	180	156	101	191
	Copalis Beach	1	0	0	10
	Everett	41	69	47	81
	Friday Harbor	25	25	14	18
	Grays Harbor	38	21	27	39
	Ilwaco/Chinook	339	243	169	269
	La Conner	84	78	76	62
	La Push	32	30	35	29
	Neah Bay	82	61	60	40
	Olympia	3	0	2	2
	Oth No Puget Snd ports	47	45	16	33
	Oth So Puget Snd ports	23	17	5	14
	Oth WA coastal ports	11	10	10	16
	Other Col R ports	68	118	75	79
	Other/unknown WA	1	0	17	14
	Port Angeles	56	58	82	83
	Pt Townsend	46	45	45	49
	Seattle	158	146	114	177
	Sequim	18	9	11	15
	Shelton	3	2	7	4
	Tacoma	53	44	32	52
	Westport	323	312	269	307
	Willapa Bay	128	131	104	130
OREGON					
	Astoria	251	248	269	269
	Bandon	15	13	10	16
	Brookings	93	116	102	107
	Cannon Beach	3	2	4	3
	Coos Bay	357	430	392	316
	Depoe Bay	20	25	18	22
	Florence	56	30	18	47
	Gearhart/Seaside	0	4	5	2
	Gold Beach	37	32	40	43
	Nehalem Bay	3	2	2	3
	Netarts Bay	0	0	0	0
	Newport	400	447	451	397
	Pacific City	31	34	31	28
	Port Orford	72	79	80	78
	Pseudo port code for Col R	208	199	190	193
	Salmon River	0	0	0	0
	Siletz Bay	0	0	0	0
	Tillamook/Garibaldi	121	141	166	110
	Waldport	7	9	7	7
	Winchester Bay	70	74	75	61
	Yachats	0	1	1	0
CALIFORNIA					
	Alameda	3	6	4	14
	Albion	24	11	11	24
	Avila	114	100	63	118

Berkeley	27	23	27	36
Bodega Bay	267	284	234	284
Crescent City	155	168	134	170
Dana Point	67	60	52	57
Eureka	164	159	101	167
Fields Landing	21	6	9	27
Fort Bragg	297	294	257	264
Long Beach	19	15	12	23
Monterey	120	93	78	122
Morro Bay	155	117	111	184
Moss Landing	196	203	220	250
Newport Beach	25	26	19	28
Oakland	4	3	1	5
Oceanside	77	32	35	56
Oth Del Norte cnty ports	0	10	0	3
Oth Humboldt cnty ports	22	35	20	21
Oth Marin/Sonoma outer coast ports	43	52	30	43
Oth Mendocino cnty ports	21	8	9	14
Oth Monterey/Sta Cruz cnty ports	14	13	9	18
Oth Orange/LA cnty ports	93	90	78	92
Oth San Diego cnty ports	97	97	60	97
Oth San Luis Obispo cnty ports	9	4	2	13
Oth SFBay/San Mateo cnty ports	33	29	24	41
Oth Ventura/Sta Barbara cnty ports	5	8	1	5
Other/unknown CA ports	10	12	8	12
Oxnard	95	103	89	112
Point Arena	40	33	20	41
Point Reyes	12	18	20	21
Port Hueneme	46	56	41	55
Princeton	142	255	218	244
Richmond	27	19	9	17
San Diego	91	85	59	112
San Francisco	281	352	282	323
San Pedro	160	157	116	188
Santa Barbara	184	178	153	205
Santa Cruz	101	110	120	123
Sausalito	40	36	24	80
Terminal Island	159	161	116	190
Tomales Bay	5	5	2	4
Trinidad	25	27	22	28
Ventura	105	114	61	112
Willmington	8	8	13	6

Table A.3-4. Vessels by port and sector for 2003–05 and five-year average.

		Non-Whiting Groundfish Trawl				Fixed Gear - Sablefish				Fixed Gear - Pot and H&L Rockfish and Lingcod				Whiting Trawl			
State	**Port**	**2003**	**2004**	**2005**	**2000-04 Avg**	**2003**	**2004**	**2005**	**2000-04 Avg**	**2003**	**2004**	**2005**	**2000-04 Avg**	**2003**	**2004**	**2005**	**2000-04 Avg**
WASHINGTON																	
	Anacortes																
	Bellingham Bay	12	10	6	13	29	35	24	34	20	12	11	20				
	Blaine	9	7	4	10								0		1		
	Copalis Beach												0				
	Everett					1	4	3	2	2	2	4	1				
	Friday Harbor																
	Grays Harbor		1		0	4	1		3								
	Ilwaco/Chinook				2	33	19	31	21	2	3	5	3	3	1	3	2
	La Conner								0				0				
	La Push					14	16	20	14				3				
	Neah Bay	8	6	8	9	17	13	11	7	4	2	4	2				
	Olympia																
	Other Col R ports							1									
	Oth No Puget Snd ports																
	Oth So Puget Snd ports																
	Oth WA coastal ports																
	Other/unknown WA				0				1								
	Port Angeles		6	5	6	8	14	26	24		3	5	11				
	Pt Townsend				1	5		1	1				0				
	Seattle				1	6		2	5				1				
	Sequim																
	Shelton																
	Tacoma																
	Westport	6	5	3	7	49	35	23	32			1	1	5	6	8	6
	Willapa Bay					4	3	1	3			1	0				
OREGON																	
	Astoria	38	28	29	36	41	35	35	38	3	3	4	4	10	6	5	10
	Bandon					3	1		1	1	3	6	3				
	Brookings	13	8	7	10	8	3	3	3	31	35	24	37				
	Cannon Beach																
	Coos Bay	27	19	20	25	27	23	37	25	6	8	39	17	3	3	2	3

Depoe Bay								1	6	4	3	6				
Florence	1	1		1	4			4		1		1				
Gearhart/Seaside																
Gold Beach					2		1	1	33	26	30	37				
Nehalem Bay																
Newport	25	24	23	29	45	48	33	40	11	9	6	15	13	13	12	12
Pacific City									18	23	22	20				
Port Orford					33	23	28	21	47	50	47	55				
Salmon River																
Tillamook/Garibaldi	2	3	1	3	7	9	8	4	28	19	18	20				
Winchester Bay			1	0	6	1	4	5			2	2				
CALIFORNIA																
Alameda												1				
Albion				0	1			0	11	5	4	8				
Avila	16	8	2	12	1	1	1	1	72	57	39	65				
Berkeley				1		1		1	3	3	7	8				
Bodega Bay	5	2		5	2		1	2	17	19	10	28				
Crescent City	19	3	5	16	9	6	7	10	29	28	27	39	1	1		1
Dana Point					3	8	1	5	22	21	15	19				
Eureka	27	14	14	23	24	14	16	20	7	6	3	16	2	3	3	3
Fields Landing				5	1			2				1				1
Fort Bragg	14	10	10	17	36	35	31	39	32	30	20	42				
Long Beach					1			1	3	4	2	5				
Monterey	5	2	2	4	13	4	1	6	20	16	14	31				
Morro Bay	9	11	8	11	4	2	1	3	75	42	46	74				
Moss Landing	15	15	13	14	38	27	25	33	25	25	18	42			1	
Newport Beach					5	5	5	5	10	11	10	13				
Oakland				0					1			0				
Oceanside	1			1	14		3	7	25	11	14	17				
Oth Del Norte cnty ports										5		3				
Oth Humboldt cnty ports				0				0	7	5	6	7				
Oth Marin/Sonoma outer coast ports	1	1	1	1		1	1	0	4	5	4	5				
Oth Mendocino cnty ports	2			1		2	2	1	2	1	1	1				
Oth Monterey/Sta Cruz cnty ports									13	11	9	16				

Oth Orange/LA cnty ports					3	10	3	7	18	24	20	22
Oth San Diego cnty ports					6	6	3	4	20	25	12	26
Oth San Luis Obispo cnty ports				0					4	3	1	10
Oth SFBay/San Mateo cnty ports	3	2	2	3				0	1			3
Oth Ventura/Sta Barbara cnty ports									2	4		2
Other/unknown CA ports											1	0
Oxnard	2		1	3	4	6	6	5	25	26	24	40
Point Arena								0	7	5	4	11
Point Reyes					2	2		1		1		0
Port Hueneme	3			2						1	1	2
Princeton	12	13	11	13	6	4	4	7	20	18	19	36
Richmond								0	2			2
San Diego				0	3	1		3	7	8	5	17
San Francisco	12	10	16	17	15	14	3	13	16	13	10	25
San Pedro	2			1		1		1	17	11	7	19
Santa Barbara	16	5	1	12					46	34	25	57
Santa Cruz	6	3	3	5	9	3	4	9	21	25	17	21
Sausalito												0
Terminal Island	2			2	6	5	3	4	20	21	14	26
Tomales Bay				0					1			0
Trinidad		1		0					3	5	5	7
Ventura	14	3	1	10	1	1		1	10	13	3	19
Willmington									1	2	3	2

Table A.3-5. Number of dealers by port for 2003–05 and five-year average.

State	Port	2003	2004	2005	2000-2004 Average
WASHINGTON					
	Anacortes	17	17	19	17
	Blaine	13	11	11	10
	Bodega Bay	85	80	53	79
	Brookings	33	26	20	27
	Copalis Beach	1			1
	Everett	13	13	8	11
	Friday Harbor	9	8	6	7
	Gearhart/Seaside		3	4	2
	Grays Harbor	5	3	2	5
	Ilwaco/Chinook	26	16	16	20
	La Conner	8	6	6	7
	La Push	3	3	2	3
	Neah Bay	5	6	6	5
	Oth No Puget Snd ports	10	8	9	9
	Oth So Puget Snd ports	4	4	2	4
	Oth WA coastal ports	4	3	3	4
	Other/unknown WA	1		3	2
	Other Col R ports	18	15	16	16
	Port Angeles	6	6	5	7
	Seattle	34	22	22	30
	Sequim	3	2	4	4
	Shelton	1	1	2	2
	Tacoma	14	15	10	16
	Westport	49	48	45	39
	Willapa Bay	22	16	15	19
OREGON					
	Astoria	29	37	26	29
	Bandon	10	8	3	11
	Bellingham Bay	38	42	34	34
	Cannon Beach	3	2	3	3
	Coos Bay	50	45	40	46
	Depoe Bay	11	18	15	13
	Florence	24	16	14	20
	Gold Beach	9	6	4	8
	Nehalem Bay	1	1	1	2
	Netarts Bay				
	Newport	90	67	69	73
	Port Orford	13	15	12	12
	Pseudo port code for Col R	32	28	24	26
	Siletz Bay				
	Tillamook/Garibaldi	29	26	27	31
	Waldport	7	7	5	7
	Winchester Bay	26	27	23	25
	Yachats		1	1	
CALIFORNIA					
	Alameda	3	4	4	7
	Albion	8	6	5	9
	Avila	22	28	16	27
	Berkeley	23	22	21	27
	Crescent City	30	31	20	32
	Dana Point	26	26	25	27
	Eureka	35	33	21	36

Fields Landing	1	4	1	3
Fort Bragg	55	45	42	47
Long Beach	15	17	9	18
Monterey	27	23	18	25
Morro Bay	44	45	44	54
Moss Landing	50	49	37	55
Newport Beach	20	21	16	23
Oakland	4	3	1	6
Oceanside	20	14	14	21
Olympia	2		2	2
Oth Del Norte cnty ports		7		2
Oth Humboldt cnty ports	21	20	16	15
Oth Marin/Sonoma outer coast ports	23	23	16	22
Oth Mendocino cnty ports	15	8	6	9
Oth Monterey/Sta Cruz cnty ports	8	10	6	9
Oth Orange/LA cnty ports	43	40	34	46
Oth San Diego cnty ports	46	44	32	43
Oth San Luis Obispo cnty ports	6	2	2	6
Oth SFBay/San Mateo cnty ports	27	23	17	27
Other/unknown CA ports	7	8	6	9
Oth Ventura/Sta Barbara cnty ports	4	7	1	4
Oxnard	62	62	47	66
Pacific City	9	15	11	8
Point Arena	24	19	16	18
Point Reyes	4	4	3	4
Port Hueneme	16	17	14	20
Princeton	77	95	71	91
Pt Townsend	9	7	6	9
Richmond	20	15	9	15
Salmon River				
San Diego	37	41	28	43
San Francisco	80	62	48	73
San Pedro	47	53	38	56
Santa Barbara	84	68	51	81
Santa Cruz	41	38	38	39
Sausalito	8	8	7	11
Terminal Island	45	47	35	53
Tomales Bay	5	3	2	4
Trinidad	16	12	12	13
Ventura	53	58	29	61
Willmington	7	6	9	6

Table A.3-6. Dealers by port and sector for 2003–05 and five-year average.

		Non-Whiting Groundfish Trawl				Fixed Gear - Sablefish				Fixed Gear - Pot and H&L Rockfish and Lingcod				Whiting_trawl			
State	**Port**	**2003**	**2004**	**2005**	**2000-04 Avg**	**2003**	**2004**	**2005**	**2000-04 Avg**	**2003**	**2004**	**2005**	**2000-04 Avg**	**2003**	**2004**	**2005**	**2000-04 Avg**
WASHINGTON																	
	Anacortes	0	0	0	0												
	Bellingham Bay	2	2	2	2	3	5	2	4	3	3	2	3				
	Blaine	2	1	2	1										1		
	Copalis Beach																
	Everett	0	0	0	0	1	1	1	1	1	1	1	1				
	Friday Harbor	0	0	0	0												
	Grays Harbor	0	1	0	0	1	1		1								
	Ilwaco/Chinook	0	0	0	1	7	6	5	5	2	3	4	2	1	1	1	1
	La Conner	0	0	0	0												
	La Push	0	0	0	0	1	1	1	1				1				
	Neah Bay	2	2	2	3	2	2	2	2	1	1	1	1				
	Olympia	0		0	0												
	Oth No Puget Snd ports	0	0	0	0												
	Oth So Puget Snd ports	0	0	0	0												
	Oth WA coastal ports	0	0	0	0												
	Other Col R ports	0	0	0	0			1									
	Other/unknown WA	0		0	0												
	Port Angeles	0	1	1	1	1	1	1	1		1	1	1				
	Pt Townsend	0	0	0	0	1		1									
	Seattle	0	0	0	1	3		2	3				1				
	Sequim	0	0	0	0												
	Shelton	0	0	0	0												
	Tacoma	0	0	0	0												
	Westport	2	2	1	2	7	8	5	6			1	1	1	2	1	1
	Willapa Bay	0	0	0	0	2	2	1	2			1					
OREGON																	
	Astoria	2	3	2	4	7	10	5	7	2	2	2	3	2	1	1	2
	Bandon	0	0	0	0	1	1			1	1	2	2				
	Brookings	3	3	3	5	3	2	2	2	11	10	11	10				
	Cannon Beach																
	Coos Bay	9	4	6	6	10	6	8	7	4	5	9	6	3	1	1	2

Depoe Bay	0	0	0	0				1	3	5	3	5				
Florence	1	1	0	1	2			1		1		1				
Gearhart/Seaside																
Gold Beach	0	0	0	0	1		2		7	5	3	7				
Nehalem Bay																
Newport	2	3	4	3	14	18	14	14	5	9	8	10	3	3	3	3
Pacific City									7	11	6	6				
Port Orford	0	0	0	0	2	3	2	3	4	4	3	4				
Salmon River																
Tillamook/Garibaldi	1	3	2	2	4	5	3	3	8	8	8	10				
Winchester Bay	0	0	1	0	5	2	3	2			2	2				
CALIFORNIA																
Alameda	0	0	0	0								1				
Albion	0	0	0	0	1				3	3	2	4				
Avila	3	4	4	4	1	1	1	1	14	14	7	14				
Berkeley	0	0	0	1		1		1	5	4	6	8				
Bodega Bay	3	3	0	4	3		1	2	11	16	12	19				
Crescent City	4	1	2	4	6	4	3	4	11	12	6	12	1	1		1
Dana Point	0	0	0	0	2	1	1	2	4	7	3	8				
Eureka	2	2	2	3	5	2	2	5	9	6	4	10	1	1	1	1
Fields Landing	0	0	0	0	1			1								
Fort Bragg	2	2	2	4	6	5	5	5	9	16	7	13				
Long Beach	0	0	0	0	2			1	4	7	3	6				
Monterey	4	2	1	3	5	3	1	4	9	6	9	11				
Morro Bay	5	5	6	6	4	2	1	3	15	14	15	18				
Moss Landing	10	13	9	11	6	6	3	7	8	6	4	9			1	
Newport Beach	0	0	0	0	3	2	2	2	6	8	5	7				
Oakland	0	0	0	0					1			1				
Oceanside	1	0	0	0	1		1	1	5	4	3	7				
Oth Del Norte cnty ports										3		2				
Oth Humboldt cnty ports	0	0	0	0					6	3	5	5				
Oth Marin/Sonoma outer coast ports	1	1	1	1		1	1		5	2	3	4				
Oth Mendocino cnty ports	1	0	0	1		2	1	1	2	1	1	1				
Oth Monterey/Sta Cruz cnty ports	0	0	0	0					7	8	6	8				

Oth Orange/LA cnty ports	0	0	0	0	1	2	1	3	5	5	4	10
Oth San Diego cnty ports	0	0	0	0	9	6	3	6	17	21	12	17
Oth San Luis Obispo cnty ports	0	0	0	0					2	1	1	3
Oth SFBay/San Mateo cnty ports	3	2	2	3					1			3
Oth Ventura/Sta Barbara cnty ports	0	0	0	0					1	3		1
Other/unknown CA ports	0	0	0	0							1	
Oxnard	2	0	1	3	4	7	2	5	23	21	16	26
Point Arena									4	6	5	4
Point Reyes	0	0	0	0	2	1		1		1		
Port Hueneme	2	0	0	1						1	1	2
Princeton	8	11	9	10	6	5	3	5	14	12	16	22
Richmond	0	0	0	0					2			2
San Diego	0	0	0	0	3	1		3	8	10	3	14
San Francisco	11	10	8	11	9	10	5	8	17	13	10	22
San Pedro	3	0	0	1		1		1	13	9	10	12
Santa Barbara	5	6	1	6					26	22	17	25
Santa Cruz	6	4	6	6	4	2	2	3	12	13	10	11
Sausalito	0	0	0	0								
Terminal Island	2	0	0	1	5	2	1	4	14	21	9	19
Tomales Bay	0	0	0	0					1			
Trinidad	0	1	0	0					6	6	6	6
Ventura	7	1	1	6	1	1		1	10	11	1	13
Willmington	0	0	0	0					1	4	3	2

Table A.3-7. Number of trips by port and groundfish fishery for 2000–04 average and 2005.

		Non-Whiting Grd trawl				Fixed-Gear				Whiting trawl				Groundfish Total			
State	Port Name	2000-04	2003	2004	2005	2000-04	2003	2004	2005	2000-04	2003	2004	2005	2000-04	2003	2004	2005
WASHINGTON																	
	Anacortes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bellingham Bay	160	150	134	103	79	122	94	77	0	0	0	0	239	272	228	180
	Blaine	402	382	247	207	0	0	0	0	0	0	1	0	403	382	248	207
	Copalis Beach	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Everett	0	0	0	0	5	8	12	9	0	0	0	0	5	8	12	9

Friday Harbor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grays Harbor	0	0	1	0	6	5	1	0	0	0	0	0	7	5	2	0
Ilwaco/Chinook	13	0	0	0	77	130	89	262	30	47	37	84	119	177	126	346
La Conner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
La Push	0	0	0	0	162	241	247	153	0	0	0	0	162	241	247	153
Neah Bay	272	502	229	313	49	195	61	59	0	0	0	0	321	697	290	372
Olympia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Angeles	164	0	122	61	266	0	0	115	0	0	0	0	430	0	122	176
Pt Townsend	1	0	0	0	10	0	0	1	0	0	0	0	11	0	0	1
Seattle	2	0	0	0	12	0	0	2	0	0	0	0	15	0	0	2
Sequim	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shelton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tacoma	0	0	0	0	0	15	68	0	0	0	0	0	0	15	68	0
Westport	55	42	45	45	174	49	0	129	145	97	175	200	374	188	220	374
Willapa Bay	0	0	0	0	3	23	0	2	0	0	0	0	3	23	0	2
Oth No Puget Snd ports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oth So Puget Snd ports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oth WA coastal ports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Col R ports	0	0	0	0	0	200	163	3	0	0	0	0	0	200	163	3
Other/unknown WA	0	0	0	0	1	4	3	0	0	0	0	0	1	4	3	0
WA Total	1,070	1076	778	729	843	992	738	812	176	144	213	284	2,089	2,212	1,729	1,825
OREGON																
Astoria	550	486	443	434	203	210	121	172	218	162	183	200	971	858	747	806
Bandon	0	0	0	0	2	18	17	18	0	0	0	0	2	18	17	18
Brookings	127	125	47	54	13	407	608	460	0	0	0	0	140	532	655	514
Cannon Beach	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coos Bay	421	420	279	253	125	152	114	247	56	52	103	85	603	624	496	585
Depoe Bay	0	0	0	0	1	26	26	12	0	0	0	0	1	26	26	12
Florence	7	12	6	0	17	18	2	0	0	0	0	0	24	30	8	0
Gearhart/Seaside	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gold Beach	0	0	0	0	1	981	713	661	0	0	0	0	1	981	713	661
Nehalem Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Newport	345	305	223	220	148	243	226	178	378	287	480	502	871	835	929	900
Pacific City	0	0	0	0	101	239	264	190	0	0	0	0	101	239	264	0
Port Orford	0	0	0	0	160	1,168	1,116	997	0	0	0	0	160	1,168	1,116	997
Salmon River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tillamook/Garibaldi	34	27	17	5	7	401	378	250	0	0	0	0	41	428	395	255
Winchester Bay	0	0	0	1	11	14	3	11	0	0	0	0	11	14	3	12

OR Total	1,484	1375	1015	967	687	3,877	3,588	3,196	653	501	766	787	2,824	5,753	5,369	4,950
CALIFORNIA																
Alameda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Albion	0	0	0	0	0	36	104	82	0	0	0	0	0	36	104	82
Avila	145	132	76	29	1	791	951	688	0	0	0	0	146	923	1,027	717
Berkeley	1	0	0	0	1	36	27	33	0	0	0	0	2	36	27	33
Bodega Bay	46	60	6	0	6	130	183	111	0	0	0	0	52	190	189	111
Crescent City	266	221	56	81	86	570	559	523	22	1	32	0	374	792	647	604
Dana Point	0	0	0	0	23	196	307	58	0	0	0	0	23	196	307	58
Eureka	404	373	208	204	189	153	69	72	44	42	80	64	637	568	357	340
Fields Landing	62	0	0	0	21	2	0	0	6	0	0	0	89	2	0	0
Fort Bragg	264	214	143	142	704	819	983	703	0	0	0	0	968	1,033	1,126	845
Long Beach	0	0	0	0	1	45	24	17	0	0	0	0	1	45	24	17
Monterey	79	68	110	34	93	373	395	195	0	0	0	0	172	441	505	229
Morro Bay	45	31	68	71	17	1,084	868	598	0	0	0	0	61	1,115	936	669
Moss Landing	302	364	387	295	572	811	588	353	0	0	0	1	874	1,175	975	649
Newport Beach	0	0	0	0	267	488	480	303	0	0	0	0	267	488	480	303
Oakland	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Oceanside	1	1	0	0	129	345	71	153	0	0	0	0	130	346	71	153
Oxnard	12	2	0	1	29	256	301	215	0	0	0	0	42	258	301	216
Point Arena	0	0	0	0	0	27	66	50	0	0	0	0	0	27	66	50
Point Reyes	0	0	0	0	5	16	6	0	0	0	0	0	5	16	6	0
Port Hueneme	125	114	0	0	0	0	1	1	0	0	0	0	125	114	1	1
Princeton	384	392	395	456	27	260	278	228	0	0	0	0	411	652	673	684
Richmond	0	0	0	0	0	9	0	0	0	0	0	0	0	9	0	0
San Diego	0	0	0	0	15	99	116	52	0	0	0	0	15	99	116	52
San Francisco	257	183	200	213	82	223	197	148	0	0	0	0	338	406	397	361
San Pedro	1	3	0	0	9	49	65	49	0	0	0	0	10	52	65	49
Santa Barbara	305	268	18	1	0	211	199	95	0	0	0	0	306	479	217	96
Santa Cruz	117	64	62	123	65	165	214	133	0	0	0	0	182	229	276	256
Sausalito	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Terminal Island	11	2	0	0	41	144	194	131	0	0	0	0	52	146	194	131
Tomales Bay	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Trinidad	0	0	1	0	0	73	83	103	0	0	0	0	0	73	84	103
Ventura	109	109	11	2	6	56	76	4	0	0	0	0	115	165	87	6
Willmington	0	0	0	0	0	42	53	42	0	0	0	0	0	42	53	42
Oth Del Norte cnty ports	0	0	0	0	0	0	8	0	0	0	0	0	0	0	8	0
Oth Humboldt cnty ports	0	0	0	0	0	57	68	18	0	0	0	0	1	57	68	18
Oth Marin/Sonoma outer coast ports	1	2	1	1	0	19	33	18	0	0	0	0	1	21	34	19

Oth Mendocino cnty ports	1	2	0	0	1	2	7	3	0	0	0	0	2	4	7	3
Oth Monterey/Sta Cruz cnty ports	0	0	0	0	0	75	81	35	0	0	0	0	0	75	81	35
Oth Orange/LA cnty ports	0	0	0	0	37	173	314	317	0	0	0	0	37	173	314	317
Oth San Diego cnty ports	0	0	0	0	137	361	444	290	0	0	0	0	137	361	444	290
Oth San Luis Obispo cnty ports	0	0	0	0	0	5	3	1	0	0	0	0	0	5	3	1
Oth SFBay/San Mateo cnty ports	16	4	2	2	0	1	0	0	0	0	0	0	16	5	2	2
Oth Ventura/Sta Barbara cnty ports	0	0	0	0	0	3	5	0	0	0	0	0	0	3	5	0
Other/unknown CA ports	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
CA Total	2,953	2609	1744	1,655	2,567	8,207	8,421	5,823	73	43	112	65	5,593	10,859	10,277	7,543
Grand Total	**5,507**	**5,060**	**3,537**	**3,351**	**4,097**	**13,076**	**12,747**	**9,831**	**901**	**688**	**1,091**	**1,136**	**10,506**	**18,824**	**17,375**	**14,318**

Table A.3-8. Landings (round weight in pounds) by port and fishing sector for 2000–04 average and 2005.

		Non-Whiting Grd trawl				Fixed-Gear				Whiting trawl				Groundfish Total			
State	Port Name	2000-04	2003	2004	2005	2000-04	2003	2004	2005	2000-04	2003	2004	2005	2000-04	2003	2004	2005
WASHINGTON																	
	Anacortes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bellingham Bay	6,970	6,918	7,145	3,166	2,227	0	0	1,976	0	2,175	2,199	0	9,197	9,093	9,344	5,142
	Blaine	4,329	3,732	4,506	1,972	1	0	162	0	69	0	0	0	4,399	3,732	4,668	1,972
	Copalis Beach	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
	Everett	0	0	0	0	101	0	0	189	0	111	172	0	101	111	172	189
	Friday Harbor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grays Harbor	4	0	19	0	4	0	0	0	0	4	0	0	8	4	19	0
	Ilwaco/Chinook	275	0	0	0	124	5,072	7,168	336	4,106	355	105	17,481	4,504	5,427	7,273	17,817
	La Conner	0	0	0	0	10	0	0	0	0	0	0	0	10	0	0	0
	La Push	0	0	0	0	131	0	0	194	0	145	214	0	131	145	214	194
	Neah Bay	1,448	2,169	759	1,182	92	0	0	73	0	256	164	0	1,540	2,425	922	1,256
	Olympia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Port Angeles	747	0	463	238	308	0	0	168	0	51	217	0	1,056	51	680	406
	Pt Townsend	5	0	0	0	12	0	0	1	0	29	0	0	17	29	0	1
	Seattle	20	0	0	0	160	0	0	50	0	125	0	0	180	125	0	50
	Sequim	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Shelton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tacoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Westport	1,091	745	764	631	387	23,767	50,139	592	32,918	494	505	58,243	34,396	25,006	51,407	59,466
	Willapa Bay	0	0	0	0	2	0	0	1	0	2	3	0	2	2	3	1
	Oth No Pdt Snd ports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Oth So Pdt Snd ports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Oth WA coastal ports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other Col R ports	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	14
	Other/unknown WA	5	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0
	WA Total	14,894	13,563	13,656	7,190	3,560	28,838	57,469	3,595	37,093	3,748	3,578	75,724	55,546	46,150	74,703	86,509
OREGON		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Astoria	12,084	9,943	11,746	11,891	657	32,080	35,411	649	42,369	514	518	37,979	55,110	42,537	47,675	50,519
	Bandon	0	0	0	0	2	0	0	2	0	5	4	0	2	5	4	2
	Brookings	1,764	1,974	1,072	1,356	99	0	0	83	6	141	86	0	1,869	2,115	1,158	1,438
	Cannon Beach	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Coos Bay	6,409	6,402	5,351	4,930	472	4,344	9,343	716	4,786	479	506	7,478	11,667	11,224	15,199	13,124
	Depoe Bay	0	0	0	0	10	0	0	3	0	4	5	0	10	4	5	3
	Florence	39	55	32	0	106	0	0	0	0	96	0	0	145	150	32	0
	Gearhart/Seaside	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gold Beach	0	0	0	0	131	0	0	94	0	122	108	0	131	122	108	94
	Nehalem Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Newport	5,705	5,123	5,609	3,896	958	44,210	84,769	1,002	63,147	958	1,265	90,154	69,810	50,290	91,643	95,052
	Pacific City	0	0	0	0	41	0	0	43	0	52	53	0	41	52	53	43
	Port Orford	0	0	0	0	592	0	0	555	0	527	528	0	592	527	528	555
	Salmon River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tillamook/Garibaldi	174	114	71	14	77	0	0	44	0	100	87	0	251	214	158	57
Winchester Bay	0	0	0	4	39	0	0	13	0	41	3	0	40	41	3	17
OR Total	26,175	23,610	23,880	22,090	3,183	80,634	129,523	3,203	110,309	3,039	3,162	135,611	139,667	107,282	156,565	160,905
CALIFORNIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alameda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Albion	0	0	0	0	8	0	0	7	0	7	12	0	8	7	12	7
Avila	1,122	1,549	986	3	81	0	0	75	0	83	102	0	1,203	1,632	1,087	79
Berkeley	7	0	0	0	5	0	0	2	0	2	3	0	12	2	3	2
Bodega Bay	422	445	57	0	58	0	0	18	0	14	30	0	480	459	87	18
Crescent City	2,257	1,905	1,066	1,282	332	42	3,447	288	2,993	326	280	0	5,581	2,273	4,793	1,570
Dana Point	0	0	0	0	56	0	0	24	0	74	134	0	56	74	134	24
Eureka	4,007	4,418	3,699	3,653	293	3,648	7,031	282	3,896	255	169	6,735	8,196	8,321	10,899	10,670
Fields Landing	726	0	0	0	22	0	0	0	379	42	0	0	1,127	42	0	0
Fort Bragg	3,592	3,030	2,903	2,737	516	0	0	419	0	483	656	0	4,108	3,513	3,559	3,156
Long Beach	0	0	0	0	31	0	0	3	0	52	19	0	31	52	19	3
Monterey	623	553	422	120	57	0	0	22	0	61	42	0	680	614	463	142
Morro Bay	339	254	777	873	151	0	0	69	0	161	112	0	491	415	890	942
Moss Landing	1,475	2,056	1,182	787	711	0	0	297	0	783	557	89	2,186	2,839	1,740	1,173
Newport Beach	0	0	0	0	112	0	0	43	0	133	84	0	112	133	84	43
Oakland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oceanside	0	0	0	0	116	0	0	79	0	152	23	0	116	153	23	79
Oxnard	5	0	0	1	265	0	0	169	0	212	263	0	270	212	263	169
Point Arena	0	0	0	0	15	0	0	12	0	8	22	0	15	8	22	12
Point Reyes	0	0	0	0	4	0	0	0	0	15	3	0	4	15	3	0
Port Hueneme	17	13	0	0	1	0	0	0	0	0	3	0	18	13	3	0
Princeton	1,093	763	708	490	71	0	0	45	0	64	56	0	1,164	827	764	535
Richmond	0	0	0	0	1	0	0	0	0	3	0	0	1	3	0	0
San Diego	1	0	0	0	60	0	0	24	0	49	43	0	61	49	43	24
San Francisco	1,805	1,470	2,088	1,170	221	0	0	78	0	178	163	0	2,026	1,648	2,250	1,248
San Pedro	0	0	0	0	19	0	0	10	0	12	14	0	19	12	14	10
Santa Barbara	41	26	12	0	99	0	0	40	0	80	69	0	140	106	81	40
Santa Cruz	48	15	14	32	39	0	0	16	0	40	31	0	87	55	45	48
Sausalito	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
Terminal Island	1	0	0	0	56	0	0	46	0	30	57	0	58	30	57	46
Tomales Bay	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Trinidad	0	0	0	0	12	0	0	19	0	9	9	0	12	9	9	19
Ventura	25	23	2	0	41	0	0	2	0	40	35	0	66	63	37	2
Willmington	0	0	0	0	19	0	0	17	0	15	22	0	19	15	22	17
Oth D Norte cnty ports	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
Oth Humb cnty ports	1	0	0	0	10	0	0	3	0	8	8	0	11	8	8	3
Oth Marin/Sonoma outer coast ports	0	0	1	1	4	0	0	3	0	3	5	0	4	3	6	4
Oth Mend cnty ports	5	15	0	0	1	0	0	2	0	0	3	0	6	15	3	2
Oth Mont/S Cruz cnty pts	0	0	0	0	15	0	0	7	0	10	15	0	15	10	15	7
Oth Oran/LA cnty pts	0	0	0	0	76	0	0	149	0	92	143	0	76	92	143	149

Oth S Diego cnty pts	0	0	0	0	81	0	0	70	0	109	124	0	81	109	124	70
Oth S L Ob cnty pts	0	0	0	0	6	0	0	0	0	1	1	0	6	1	1	0
Oth SFBy/S Mat cnty pts	5	16	0	1	2	0	0	0	0	0	0	0	6	16	0	1
Oth Vent/Sta Brb cnty pts	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0
CA Total	17,621	16,552	13,917	11,151	3,667	3,690	10,478	2,342	7,268	3,608	3,311	6,824	28,555	23,850	27,705	20,317
Grand Total	58,690	53,726	51,452	40,432	10,410	113,162	197,470	9,141	154,669	10,395	10,051	218,159	223,769	177,282	258,972	267,731

A.4 FISHING COMMUNITY ENGAGEMENT, DEPENDENCE, RESILIENCE AND IDENTIFICATION OF POTENTIALLY VULNERABLE COMMUNITIES

A.4.1 Introduction

The purpose of this section is to present community specific information to help the Council develop rebuilding plans for overfished groundfish species. The Magnuson Stevens Act 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;…"

Looking for concepts and methodological approaches, we have reviewed available literature that points towards using sets of indicators to characterize communities as "engaged", "dependent", "resilient", and "vulnerable", which all may be components of assessing the "needs of fishing communities". Our ability to apply suggested approaches is limited by available data and the context of the Pacific groundfish fishery. For example, few, if any of the studies reviewed, specifically address fishing communities that depend on recreational fishing as a source of income, jobs, or social "well being."

A literature review was used to help choose a methodological approach to identify "commercially engaged" communities, "commercially groundfish dependent" communities, "recreationally engaged" communities, communities with "low resilience" to change, and potentially "vulnerable" communities. (These terms are defined below.)

Below are a summary of reviewed literature and an analysis using socioeconomic indicators that may be useful for assessing the "needs of fishing communities".

A.4.2 Summary of literature review

A.4.2.1 Types of literature reviewed

Several sources of literature were reviewed to collect information on methodologies used in other regions and industries to assess community engagement in and dependence on natural resources (fisheries and forestry) and community adaptability to change. Effort was made to review all relevant literature. Over thirty-three studies were reviewed. The most relevant studies have been summarized in Tables A.4-1 to A.4-5. The literature reviewed typically fell into one or more of the following categories:

- Studies offering general guidance in choosing indicators and indices
- Studies identifying key indicators potentially useful for tracking community engagement, dependence, resilience and resident well-being
- Studies determining engagement, dependence and/or resilience
- Studies identifying "communities of concern" or "areas of vulnerability"

The term "engagement" is used in the literature to describe a community's use of a resource (for example, fisheries). Most studies used the term "dependence" to mean use of a particular resource (for example, groundfish species), sometimes above a threshold level. The term "resilience" usually implied a community's adaptability to change.

A.4.2.2 Use of indicators and indices to help determine "dependence" and "resiliency"

Because there is no single agreed upon method for measuring engagement, dependence and resilience as defined above, research attempting to characterize engagement, dependence and/or resilience use various types of data as proxies. Literature sources summarized in Table A.4-1 describe several indicators and indices potentially useful in tracking engagement, dependence, resilience and sustainability of communities.

Table A.4-11. Socioeconomic and cultural indicators.

Author(s)	Key Indicators	Comments
Langdon-Pollock-PSMFC {Langdon-Pollock, DRAFT 1353 /id /d}	• Marine education programs • Number of crew members and processor employees residing in a fishing community • Reliance on other natural resources • Changes in ownership over time • Descriptions of support industries • Commercially landed pounds and revenue • Recreationally landed pounds and revenue • Fishing related social groups and organizations • Subsistence fisheries • Number of vessel owners that reside in the community • Number of vessel owners that land fish but do not reside in the community • Adaptation strategies • Industry structure • Training institutions • Perceptions and descriptions of tourism • Women's role in the fishing industries • Processors and fishery support industries • History of fishing industries	
General Fisheries Commission for the Mediterranean (2001)	National Indicators • Gross consumption of fishing products per inhabitant • Fish export/import commercial balance • Fish employment ratios • Fish coverage rates of national consumption • Extraversion rate • Fish contribution to the GNP • Ratio harvesting value • Ratio harvesting rate Local Operating Unit Indicators • Vessel physical productivity • Capacity physical productivity • Power physical productivity • Per vessel hour physical productivity • Capacity productivity • Vessel productivity • Power productivity • Per vessel hour productivity • Man physical productivity • Man productivity	Of a larger group of potential indicators, an advisory group determined that adequate information existed for only sixteen variables that were used to construct the indicators shown. These results would be tracked over time to develop a better understanding of main socioeconomic trends within the Alboran Sea Mediterranean fisheries management unit.

	• Average wage • Landing prices • Invested capital • Salary cost • Opportunity cost • Gross estimated profit • Profit rate • Gross added value	
Kusel, Fortmann (1991)	• Economic well-being (poverty, average income, income inequality) • Health (work injuries) • Social Pathology (rate of burglary) • Capacity • Economic importance of forestry sector • Amount of public land • Concentration of private timber land • Economic importance of tourism • Immigration	Well-being is reformulated in terms of Sen's concepts of capabilities (opportunities an individual has to choose from) and functioning (what (s)he succeeds in doing with the commodities at her command) coupled with an expanded conception of community which is used to explore the question of how communities develop and maintain the capacity to enhance their well-being and to defend their interests against outsiders. *Study 1:* statistical analyses between indicators of well-being and measures of forest and use *Study 2:* rapid rural appraisal of 7 forest communities to determine issues of local importance and to assess capacity to undertake action to address them *Study 3 (v2):* evaluates the well-being of 3 forest communities in CA.
Northeast Fisheries Management Council (2003)	• *Size and demographic characteristics of the fishery workforce in the community* • *Cultural issues* - attitudes, beliefs, values of fishermen, their families, and their communities • *Social structure and organization* - the ability of communities to provide necessary social support and services to families • *Non-economic social aspects* - lifestyle, health, and safety issues • *Historical dependence on fishery* - reflected in the structure of fishing practices and income distribution	This SIA was framed by the following questions: - Will standards, style, or pace of living change? - Will cooperation and interaction patterns change? - Will change be sudden or gradual? - How does the proposed action fit with historical trends and participation in the fishery? - Does the change fit with cultural or normative expectations of behavior in the fishery or community? - How do fishermen and the community members view the alternatives?
Pollnac{Pollnac, Draft 1367 /id /d}	o *Occupational attributes:* o Annual rounds o Fishing units and gears o Cost of entry	

	o Crew structure o Occupational mobility o Productivity o Absenteeism o Turnover o Safety o Flexibility o *Individual attributes* o Mental health (anxiety, low self-esteem, worry, tension) o Psychosomatic illness o Heart disease o Longevity o Education and training o Flexibility o Resilience o *Social structure:* o Occupation structure o Community solidarity o Power structure o Social stratification o Family relationships o Flexibility o Resilience o Robustness o *Social problems:* o Conflict o Non-compliance o Unemployment o Impaired inter-personal relationships o Family violence o Unemployment	
Pollnac and Poggie (1988)	• *Job satisfaction* • Individual longevity • Mental health • Family violence • Worker productivity	
Smith et al. (2003)	*Mental health* • Anxiety • Stress • Mastery • self-esteem • industry changes • depression • employment • spirituality	

A.4.2.3 Engagement and Dependence

Community engagement and/or dependence on a particular resource were often described for the purpose of identifying communities that could potentially be impacted by a particular change in management regulations. Descriptions of engagement and/or dependence used one or more indicators that served as proxies. Table A.4-2 provides a summary of the literature review conducted on studies assessing resource (fishing and forestry) engagement and/or dependence. The analyses reviewed usually used at least one, and usually more than one, of the following indicators as proxies for dependence[5]:

[5] Often, the term "engagement" was not used.

- Employment in fishing as a percentage of total employment in the area under analysis,
- Income from fishing as a percentage of total income in the area under analysis,
- Number of fishing vessels in the area under analysis,
- Number of fishing permits in the area under analysis,
- Number of processors/buyers in the area under analysis,
- Fish landings to the area under analysis.

While other indicators, not listed here, were sometimes used to describe dependence (see Hall-Arber *et al.* 2001), those listed above were the indicators used most often.

Typically, one of two approaches, or a variation thereof, was used for describing a community's dependence on a resource (see Table A.4-2 for more detail on individual studies and Table A.4-3 for a summary of various methodological approaches).

- Communities are ranked based on indicators represented by values for each indicator category for each community. Communities with indicators represented by high values are characterized as "more dependent" on the resource than communities with indicators representing lower values.
- Communities are ranked from highest to lowest by indicators represented by values for each indicator category for each community. Communities with indicators represented by values above chosen thresholds are labeled "dependent".

While the first method allows for relative dependency comparisons between communities, the second method characterizes all communities above a certain threshold as equivalent.

Table A.4-12. Determining dependence.

Author(s)	Primary variables considered	Thresholds
Dyer and Griffith (1996)	• Repair/supply facilities • Fish dealers/processors • Religious art/architecture dedicated to fishing • Secular art/architecture dedicated to fishing • Number of Multispecies Groundfish (MGF) permits • Number of MGF vessels	No specific thresholds. Consideration of the suggested variables can give an indication with regard to the relative degree of dependence. Factors were scored in two ways: nominally (as either present or absent) and ordinally (ranked from 5-highest to 1-lowest). Higher scores indicate greater dependence. Scores for each factor are added together to rank the relative dependence of ports.
Jacob et al. (2002)	• Fishing employment (directly and indirectly derived from the fishing sector with the use of regional economic multipliers) as a percentage of total employment	Dependence was defined as at least 15% of total employment (chosen based on ERS calculations – see below)
Hall-Arber et al. (2001)	• Employment in fishing as a percentage of the labor force in all occupations • Employment in fishing as a percentage of employment in related occupations within the Bureau of Labor Statistics category of fisheries/forestry/farming • Summary measure of a series of dependency ratios that explore the number of fishermen per hundred to various alternative occupational roles that fishermen could enter with their particular skill profiles	No specific thresholds. Consideration of the suggested variables can give an indication with regard to the relative degree of dependence.
European Commission (2000)	• Share of fisheries activity in value added • Share of fisheries employment as a percentage of total regional employment • Share of catch as a proportion of total catch	No specific thresholds. Consideration of the suggested variables can give an indication with regard to the relative degree of dependence.

USDA Economic Research Service (2006)	• Average annual labor over two years as a percentage of total labor • Proprietors' earnings over two years as a percentage of total earnings	Farming – 15%[6] or more of average annual labor and proprietor's earnings derived from farming during 1998-2000 OR 15% or more of employed residents worked in farm occupations in 2000[7]. Mining – 15% or more of average annual labor and proprietors' earnings derived from mining during 1998-2000 Manufacturing – 25% or more of average annual labor and proprietors' earnings derived from manufacturing during 1998-2000 Federal/state government – 15% or more of average annual labor and proprietors' earnings derived from Federal and State government during 1998-2000 Services – 45% or more of average annual labor and proprietors' earnings derived from services during 1998-2000
Forest Service (1987) as referenced by Donoghue and Haynes (2002)	• A community's employment in the forest products industry as a percentage of total employment	Dependence was defined as at least 10% of total employment
Johnson and Beale (2002)	A weighted average of : • Wage and salary employment in entertainment and recreation, accommodations, eating and drinking places, and real estate as a percentage of all employment reported in the Census Bureau's County Business Patterns for 1999 • Percentage of total personal income reported for the same categories by the Bureau of Economic Analysis • Percentage of housing units intended for seasonal or occasional use reported in the 2000 Census • Per capita receipts from motels and hotels as reported in the 1997 Census of Business.	This study analyzes community dependence on recreational industries. The industry categories were chosen after reviewing data for a sample of counties of well-known, undisputed high recreational dependence. The variables were converted into z-scores and combined into a weighted index to reflect recreational activity (0.3 employment + 0.3 income + 0.4 seasonal homes). Counties with index scores of 0.67 or higher were regarded as potential recreation counties. Other counties were also considered if they had a score greater than the mean of the index and one of the following conditions was met: 1) the county had at least $400 per capita of hotel-motel receipts or 2) at least 25% of the housing in the county was seasonal. In this way, counties with a high volume of recreational activity but large urban centers that dilute their scores can be included.
Norman et al. (2006)	• Value of fish landed in the community • Metric tons of fish landed in the community	All variables were outputs generated by a Data Envelopment Analysis (DEA) Model, where

[6] In general, the ERS used one standard deviation from the mean labor and proprietor income for each economic type to help determine the cutoff. The cutoff was then rounded to the nearest 5% (ERS, 2005).

[7] Farming was based on two thresholds. The farming occupation option was adopted to allow counties into the farming-dependent group that had highly farming-oriented economies but did not meet the earnings threshold, most often due to negative farm earnings estimates for some or all of the analyzed years.

	• Permit holders residing in the community • Vessel owners residing in the community • Number of vessels delivering fish to the community	inputs were community populations. The model thereby compared all communities to one another in terms of fishing outputs per capita, and generated a list of communities in rank order by level of dependence on fishing. Communities were analyzed as dependent upon fishing in general, or engaged in a specific fishery, relative to one another and then rank ordered according to the relative importance of their dependence or engagement score. No specific threshold was identified. However, once assembled in a rank ordering, communities which scored at least one standard deviation above the mean on either the dependence or engagement scale were selected for detailed profiling.
Sepez et al. (2005)	• Metric tons of fish landed in the community • Number of processors in the community • Number of vessels delivering fish to that community • Number of vessels homeported in the community • Number of vessel owners residing in the community • Number of crew licenses in the community • Ratio of state-issued fishing permits to population • Ratio of state-issued setnet fishing permits to population • Ratio of federally issued vessel permits to population • Aggregate of all indicators described above per capita	If any one of these indicators for a particular Alaskan community exceeded the threshold of 0.15, which in most cases was determined as a ratio to community population, it was determined to be significantly linked to fishing and selected for profiling.
Langdon-Pollack (2004)	• Population • Poverty • Unemployment • Per capita income • Year that houses were built • Percent of vacant houses • Number of industries outside fishing • Number of berths • Percent that a harbor is filled with commercial and/or recreational vessels • Landings data and number of suppliers • Processors • Community fishing organizations • Community fishing events	The author suggests the use of these indicators in a dependency index. However, after collecting this data for the Pacific coast region, it was determined that creating a dependency index was impractical given the available information.
Daniels (2004)	• The amount of forest land per county as a percentage of total county land	The ranked list of counties and their values were divided into three equal parts. The top third was labeled with a “high” dependence, the second third with a “medium” dependence and the lowest third was labeled with “low” forest dependence.

Table A.4-3. Methodologies used in past research to identify dependence.

Method	Sources that use this method	Threshold identified? How?	Primary variables	Notes
Dependence threshold using indicators as proxies for dependence	Forest Service (1987), USDA ERS, Jacob et al. (2002)	The threshold was identified by estimating one standard deviation from the mean for each variable to help determine the cutoff. The cutoff was then rounded to the nearest 5%.	• Industry employment as a percentage of total area employment (using multipliers or input-output model) • Industry earnings as a percentage of total area earnings	
Dependence threshold using an index as a proxy for dependence	Kenneth and Beale (2002)	The variables were converted into z-scores and combined into a weighted index to reflect recreational activity (0.3 employment + 0.3 income + 0.4 seasonal homes). Counties with index scores of 0.67 or higher were regarded as potential recreation counties. Other counties were also considered if they had a score greater than the mean of the index and one of the following conditions was met: 1) the county had at least $400 per capita of hotel-motel receipts or 2) at least 25% of the housing in the county was seasonal. In this way, counties with a high volume of recreational activity but large urban centers that dilute their scores can be included.	• Wage and salary employment in entertainment and recreation, accommodations, eating and drinking places, and real estate as a percentage of all employment • Percentage of total personal income • Percentage of housing units intended for seasonal or occasional use reported • Per capita receipts from motels and hotels	Used to determine recreational dependence
Relative dependence of communities using indicators as proxies for dependence	Daniels (2004), Hall-Arber et al. (2001), European Commission (2000)	No threshold identified. Consideration of the suggested variables can give an indication with regard to the relative degree of dependence.	• Employment in fishing as a percentage of the labor force in all occupations • Employment in fishing as a percentage of employment in related occupations within the Bureau of Labor Statistics category of fisheries/forestry/farming • Summary measure of a series of dependency ratios that explore the number of fishermen per hundred to various alternative occupational roles that fishermen could enter with their particular skill profiles • Share of fisheries activity in value added • Share of catch as a proportion of total catch • The amount of forest land per county as a percentage of total county land	Daniels (2004) used this method to help identify “areas of concern”. The ranked list of counties and their values were divided into three equal parts. The top third was labeled with a “high” dependence, the second third with a “medium” dependence and the lowest third was labeled with “low” forest dependence.

Relative dependence of communities using as index as a proxy for dependence	Dyer and Griffith (1996)	No threshold identified. Consideration of the suggested variables can give an indication with regard to the relative degree of dependence.	• Infrastructure - Repair/supply facilities, fish dealers/processors • Art/architecture dedicated to fishing • Number of permits • Number of vessels	
Relative dependence on fishing and engagement in specific fisheries using indicators as proxies for dependence and engagement	Norman, et al. (forthcoming)	Communities were analyzed as dependent upon fishing in general, or engaged in a specific fishery, relative to one another and then rank ordered according to the relative importance of their dependence or engagement score. No specific threshold was identified. However, once assembled in a rank ordering, communities which scored at least one standard deviation above the mean on either the dependence or engagement scale were selected for detailed profiling.	• Value of fish landed in the community • Metric tons of fish landed in the community • Permit holders residing in the community • Vessel owners residing in the community • Number of vessels delivering fish to the community	Engagement analysis focused on the value of fish landed, permit holders, and fishery-specific vessels owned by community members. Each of these categories was broken down by each North Pacific and Pacific fishery management group.

A.4.2.4 Resilience

Often, once community dependence is described in the reviewed literature, an assessment of community resilience is often made. Resilience is typically defined as the ability for a community to adapt to change. An assessment of resilience is made in order to assess the potential impact the change in management regulations will have on the areas under analysis. It is typically assumed that the greater socio-economic and cultural diversity and infrastructure an area has, the more resilient an area will be if a management regulation negatively affects the area. Indices, or aggregations, of indicators represented by values are often used as a proxy for resilience. These indices include a greater variety of indicators than the list of indicators used as proxies for dependence (see Table A.4-4). Resiliency indices in the studies reviewed sometimes included some of the following indicators:

- Employment in various industries,
- Unemployment,
- Income,
- Resident mobility,
- Resident education, skills and training,
- Population density (as a proxy for community infrastructure),
- Community isolation,
- Fisheries specific infrastructure.

Several of the studies reviewed use indices of community well-being as a guide in developing resiliency indicators.

Table A.4-4. Determining resilience.

Author(s)	Variables incorporated into resilience indicator	Comments
Hall-Arber et al. (2001)	• Infrastructure o Icehouse o NMFS extension office o Dockside diesel fuel o International fish brokers o Boat insurance o Local trucking o Fish processor o Fishing monument o Boat welders o Fishermen supply house o Vessel haul out facility o Bait house o 3+ fishing associations o Marine supply house o Local net maker o Fish retail store o 2 or fewer association	Surveys of 25 local communities and principal components analysis was used to rank the infrastructure factors and aggregate these into a score for each community to show relative resilience.
Charles et al. (2001)	• Debt levels among fishermen • Reported bankruptcies • Bankruptcy liabilities • Distribution of landed value across species • Proportion of fishers with multiple licenses • Age distribution of fishers	The authors suggest use of these indicators to proxy resilience.

	• Diversification of employment sources	

Pollard (2004)	• Isolation
	• Deprivation index
	    o Income
	    o Employment
	    o Health deprivation and disability
	    o Education skills and training,
	    o Housing
	    o Geographical access to services
		This report identifies "vulnerable" areas based on their location (as categorized by Travel to Work Areas – an indication of their rural status and remoteness), deprivation, and regional policy.

Daniels, JW (2004); Horne and Haynes (1999)	• *Lifestyle diversity* Mobility Ethnicity Degree of urbanness Race Income Education • *Economic diversity* employment in county *i* in industry *j*, *Ei* = total employment in county *i*, *Ej* = total employment in industry *j* in all counties, and *E* = total employment in all industries across all counties. • *Population density* (proxy for civic infrastructure) Greater population density is assumed to lead to a more developed county infrastructure and so increases socioeconomic resiliency.	Each county received an overall socioeconomic resiliency rating corresponding to an unweighted average of its ranks for lifestyle diversity, economic resiliency, and population density. These values were then sorted from highest to lowest value and divided into thirds. Counties in the top third had the highest socioeconomic resilience and so were given a rating of "high." Counties in the middle third were given a "medium," and counties in the last third were given a "low" socioeconomic resiliency rating.
Sommers (2001)	• Demographics • Employment • Government revenues • Facilities and infrastructure • Social services burden • Federal assistance • Business trends • Taxes	
Wilson and McCay (1998)	• Existence of alternative activities, both fishing and non-fishing (the more alternatives available to someone who must change their behavior because of a regulation, the better that person is able to deal with the change) • Economic vulnerability (amount and sources of pressure and competition faced in running fishing operators and selling their products. The more vulnerable the fish-related operation is, the greater the impact's regulation. • Community support (communities differ in the degree to which social capital is available to people and fishing operations affected by regulation. The more community support, the better the communities can absorb the regulation's impact.	While this study does not call itself a resiliency report, it offers "3 characteristics of communities influencing the magnitude and importance of the impact" which is a measure of resiliency

A.4.2.5 "Communities of concern" or "areas of vulnerability"

In the reviewed literature, the purpose of identifying "communities of concern" or "areas of vulnerability" is to alert decision-makers to areas that may require particular focus and/or mitigation efforts. Most of the reviewed studies that attempted to measure dependence *and* resilience used these two measurements to identify the areas that had both relatively high dependence and relatively low resilience levels. These areas are then labeled as "communities of concern" or "areas of vulnerability" (see Table A.4-5). The states of Washington, Oregon and California have their own definitions of "distressed", "disadvantaged" or "high unemployment" areas (see Table A.4-6). Washington and California rely upon unemployment rates while Oregon uses indices averaging employment change, average wage change, annual employment rate relative to the state level, and per capita personal income relative to state[8].

Table A.4-5. Linking dependence and resilience to identify vulnerable areas.

Author (s)	Definition of "communities of concern" or "vulnerable areas"	Comments
Crone and Haynes (2001)	Wood products counties of concern – a minimum 10% employment in SIC category 24 and contained two or more communities with medium to very high wood products specialization rating Range counties of concern – 12% or more of agricultural sales derived from sheep or cattle produced from federal forage, harvest levels, animal unit months	Community ranking - Communities were ranked that contained two or more isolated communities that had a medium to very high wood products or agricultural specialization and for which at least 33% of the land in a 20 mile radius circle is FSBLM land (with respect to wood products). The counties were ranked from 1 to 3 based on how high a concern the area was. Finding the preferred alternative - Rankings were aggregated and the lowest aggregate level indicated the preferred alternative.
Daniels (2004)	Areas with "low" socioeconomic resilience and "high" forest dependence (see Tables 2 and 3 for definitions)	
Pollard (2004)	Areas with overlap of high dependence, remoteness, and a high deprivation index score	See Table 3 for more details on indicators used.

Table A.4-6. Distressed counties.

State	Definition of "distressed"	Communities
Washington	Counties having three year average unemployment rate greater than or equal to 120% of the state average (Jan 2002-Dec 2004)	Adams, Clark, Columbia, Cowlitz, Ferry, Grant, Grays Harbor, Klickitat, Lewis, Okanogan, Pacific, Pend Oreille, Skamania, Stevens, Wahkiakum, Yakima[9]
Oregon	To determine whether a county is distressed or not, four factors were used to create an index for the county. These factors are: • Employment change (ever the most recent period for which data is available);	Severely distressed counties – Baker, Columbia, Coos, Crook, Douglas, Grant, Harney, Klamath, Lake, Linn, Malheur, Sherman, Umatilla, Wallowa, Wasco, Wheeler

8 To determine whether an incorporated city or sub-city area in a non-distressed county is distressed, four factors were used including: poverty rate, per capita personal income, percent of population aged 25+ with college education, and unemployment rate.

9 Assessed by the Washington State Employment Security Department. Distressed Areas List for 2005. www.workforceexplorer.com/article.asp?ARTICLEID=5010

	• Average wage change (over the most recent period for which data is available); • Annual employment rate relative to state (latest year for which data is available); and • Per capita personal income relative to state (latest year for which data is available.[10] To determine whether an incorporated city or sub-city area in a non-distressed county is distressed, four factors were used: • Poverty rate (i.e. percent of the population in poverty) • Per capita personal income • Percent of population aged 25+ with college education • Unemployment rate[11]	Distressed counties – Curry, Gilliam, Hood River, Jefferson, Josephine, Lincoln, Marion, Morrow, Union Severely distressed city/area – Monroe, Butte Falls, Eagle Point, Talent, Phoenix, Gold Hill, Oakridge, Creswell, Lowell, Cottage Grove, Springfield, Florence, Lents area of Portland, North/NE Portland, Rockwood area of Portland, Falls City, Independence, Garibaldi, Gaston, Dayton, Sheridan, Lafayette, McMinnville Distressed city/area – Johnson City, Estacada, Warrenton, Seaside, Astoria, Rogue River, Veneta, Westfir, Fairview, Wood Village, Dallas, Monmouth, Tillamook, Bay City, Cornelius, Forest Grove, Amity, Newberg, Willamina[12]
California	There are several measures used to qualify communities for specific programs in California. Some examples are: 1) A county is labeled "distressed" if it has an unemployment rate exceeding 125% of the statewide average. 2) The Employment Training Administration of the Federal Department of Labor designates Labor Surplus Areas for Workforce Development and defines them as areas that have had unemployment rates of 120% of the national average for two fiscal years. 3) To qualify for the Federal Foreign Investor Visa Program, a county must be a high unemployment area with an unemployment rate of 150% above the national average).	1) Del Norte, Alpine, Monterey, San Joaquin, Modoc, Lake, Madera, Stanislaus, Glenn, Siskiyou, Plumas, San Benito, Yuba, Kern, Sierra, Fresno, Sutter, Trinity, Merced, Kings, Tulare, Colusa, Imperial[13] 2) Alpine, Colusa, Del Norte, Glenn, Imperial, Kern, Kings, Lasses, Madera, Merced, Modoc, Monterey, Plumas, San Benito, San Joaquin, Santa Clara, Shasta, Sierra, Siskiyou, Stanislaus, Sutter, Tehama, Trinity, Tulare, Yuba 3) Kern, Imperial, Fresno, Kings, Madera, Merced, Stanislaus, San Benito, San Joaquin, Tulare, Sutter, Yuba

A.4.2.6 Scale

Almost all of the literature reviewed cautioned against the use of the dependence and resiliency indicators and indices as the primary guidance for making fishery management decisions due to the scale of analysis. Most of the studies used data on the county level which was admittedly too large a scale to accurately measure community dependence and resilience. However, in almost all cases, data on a smaller scale was not available.

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[10] The index is a composite of these four factors. A county is distressed if its index is less than 1.0 and non-distressed otherwise. If a county is distressed, all of its parts are considered to be distressed. An index less than one shows that, on average, economic conditions worsened for a county relative to the state over the period under consideration.

[11] If three or more of these factors were worse than a threshold value, then that place was identified as distressed. The threshold value is a representative value for each of the four factors in distressed counties.

[12] Assessed by the Oregon Economic and Community Development Department for 2005. www.econ.state.or.us/distMethods.htm

[13] "Economically distressed counties" are defined in a 1999 state statute and the counties qualifying are based on 2004 data. Information in the above table came from the California Economic Development Department (http://www.edd.ca.gov/).

A.4.3 Analysis for assessing engagement, dependence, resilience and vulnerable areas

A.4.3.1 Methodology for determining engagement and dependence in the commercial and recreational fisheries

Characterization of community engagement in fishing requires consideration of geographic use on the Pacific fish resource in general while a description of community dependence requires consideration of geographic use of the Pacific groundfish resource specifically. The following indicators are used as proxies for overall community engagement in the Pacific coast commercial fishery:

- Number of federal and state fishing permits as a percentage of each state's total number of permits (based on owner mailing address).
- Number of commercial fishing vessels (based on owner mailing address).
- Revenue from fish landings as a share of coastwide revenue from fishing landings
- Number of processors/buyers.

Port/city and county level data was available for each of the above indicators. Data for 2005 is used because it is the most recent year data is available for and because a using a single year is the most simplified way to conduct the analysis (which was a deemed necessary due to time constraints).

The following indicators are used as proxies for overall community engagement and dependence in the Pacific coast recreational fishery:

- Number of charter vessels as a percentage of each states total number of charter vessels.
- Number of private/rental angler trips as a percentage of each state's total number of private/rental angler trips.
- Number of private/rental groundfish angler trips as a percentage of each state's total number of private/rental groundfish angler trips.
- Number of party/charter trips as a percentage of each state's total number of party/charter trips.
- Number of party/charter groundfish trips as a percentage of each state's total number of party/charter groundfish trips.

Port/city level data was available for Oregon and Washington. Region level data was available for California. Data for 2005 is used for the reasons given above.

The following indicators are used as proxies for community dependence on the Pacific coast groundfish fishery specifically:

- Number of federal and state groundfish permits as a percentage of each state's total number of groundfish permits (based on owner mailing address).[14]
- Groundfish revenue as a percentage of total community fisheries revenue.

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[14] Permits were characterized as "groundfish" permits if they were one of the following types: federal LE groundfish permit with a trawl or fixed gear endorsement, CA deeper nearshore species fishery permit, CA nearshore fishery bycatch permit, CA nearshore north central trap endorsement permit, CA nearshore north central fishery permit, CA nearshore north fishery permit, CA nearshore south central fishery permit, CA nearshore south central trap endorsement permit, CA nearshore south fishery permit, CA nearshore south trap endorsement permit, OR rockfish nearshore endorsement permit, OR rockfish permit, WA coastal hagfish permit, WA Puget Sound whiting trawl permit.

- Groundfish revenue as a percentage of total groundfish revenue coastwide.

Port/city and county level data was available for each of the above indicators. Region level data was available for California. Data for 2005 is used for the reasons given above.

These sets of indicators were chosen based largely on: 1) the kind indicators seen in the literature and 2) data availability. Most of the data was obtained from PacFIN and state fishery management agencies. Other data, not included in this analysis, was available on a port group level (income from commercial and recreational groundfish fishing as a share of total personal income, number of persons employed by entities involved in commercial and recreational groundfish and other fishing or groundfish and other processing operations as a percentage of the total number of employed persons). This data has been included and discussed in other parts of the environmental impact statement (EIS).

To describe the relative community engagement in and dependence on the Pacific fishery resource, first, indicators represented by values were assigned to each community (port/city/county/region) within each category (Overall Community Engagement in the Pacific Coast Commercial Fishery, Overall Community Engagement and Dependence in the Pacific Coast Recreational Fishery, Community Dependence on the Pacific Coast Groundfish Fishery). Second, the communities were ranked from highest indicator value to lowest indicator value for each indicator. Third, the top one-third of communities was identified for each indicator. Fourth, the number of times a community was listed in the top one-third for each indicator was tallied. The communities that were tallied one or more times in the category of overall community engagement and/or dependence in the Pacific coast commercial fishery and/or overall community engagement and dependence in the Pacific coast recreational fishery were labeled as relatively "highly engaged" or "highly dependent" for each category.

A.4.3.2 Methodology for determining resilience

The purpose of gauging resiliency by community is to determine which communities are least able to adapt to a decrease in harvest as a result of a change in regulations. In some of the papers reviewed, the authors assume that the relationship between diversity and resiliency in social and economic systems is similar to that in the ecological literature. That is, a system with higher diversity is less affected by change than a system with lower diversity and the more diverse system therefore has higher resiliency. Socioeconomic systems (communities in this case) with higher resiliency are defined here as those that adapt quickly as indicated by rebounding measures of socioeconomic well-being. We assume that communities with high resiliency have access to diverse employment opportunities, higher employment rates, lower numbers of people living below the poverty line, are not located in isolated cities, and have the necessary municipal/county infrastructure to enable a rebound from a decrease in catch limits. That is, it is assumed that if the local fishing sector within a community with high resiliency experiences a major downturn, unemployment rates will rise only briefly until displaced people find other employment. It is assumed that communities with low resiliency have more lingering negative impacts, such as unemployment or out-migration rates that remain high for many years.

The theoretical basis for gauging resiliency rests on the concept of social well-being, which is sometimes defined as a composite of four factors: economic resiliency, social and cultural diversity (population size, mix of skills), civic infrastructure (leadership, preparedness for change), and amenity infrastructure (attractiveness of the area) (McCool and others 1997). For this analysis, indicators were chosen with these factors in mind. The following indicators were used as proxies for describing resiliency:

- Industry diversity index.[15]

[15] The industry diversity index was used to attempt to characterize the diversity of employment in the community. It

- Unemployment rate.
- Percentage of the population living below the poverty line.
- Isolated cities.[16]
- Population density.[17]

City and county level data was available for each of the above indicators except isolated city which was only analyzed on the city level. The most recent data available was used (2002 and 2003).

The above indicators were chosen based on: 1) similar indicators used in the literature and 2) data availability. Almost all of the indicator data was gathered from U.S. Census data. While several other indicators, such as educational attainment and income, could have been added to the analysis, the indicators used were deemed most relevant. Theoretically, many of the indicators used are likely correlated with educational attainment and income.

To describe relative community resilience, first, indicators represented by values were assigned to each community (port/city/county). Second, the communities were ranked from least resilient to most resilient based on the value for each indicator. Third, the top one-third of communities was listed for each indicator. Fourth, the number of times a community was listed in the top one-third for each indicator was tallied. The communities that were tallied one or more times were labeled as relatively "low resilience," for purposes of this analysis.

A.4.3.3 Methodology for identifying "vulnerable areas"

"Vulnerable areas" are defined in this analysis as those communities that are both "highly engaged" or "highly dependent" and have relatively "low resilience". If a community appears in the "highly engaged" or "highly dependent" list and the "low resilience" list, then the community is listed as a "vulnerable area" for the purposes of this analysis. However, it is important to note that various deficiencies in the data make the analysis results somewhat unreliable for the purposes of definitively identifying communities that are most highly engaged, most dependent, and least resilient. For example, the analysis does not incorporate measures of employment and income to supply industries (shipyards, cold storage, processing). Therefore, the results of this analysis must be considered with other information provided in the chapter and appendices.

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was assumed that a community with more types of industries, the more resilient the community may be to negative impacts to the fishing industry. The index was used to identify communities with very little employment in industries other than fishing. The index was calculated using all nineteen major industry categories used in the Census. Numbers of persons employed in each industry category was gathered for each port and for each coastal county. The Shannon-Weiner index was used to measure industry diversification. This index was originally used to measure species diversity in an ecosystem. However, it has also been used in socioeconomic analyses to measure industry diversification. The greater number of employees and the more even the distribution of employees across industries both increase the index (see Tables A.4-18 and A.4-19 for diversity index results).

[16] Identification of isolated cities was made by Langdon-Pollack (2004). The analysis defined geographically isolated cities as those cities located in coastal counties with a population of 1,900 or less, were not located on a major highway and fell outside of the 35-mile buffer of cities over 20,000. The isolated cities in Washington include: Neah Bay, La Push, Tahola, Moclips, Copalis Beach, Ocean City, Markham, Junction City, Cohassett Beach, Grayland, Tokeland, Ocean Park, and Naselle. The isolated cities in Oregon include: Oceanside, Cape Mears, Netarts, and Powers. California did not have any geographically isolated cities.

[17] A proxy for municipal infrastructure.

A.4.4 Engagement and Dependency Indicator Results

A.4.4.1 Commercial Fishing – General

Table A.4-7 displays the indicators and their representative values and rank used to rate the relative engagement of communities in commercial fishing. Table A.4-7 also shows the indicators used to rate the relative dependence of communities on the groundfish resource by city. The isolated areas indicators were applied to both engagement and dependency. Table A.4-8 displays these same indicators by value and ranking by county.

Table A.4-9 displays the number of times the cities scored in the top one-third of the commercial fishing engagement indicators. Astoria, Bellingham, Coos Bay, Crescent City, Eureka, Fort Bragg, Ilwaco, Newport, San Francisco, San Pedro, Santa Barbara, and Westport all scored highest with a score of four. That is, they all were ranked in the top one-third of all four indicators used to measure engagement in the Pacific fisheries. Table A.4-10 displays the top scoring counties with regard to the commercial fishing engagement indicators. Coos, Grays Harbor, and Lincoln counties top the list scoring four out of four. Clatsop, Humboldt, Los Angeles, Mendocino, Orange, Pacific, San Diego, San Mateo, and Whatcom counties also score highly.

A.4.4.2 Commercial Fishing – Groundfish

Table A.4-11 displays the number of times the cities scored in the top one-third of commercial groundfish dependency indicators. Astoria, Bellingham, Brookings, Coos Bay, Crescent City, Eureka, Fort Bragg, Morro Bay, Newport, Port Orford, and San Francisco are all heavily dependent upon the groundfish resource (scoring three out of three). Astoria, Bellingham, Coos Bay, Crescent City, Eureka, Fort Bragg, Newport, and San Francisco are all both highly engaged in the Pacific fisheries and highly dependent on the groundfish resource. Table A.4-12 displays the top scoring counties with regard to the commercial groundfish dependency indicators. Los Angeles County scores highest (three out of three). Clatsop, Coos, Curry, Grays Harbor, Lincoln, and Ventura counties also scored highly. Clatsop, Coos, Grays Harbor, Lincoln, and Los Angeles counties are all both heavily engaged in fishing in general and heavily dependent upon the groundfish resource.

The analysis was done in such a way that communities heavily engaged in commercial groundfish fishing specifically and on a large scale were indirectly given greater weight in the analysis. Therefore, communities heavily engaged in commercial fishing in general and groundfish in particular scored higher than communities only heavily engaged in commercial fishing in general. The analysis also used indicators (port groundfish revenue as a percentage of total port revenue, isolated areas) that allowed for small cities focusing on groundfish fishing to be identified as relatively dependent on groundfish. Smaller communities not focusing on groundfish heavily can be ranked as relatively engaged due to inclusion of indicators that account for a large number of small vessels.

A.4.4.3 Recreational Fishing

Table A.4-13 shows the relative rankings of the number of charter vessels in California as a percentage of the state total by region while Table A.4-14 shows the relative rankings of the recreational engagement indicators by county group. California data was separated from Oregon and Washington due to the differences in scale between California (comparable on the region and county group level) and Oregon and Washington (comparable on the port level only). Due to the scarcity of recreational data, indicators represented by values for all regions/port groups/ports are included in Tables A.4-13, A.4-14, and A.4-15. Table A.4-15 shows the relative rankings of the recreational engagement indicators by county group (including number of charter vessels as a percentage of the state total). Tables A.4-16 and A.4-17 show the number of times the regions/port groups/cities scored in the top one-third of the recreational engagement indicators for California and Oregon/Washington, respectively. The analysis indicates that San Luis Obispo through Santa Cruz and San Diego through Los Angeles are the most heavily engaged regions in fishing in California. In Oregon and Washington, the four most heavily engaged communities are all located in Oregon (Newport, Garibaldi, Brookings, and Charleston) with Newport being the most heavily engaged.

The analysis was done in such a way that communities heavily engaged in groundfish recreational fishing specifically (compared to recreational fishing in general), were indirectly given greater weight in the analysis. Therefore, communities heavily engaged in recreational fishing in general and groundfish in particular scored higher than communities only heavily engaged in recreational fishing in general.

Table A.4-7. Commercial indicators and rankings by city.

City	Total Number of Vessels Participating in Any Fishery in 2005 by Port	Rank	Dealers	Rank	Permits as a % of state total	Rank	Groundfish permits as a percentage of the state total	Rank	Port fish revenue/ Coastwide fish revenue	Rank	Port groundfish revenue/ Port fish revenue	Rank	Port groundfish revenue/ Coastwide groundfish revenue	Rank
Aberdeen					5.21%	10	5.19%	13						
Alameda	4		4		0.29%		0.28%							
Albion	11		5		0.48%		0.85%				28.7%	22		
Anacortes	107	19	19	26	5.27%	9	0.65%		0.9%					
Arroyo Grande					0.67%		1.28%	62						
Astoria	269	4	26	19	11.57%	1	6.69%	8	13.4%	2	31.9%	19	18.2%	1
Atascadero					0.83%		1.84%	43						
Avalon					0.41%									
Avila	63	29	16	29					0.3%		70.2%	4	0.8%	
Bandon	10		3		2.37%	22	2.87%	22			*			
Bellingham	232	7	34	14	7.64%	5	2.60%	29	4.5%	6	55.3%	7	10.6%	3
Berkeley	27		21	24	0.20%		0.14%				17.9%			
Blaine	101	22	11		2.43%	20	2.60%	30	1.0%		37.0%	16	1.6%	
Bodega Bay	234	6	53	3	2.34%	23	1.42%	51	1.0%		2.8%		0.1%	
Brookings	102	21	20	25	7.82%	4	7.32%	6	1.5%		27.8%	23	1.8%	13
Cambria					0.24%		1.28%	63						
Cannon Beach	4		3		0.13%									
Cathlamet					2.07%	29								
Charleston					4.40%	15	1.91%	41						
Chinook					2.25%	26	3.90%	18						
Clackamas					0.86%		4.78%	14						
Clatskanie					1.47%									
Coos Bay	392	2	40	10	4.97%	13	3.82%	19	7.8%	4	24.6%	24	8.1%	5
Costa Mesa					0.35%		1.42%	49						
Crescent City	134	14	20	25	4.59%	14	9.22%	4	2.8%	7	19.0%	28	2.2%	10
Dana Point	52		25	20	0.65%		0.57%		0.4%		7.3%		0.1%	
Depoe Bay	18		15		0.99%						3.8%			
Edmonds					1.01%		1.30%	60						
El Granada					1.12%		1.56%	46						
Eureka	101	22	21	24	2.21%	27	2.13%	35	2.2%	11	52.8%	10	5.0%	6
Everett	47		8		0.83%				0.3%		74.7%	2	1.1%	
Ferndale					2.01%	32	0.28%							

Fields Landing	9		1											
Florence	18		14		1.90%	37	0.96%	75						
Fort Bragg	257	5	42	9	5.17%	11	7.66%	5	2.3%	10	40.6%	15	3.9%	7
Friday Harbor	14		6		1.18%									
Garibaldi					2.12%	28	2.55%	33						
Gearhart/Seaside	5		4											
Gig Harbor					1.78%		2.60%	28						
Gold Beach	40		4		2.07%	30	5.73%	11	*		*	3	*	
Goleta					0.81%		0.99%	72						
Grayland					1.78%									
Grays Harbor	27		2						*					
Half Moon Bay					1.08%		1.42%	50						
Hammond					1.17%		1.91%	40						
Harbor					2.29%	24	4.14%	16						
Hoquim														
Huntington Beach					0.43%		0.99%	70						
Ilwaco	169	11	16	29	2.43%	19	0.65%		4.9%	5	14.7%		3.1%	8
La Conner	76	27	6						0.1%					
La Push	35		2		0.24%		0.65%		*		*	20	*	
Lake Forest					0.19%		1.56%	45						
Lake Forest Park					0.65%		7.14%	7						
Long Beach	12		9		1.60%		0.43%		0.2%		1.8%			
Long View														
Los Osos					0.98%		2.70%	24						
Mckinleyville					0.91%		1.13%	68						
Monterey	78	26	18	27	2.00%	33	1.56%	44	0.5%		16.9%		0.3%	
Morro Bay	111	18	44	8	2.75%	17	5.82%	10	0.8%		48.3%	11	1.7%	14
Moss Landing	220	8	37	12	0.74%		0.85%		1.8%	16	23.0%	26	1.8%	12
Neah Bay	60		6		0.53%		4.55%	15	0.4%		64.1%	5	1.2%	
Nehalem Bay	2		1											
Newport	451	1	69	2	8.20%	3	10.19%	3	11.1%	3	35.9%	17	16.9%	2
Newport Beach	19		16	29	0.33%		0.28%		0.1%		41.6%	13	0.2%	
North Bend					1.99%	34	0.96%	73						
Oakland	1		1		0.46%		1.99%	36						
Ocean Park					1.24%									
Oceanside	35		14		0.43%				0.4%		28.9%	21	0.5%	
Olympia			2		1.18%		0.65%							
Oth Humboldt cnty ports	20		16	29							13.4%			

Oth Marin/Sonoma outer coast ports	30		16	29					0.1%		7.2%			
Oth Mendocino cnty ports	9		6								12.1%		0.1%	
Oth Monterey/Sta Cruz cnty ports	9		6								100.0%	1		
Oth No Puget Snd ports	16		9											
Oth Orange/LA cnty ports	78	26	34	14					0.4%		52.8%	9	0.9%	
Oth San Diego cnty ports	60		32	15					0.6%		21.8%	27	0.5%	
Oth San Luis Obispo cnty ports	2		2								*			
Oth SFBay/San Mateo cnty ports	24		17	28					0.1%		1.6%			
Oth So Puget Snd ports	5		2											
Oth Ventura/Sta Barbara cnty ports	1		1											
Other Col R ports	75	28	16	29					0.2%		5.8%			
Other Washington Coastl Ports	10		3											
Other/unknown CA ports	8		6								1.5%			
Other/unknown WA	17		3											
Oxnard	89	23	47	6	2.52%	18	2.70%	25	1.0%		12.7%		0.5%	
Pacific City	31		11		1.73%		3.18%	21			53.1%	8	0.1%	
Point Arena	20		16	29	0.41%		0.57%		0.1%		18.3%	29	0.1%	
Point Reyes	20		3											
Port Angeles	82	24	5		1.30%		3.90%	17	0.4%		46.7%	12	0.7%	
Port Hueneme	41		14		0.45%		0.43%		2.6%	8				
Port Orford	80	25	12		5.61%	7	16.56%	2	1.1%		40.9%	14	2.0%	11
Portland					2.07%	31	0.32%							
Princeton	218	9	71	1					1.6%	17	23.1%	25	1.6%	
Pseudo port code for Columbia River	190	10	24	21					0.9%					
Pt Townsend	45		6		0.12%				0.2%		0.3%			
Raymond					1.01%									
Reedsport					1.55%		1.27%	66						
Richmond	9		9		0.16%		0.28%							
Salem					1.25%		0.32%							
Salkum					0.24%		2.60%	26						
San Diego	59		28	17	5.12%	12	2.55%	31	0.3%		6.3%		0.1%	
San Francisco	282	3	48	5	1.91%	36	2.70%	23	2.0%	14	33.6%	18	2.9%	9
San Jose					1.19%		0.57%							
San Luis Obispo					0.31%		0.99%	71						

San Pedro	116	16	38	11	2.38%	21	1.28%	61	2.4%	9	0.4%			
Santa Barbara	153	13	51	4	5.40%	8	5.39%	12	1.9%	15	3.1%		0.2%	
Santa Cruz	120	15	38	11	1.60%		1.13%	69	0.5%		7.8%		0.2%	
Santa Maria					0.32%		1.56%	47						
Sausalito	24		7		0.40%		0.14%							
Seaside					0.52%		1.42%	48						
Seattle	114	17	22	23	7.11%	6	27.92%	1	0.5%		16.0%		0.4%	
Sequim	11		4		1.30%		0.65%							
Shelton	7		2		0.53%		0.65%							
Siletz					1.86%		2.55%	32						
South Beach					1.55%		1.91%	42						
South Bend					1.54%		2.60%	27						
Tacoma	32		10		1.72%				0.1%					
Terminal Island	116	16	35	13	0.01%				2.2%	12	2.7%		0.2%	
Tillamook	166	12	27	18	1.08%		0.32%		1.5%		2.3%		0.1%	
Tokeland					1.72%									
Toledo					1.94%	35	2.23%	34						
Tomales Bay	2		2											
Trinidad	22		12		0.45%		0.57%		0.4%		2.7%		0.1%	
Ventura	61		29	16	2.26%	25	0.85%		2.1%	13	0.2%			
Waldport	7		5		0.65%									
Warrenton					3.41%	16	3.18%	20						
Westport	269	4	45	7	8.47%	2	5.84%	9	14.6%	1	14.5%		9.0%	4
Willapa Bay	104	20	15						1.5%	18				
Willmington	13		9								61.9%	6	0.1%	
Winchester Bay	75	28	23	22	0.86%				0.7%		1.9%		0.1%	
Yachats	1		1		0.22%									

Note: Blank spaces indicate that the value for the particular indicator is zero or very close to zero (less than 0.01%).
Note: When the data available grouped two cities together, the data was analyzed and associated with only one of the two cities. Under the grouping Ilwaco/Chinook, data was associated with Ilwaco.
Under the grouping Tillamook/Garibaldi, data was associated with Tillamook. Under the grouping Princeton/Half Moon Bay, data was associated with Princeton.
Note: An asterix (*) denotes confidential data.
Note: Total number of vessels indicates the number of vessels who made at least one landing at the port.
Not appropriate to sum vessels across ports, as some vessels make landings in multiple ports.
Note: Total number of dealers indicates the number of dealers who made at least one purchase at the port.
Not appropriate to sum vessels across ports, as some vessels make landings in multiple ports.
Note: Blank spaces in the rankings columns indicate that this city did not score in the top one-third of cities with a value under the indicator.

Table A.4-8. Commercial indicators and rankings by county.

County	Total Number of Vessels Participating in Any Fishery in 2005 by County	Rank	Dealers	Rank	Permits as percentage of state total	Rank	Groundfish permits a percentage of state total	Rank	County fish revenue/ Coastwide fish revenue	Rank	County groundfish revenue/ County fish revenue	Rank	County groundfish revenue/ Coastwide groundfish revenue	Rank
Alameda County					1.4%	25	1.5%							
Benton County					0.1%									
Butte County					0.2%		0.3%							8
Clackamas County					0.5%		1.6%	19						
Clallam County	115		15		0.6%		1.4%		1.3%		0.9%	5	2.5%	
Clark County					0.2%		0.1%							
Clatsop County	274	6	28		3.6%	11	3.7%	11	7.3%	3	1.2%	3	18.2%	
Columbia County					0.4%									
Contra Costa County					1.2%		0.4%							
Coos County	399	2	40	11	2.9%	15	2.9%	13	4.7%	8	0.9%	7	8.2%	
Cowlitz County					0.3%									
Curry County	194	10	27		3.6%	10	9.5%	2	2.4%		0.9%	6	4.2%	
Del Norte County	134		20		3.3%	12	5.7%	4	4.1%	10	0.3%		2.2%	
Deschutes County					0.1%									9
Douglas County	75		23		0.6%		0.4%		0.5%		0.1%		0.1%	
El Dorado County					0.2%									
Fresno County					0.2%									
Grays Harbor County	280	4	46	8	2.4%	17	2.0%	18	5.8%	6	0.8%	8	9.0%	
Hood River County					0.1%									
Humboldt County	135		37	12	4.2%	8	4.1%	9	3.7%	11	0.7%		5.0%	
Island County					0.2%		0.2%							
Jackson County					0.1%									
Jefferson	45		6		0.2%				0.2%		0.0%		0.0%	
Josephine County					0.1%									
Kern County					0.3%		0.3%							

King County	114		22		1.6%	22	5.1%	6	2.8%		0.1%		0.4%	
Kitsap County					0.2%		0.5%							
Klamath County					0.1%		0.1%							
Lake County					0.2%									
Lane County	18		14		0.6%		0.3%		0.2%		0.0%		0.0%	
Lewis County					0.3%		0.5%							
Lincoln County	464	1	79	1	3.2%	13	4.5%	8	6.4%	5	1.3%	2	16.9%	
Los Angeles County	145		50	6	5.1%	5	2.3%	16	8.2%	1	2.0%	1	0.8%	1
Marin County	149		37	12	2.0%	19	0.9%		1.5%		0.0%		0.1%	
Marion County					0.3%		0.4%							
Mason County	7		2		0.1%		0.1%		*		*		*	
Mendocino County	275	5	51	5	5.2%	3	6.1%	3	3.3%		0.6%		4.0%	
Monterey County	183		41	10	4.3%	7	3.5%	12	1.7%		0.2%		1.2%	
Multnomah County					0.4%		0.1%							
Nevada County					0.1%		0.1%							
Okanogan County							0.2%							
Orange County	145		50	6	3.0%	14	4.7%	7	8.2%	2	0.0%		0.8%	
Pacific County	246	7	30		2.0%	20	0.9%		4.3%	9	0.4%		3.1%	6
Pierce County	32		10		0.7%		0.4%		0.4%		0.0%		0.0%	
Placer County					0.2%									
Polk County					0.1%		0.3%							
Riverside County					0.2%									
Sacramento County					0.8%		0.1%							
San Benito County					0.1%									
San Bernardino County					0.2%									
San Diego County	122		54	3	5.7%	1	2.8%	14	5.7%	7	0.1%		1.1%	
San Francisco Bay County	242	8	66	2	1.3%		1.6%		0.2%		0.0%		0.0%	
San Joaquin County					0.3%		0.1%							
San Juan County			6		0.3%		0.3%		2.1%		0.6%		2.4%	2
San Luis Obispo County	154		53	4	5.2%	4	10.4%	1	2.7%		0.2%		2.8%	
San Mateo	242	9	66	2	2.6%	16	2.4%	15	2.7%		0.2%		2.8%	

County														
Santa Barbara County	136		47	7	5.3%	2	5.5%	5	3.5%		0.1%		0.4%	
Santa Clara County					1.4%	24	0.4%							
Santa Cruz County	183		41	10	2.2%	18	1.1%		1.7%		0.2%		1.2%	
Shasta County					0.1%									
Skagit County	162		24		1.1%		0.3%		1.3%		0.0%		0.0%	
Snohomish County	47		8		0.7%		0.5%		0.7%		0.8%		1.1%	
Solano County					0.4%									
Sonoma County	149		37	12	3.7%	9	1.1%		1.5%		0.0%		0.1%	4
Stanislaus County					0.1%									
Tehama County					0.1%									
Thurston	2		2		0.2%		0.1%		*		*		*	
Tillamook County	187	11	33		1.5%	23	2.1%	17	1.0%		0.1%		0.2%	
Tulare County					0.1%									
Tuolumne County							0.1%							
Umatilla County							0.3%							3
Ventura County	136		47	7	4.6%	6	4.0%	10	3.5%		0.1%		0.4%	5
Wahkiakum County					0.4%				6.4%	4	0.9%	4	12.2%	
Washington County					0.3%		0.3%							
Whatcom County	303	3	43	9	1.9%	21	0.7%							7
Yamhill County					0.2%		0.1%							
Yolo County					0.2%									
Yuba County					0.1%		0.4%							
Note: An asterix (*) indicates confidential data														

Table A.4-9. Commercial fishing engagement scores by city.

City	Number of times the city scored in top one-third of commercial fishing engagement indicators
Astoria	4
Bellingham	4
Coos Bay	4
Crescent City	4
Eureka	4
Fort Bragg	4
Ilwaco	4
Newport	4
San Francisco	4
San Pedro	4
Santa Barbara	4
Westport	4
Anacortes	3
Bodega Bay	3
Brookings	3
Monterey	3
Morro Bay	3
Moss Landing	3
Oxnard	3
Princeton	3
Seattle	3
Terminal Island	3
Ventura	3
Avila	2
Blaine	2
Other Orange/LA county ports	2
Other Columbia River ports	2
Port Orford	2
Pseudo port code for Columbia River	2
San Diego	2
Santa Cruz	2
Tillamook	2
Willapa Bay	2
Winchester Bay	2
Aberdeen	1
Bandon	1
Berkeley	1
Cathlamet	1
Charleston	1
Chinook	1
Dana Point	1
Ferndale	1
Florence	1
Garibaldi	1
Gold Beach	1
Harbor	1
La Conner	1

Newport Beach	1
North Bend	1
Other Humboldt county ports	1
Other Marin/Sonoma outer coast ports	1
Other San Diego county ports	1
Other SF Bay/San Mateo county ports	1
Point Arena	1
Port Angeles	1
Port Hueneme	1
Portland	1
Toledo	1
Warrenton	1

Table A.4-10. Commercial fishing engagement scores by county.

County	Number of times the county scored in top one-third of commercial fishing engagement indicators
Coos County	4
Grays Harbor County	4
Lincoln County	4
Clatsop County	3
Humboldt County	3
Los Angeles County	3
Mendocino County	3
Orange County	3
Pacific County	3
San Diego County	3
San Mateo County	3
Whatcom County	3
Curry County	2
Del Norte County	2
Marin County	2
Monterey County	2
San Francisco Bay County	2
San Luis Obispo County	2
Santa Barbara County	2
Santa Cruz County	2
Sonoma County	2
Tillamook County	2
Ventura County	2
Alameda County	1
King County	1
Santa Clara County	1
Wahkiakum County	1

Table A.4-11. Groundfish dependency scores by city.

City	Number of times the city scored in top one-third of commercial groundfish dependency indicators
Astoria	3
Bellingham	3
Brookings	3
Coos Bay	3
Crescent City	3
Eureka	3
Fort Bragg	3
Morro Bay	3
Newport	3
Port Orford	3
San Francisco	3
Blaine	2
Gold Beach	2
Moss Landing	2
Neah Bay	2
Pacific City	2
Port Angeles	2
Westport	2
Aberdeen	1
Albion	1
Arroyo Grande	1
Atascadero	1
Avila	1
Bandon	1
Bodega Bay	1
Cambria	1
Charleston	1
Chinook	1
Clackamas	1
Costa Mesa	1
Edmonds	1
El Granada	1
Everett	1
Florence	1
Garibaldi	1
Gig Harbor	1
Goleta	1
Half Moon Bay	1
Hammond	1
Harbor	1
Huntington Beach	1
Ilwaco	1
La Push	1

Lake Forest	1
Lake Forest Park	1
Los Osos	1
Mckinleyville	1
Monterey	1
Newport Beach	1
North Bend	1
Oakland	1
Oceanside	1
Other Monterey/Santa Cruz county ports	1
Other Orange/LA county ports	1
Other San Diego county ports	1
Oxnard	1
Point Arena	1
Princeton	1
Reedsport	1
Salkum	1
San Diego	1
San Luis Obispo	1
San Pedro	1
Santa Barbara	1
Santa Cruz	1
Santa Maria	1
Seaside	1
Seattle	1
Siletz	1
South Beach	1
South Bend	1
Toledo	1
Warrenton	1
Willmington	1

Table A.4-12. Groundfish dependency scores by county.

County	Number of times the county scored in top one-third of commercial groundfish dependency indicators
Los Angeles County	3
Clatsop County	2
Coos County	2
Curry County	2
Grays Harbor County	2
Lincoln County	2
Ventura County	2
Butte County	1
Clackamas County	1
Clallam County	1
Del Norte County	1
Deschutes County	1
Humboldt County	1
King County	1
Mendocino County	1
Monterey County	1
Orange County	1
Pacific County	1
San Diego County	1
San Juan County	1
San Luis Obispo County	1
San Mateo County	1
Santa Barbara County	1
Sonoma County	1
Tillamook County	1
Umatilla County	1
Wahkiakum County	1
Whatcom County	1

Table A.4-13. California charter vessels ranked by region.

Region - CA	Number of charter vessels in California as a percentage of the state total	Rank
San Diego Mission Bay (includes boats going to Mexico)	28.6%	1
San Fran, San Fran Bay-Delta	13.9%	2
Seal Beach, Long Beach, San Pedro	13.3%	3
Port Hueneme, Oxnard/Ventura, Santa Barbara	9.4%	4
Princeton, Bodega Bay	8.0%	5
Oceanside Dana Harbor	6.2%	6
Monterey, Moss Landings, Santa Cruz	5.6%	7
Newport Beach	5.3%	8
Fort Bragg, Eureka, Crescent City	4.1%	9
Redondo, Marina del Rey, Malibu	3.8%	10
Avila Beach, Morro Bay	1.8%	11

Table A.4-14. California recreational indicator values and rankings by region.

County Group - CA	Private/rental angler trips as a percentage of state total	Rank	Private/rental groundfish angler trips as a percentage of state total	Rank	Party/charter trips as a percentage of state total	Rank	Party/charter groundfish trips as a percentage of state total	Rank
San Diego through LA	39.4%	1	12.3%	5	53.5%	1	40.8%	1
San Luis Obispo through Santa Cruz	11.2%	2	23.4%	1	6.1%	5	17.3%	2
Sonoma and Mendocino	9.8%	3	19.9%	3	12.6%	2	1.9%	5
Humbolt and Del Norte	9.3%	4	20.5%	2	0.3%	6	0.8%	6
San Mateo up through Marin	7.4%	5	14.1%	4	7.7%	3	16.5%	3
Ventura and Santa Barabara	5.1%	6	4.4%	6	7.0%	4	13.8%	4

Table A.4-15. Oregon and Washington recreational indicator values and rankings by city.

Port - OR/WA	Number of charter vessels as a percentage of total charter vessels in state	Rank	Private/rental angler trips as a percentage of state total	Rank	Private/rental groundfish angler trips as a percentage of state total	Rank	Party/charter trips as a percentage of state total	Rank	Party/charter groundfish trips as a percentage of state total	Rank
Astoria, Hammond and Warrenton	20.2%	3	9.6%	6	0.7%		4.9%		0.1%	
Bandon	3.0%		1.3%		3.0%		3.3%		3.5%	
Brookings	6.1%		21.4%	1	36.1%	1	6.8%	5	9.0%	4
Charleston	6.1%		10.5%	5	11.4%	3	6.5%	6	8.0%	5
Depoe Bay	16.2%	5	4.8%		5.7%		24.6%	2	28.2%	2
Florence			0.9%		0.1%		0.0%		0.0%	
Garibaldi	12.1%		11.5%	4	6.3%	6	13.2%	3	12.5%	3
Gold Beach	4.0%		2.7%		8.9%	5	2.3%		3.2%	
Ilwaco/Chinook	5.8%		8.6%		0.2%		3.8%		0.4%	
Lapush	45.3%	1	1.1%		0.5%		0.2%		0.1%	
Neah Bay	33.7%	2	5.4%		4.1%		1.0%		0.3%	
Newport	19.2%	4	17.7%	2	14.6%	2	31.9%	1	33.4%	1
Pacific City	4.0%		5.0%		10.5%	4	1.6%		1.6%	
Port Orford	3.0%		0.8%		1.9%		0.5%		0.5%	
Westport	15.1%		2.7%		0.6%		7.9%	4	7.9%	6
Winchester Bay	6.1%		13.8%	3	0.8%		4.4%		0.0%	

Note: Blank space under indicator columns indicate that no data was available in this category for a particular port.
Note: Blank space under rank columns indicate that the city did not rank in the top one-third.

Table A.4-16. California recreational engagement scores by region.

County Group - CA	Number of times the county group scored in top one-third of CA recreational fishing engagement indicators
San Diego through LA	3
San Luis Obispo through Santa Cruz	3
Sonoma and Mendocino	1
Humboldt and Del Norte	1

Table A.4-17. Oregon and Washington recreational engagement scores by city.

Port - OR/WA	Number of times the port scored in top one-third of OR/WA recreational fishing engagement indicators
Newport	5
Brookings	4
Charleston	4
Garibaldi	4
Depoe Bay	3
Astoria, Hammond and Warrenton	2
Westport	2
Gold Beach	1
La Push	1
Neah Bay	1
Pacific City	1
Winchester Bay	1

A.4.5 Resiliency Results

Table A.4-18 shows resiliency indicators and the values for cities data was available for as well as the rankings of cities that were in the top one-third of each indicator. Table A.4-19 shows the indicators and values for a range of counties data was available for and rankings of counties that were in the top one-third of each indicator. Table A.4-20 shows the number of times each city scored in the top one-third of the five resiliency indicators. Netarts, Neah Bay, La Push, and Copalis Beach scored in the top one-third of all categories and could be described as relatively least resilient according to this analysis. Moss Landing and Winchester ranked in the top one-third of four out of five indicators. Waldport, Trinidad, Ilwaco, Garibaldi, and Chinook also scored highly (three out of five indicators). Garibaldi is classified as a "severely distressed city" by the state of Oregon (see Table A.4-6). Netarts, Neah Bay, La Push and Copalis Beach are all identified as isolated cities.

Table A.4-21 displays the number of times each county scored in the top one-third of the five resiliency indicators. Del Norte, Grays Harbor, Hood River and Lincoln counties ranked in the top one-third of all resiliency indicators (isolated communities indicator does not apply to counties). Coos, Cowlitz, Humboldt, Mendocino, Pacific, Skamania, and Wahkiakum counties can also be described as relatively least resilient according to this analysis.

Table A.4-18. Resiliency indicator values and rankings by city.

Port	Industry diversification index (Shannon-Weiner Index)	Rank	Total population	Rank	Unemployment rate	Rank	Poverty rate	Rank	Isolated City
Aberdeen	2.340		16,461		5.8%	9	22.2%	7	
Anacortes	2.243		14,557		2.9%		7.7%		
Astoria	2.452		9,813		4.3%	23	15.9%	24	
Bandon	2.140	22	2,833		3.5%		16.0%	23	
Bellingham	2.528		67,171		6.8%	6	20.6%	10	
Berkeley	2.466		102,743		3.6%		20.0%	12	
Blaine	2.421		3,770		4.0%		15.5%		
Bodega Bay	1.473	7	1,423	20	1.4%		4.0%		
Brookings	2.360		5,447		3.2%		11.5%		
Cannon Beach	1.588	8	1,588	21	3.1%		12.0%		
Chinook	1.217	3	457	5	1.8%		18.2%	16	
Coos Bay	2.408		15,374		5.4%	13	16.5%	20	
Copalis Beach	1.403	5	489	8	7.9%	4	17.4%	18	yes
Crescent City	2.302		4,006		6.5%	8	34.6%	1	
Dana Point	1.974	17	35,110		2.6%		6.7%		
Depoe Bay	1.623	9	1,174	19	2.9%		8.0%		
Eureka	2.363		26,128		5.5%	12	23.7%	5	
Everett	2.505		91,488		5.3%	14	12.9%		
Florence, OR	2.286		7,263		3.9%		14.4%		
Fort Bragg	2.209		7,026		5.3%	15	20.4%	11	
Friday Harbor	2.486		1,989	23	3.5%		12.0%		
Garibaldi	1.739	10	899	14	4.2%	24	11.6%		
Gold Beach	2.366		1,897	22	2.1%		12.4%		
Half Moon Bay	2.282		11,842		2.6%		6.1%		
Hood River	2.422		5,831		5.1%	17	17.3%	19	
Ilwaco	1.787	11	950	15	3.7%		16.3%	21	
La Conner	2.153	23	761	11	1.9%		11.8%		
La Push	0.000	1	371	4	16.1%	2	34.5%	2	yes
Long Beach	2.623		461,522		5.8%	9	22.8%	6	
Los Angeles	2.626		3,694,820		5.6%	11	22.1%	8	
Monterey	2.550		29,674		2.2%		7.8%		
Morro Bay	2.092	18	10,350		2.0%		13.0%		
Moss Landing	1.820	12	300	2	17.4%	1	18.8%	15	
Neah Bay	1.852	14	794	12	16.0%	3	29.9%	3	yes
Nehalem	2.120	21	203	1	1.5%		7.7%		
Netarts	0.553	2	744	10	5.2%	16	17.3%	19	yes
Newport	2.285		9,532		5.7%	10	14.4%		
Newport Beach	2.481		70,032		2.0%		4.4%		
Oakland	2.667		399,484		5.1%	18	19.4%	13	
Oceanside	2.415		161,029		3.4%		11.6%		yes
Olympia	2.516		42,514		3.3%		12.1%		
Oxnard	2.469		170,358		4.7%	21	15.1%		
Pacific City	1.403	6	1,027	16	4.0%		7.9%		
Point Arena	2.270		474	6	2.1%		26.0%	4	
Point Reyes St	2.239		818	13	1.1%		6.6%		
Port Angeles	2.355		18,397		4.7%	21	13.2%		
Port Hueneme	2.377		21,845		3.2%		12.2%		
Port Orford	2.160		1,153	18	3.5%		17.8%	17	
Port Townsend	2.396		8,334		4.3%	23	14.0%		

Portland	2.670		529,121		4.5%	22	13.1%		
Richmond	2.519		99,216		4.8%	20	16.2%	22	
San Diego	2.618		1,223,400		3.8%		14.6%		
San Francisco	2.609		776,733		3.0%		11.3%		
San Pedro	2.429		79,886		4.0%		16.5%	20	
Santa Barbara	2.602		92,325		3.9%		13.4%		
Santa Cruz	2.514		54,593		4.2%	24	16.5%	20	
Seaside	2.114	20	5,900		2.6%		15.6%		
Seattle	2.674		563,374		3.6%		11.8%		
Sequim	2.435		4,334		2.0%		13.9%		
Shelton	2.466		8,442		4.9%	19	18.9%	14	
Siletz	2.099	19	1,133	17	3.2%		15.4%		
Tacoma	2.595		193,556		4.9%	19	15.9%	24	
Tillamook	2.375		4,352		2.6%		15.4%		
Trinidad	1.917	15	311	3	4.2%	24	8.8%		
Ventura	2.603		100,916		3.3%		9.0%		
Waldport	2.213		2,050	24	7.9%	5	17.3%	19	
Warrenton	2.159	24	4,096		2.3%		14.2%		
Westport	1.836	13	2,137		4.1%		14.3%		
Winchester	1.921	16	488	7	6.7%	7	21.3%	9	
Yachats	1.348	4	617	9	2.5%		14.1%		
Note: Blank spaces in the rankings columns indicate that this city did not score in the top one-third.									

Table A.4-19. Resiliency indicator values and rankings by county.

County	Industry diversification index (Shannon-Weiner Index)	Rank	Total population	Rank	Unemployment rate	Rank	Poverty rate	Rank
Alameda	2.50		1,443,741		3.6		11	
Clallam	2.25	9	64,525	15	3.9		12.5	
Clark	2.38		345,238		4		9.1	
Clatsop	2.15	4	35,630	10	4.1		13.2	
Columbia	2.06	2	43,560	11	4.1		9.1	
Contra Costa	2.50		948,816		3.1		7.6	
Coos	2.36		62,779	14	4.6	12	15	7
Cowlitz	2.29	13	92,948		4.7	11	14	13
Curry	2.27	11	21,137	6	3.6		12.2	
Del Norte	2.22	7	27,507	9	4.9	7	20.2	1
Douglas	2.31	15	100,399		4.3		13.1	
Grays Harbor	2.26	10	67,194	16	4.8	10	16.1	5
Hood River	2.30	14	20,411	4	4.4	16	14.2	12
Humboldt	2.28	12	126,518		5.2	3	19.5	2
Island	2.27	11	71,558	17	3		7	
Jefferson	2.25	9	25,953	8	3.6		11.3	
King	2.55		606,024		3.5		6.9	
Kitsap	2.27	11	231,969		3.5		8.8	
Lane	2.36		322,959		4.1		14.4	8
Lincoln	2.17	6	44,479	12	4.9	8	13.9	14
Los Angeles	2.48		9,519,338		5	6	17.9	3
Marin	2.44		247,289		1.9		6.6	
Mason	2.35		49,405	13	4.5	14	12.2	
Mendocino	2.30	14	86,265		4.5	15	15.9	6
Monterey	2.42		401,762		5.2	5	13.5	16
Multnomah	2.55		660,486		4.4		12.7	
Orange	2.52		2,846,289		3.3		10.3	
Pacific	2.14	3	20,984	5	3.9		14.4	9
Pierce	2.39		700,820		4.1		10.5	
San Diego	2.47		2,813,833		3.6		12.4	
San Francisco	2.47		776,733		3		11.3	
San Joaquin	2.41		563,598		6.2	2	17.7	4
San Juan	2.38		14,077	3	1.9		9.2	
San Luis Obispo	2.38		401,762		5.2	4	13.5	15
San Mateo	2.53		707,161		2.2		5.8	
Santa Barbara	2.46		399,347		4.2		14.3	10
Santa Cruz	2.41		255,602		4.1		11.9	
Skagit	2.17	6	102,979		4.3		11.1	
Skamania	2.03	1	9,872	2	7.1	1	13.1	
Snohomish	2.30	14	606,024		3.5		6.9	
Solano	2.33	16	394,542		3.8		8.3	
Sonoma	2.39		458,614		2.8		8.1	
Thurston	2.33	16	207,355		3.9		8.8	
Tillamook	2.23	8	242,62	7	2.6		11.4	
Ventura	2.43		753,197		3.4		9.2	
Wahkiakum	2.16	5	3,824	1	4.5	13	8.1	
Whatcom	2.36		166,814		4.9	9	14.2	11
Note: Blank spaces in the rankings columns indicate that this county did not score in the top one-third.								

Table A.4-20. Resiliency scores by city.

City	Number of times the city scored in top one-third (least resilient) of resiliency indicators
Copalis Beach	5
La Push	5
Neah Bay	5
Netarts	5
Moss Landing	4
Winchester	4
Chinook	3
Garibaldi	3
Ilwaco	3
Trinidad	3
Waldport	3
Aberdeen	2
Astoria	2
Bandon	2
Bellingham	2
Bodega Bay	2
Cannon Beach	2
Coos Bay	2
Crescent City	2
Depoe Bay	2
Eureka	2
Fort Bragg	2
Hood River	2
La Conner	2
Long Beach	2
Los Angeles	2
Nehalem	2
Oakland	2
Pacific City	2
Point Arena	2
Port Orford	2
Richmond	2
Santa Cruz	2
Shelton	2
Siletz	2
Tacoma	2
Yachats	2
Berkeley	1
Dana Point	1
Everett	1
Friday Harbor	1
Gold Beach	1
Morro Bay	1
Newport	1
Oceanside	1
Oxnard	1
Point Reyes St	1
Port Angeles	1
Port Townsend	1
Portland	1
San Pedro	1
Seaside	1
Warrenton	1
Westport	1

Table A.4-21. Resiliency scores by county.

County	Number of times the county scored in top one-third (least resilient) of resiliency indicators
Del Norte	4
Grays Harbor	4
Hood River	4
Lincoln	4
Coos	3
Cowlitz	3
Humboldt	3
Mendocino	3
Pacific	3
Skamania	3
Wahkiakum	3
Clallam	2
Clatsop	2
Columbia	2
Curry	2
Island	2
Jefferson	2
Los Angeles	2
Mason	2
Monterey	2
San Joaquin	2
San Luis Obispo	2
Tillamook	2
Whatcom	2
Douglas	1
Kitsap	1
Lane	1
San Juan	1
Santa Barbara	1
Skagit	1
Snohomish	1
Solano	1
Thurston	1

A.4.6 Vulnerable Areas Results

Tables A.4-22 and A.4-23 show the results of the “vulnerable areas” analysis for cities and counties, respectively. Vulnerable areas are cities or counties that are with highly engaged (Tables A.4-9 and A.4-10) in or dependent on groundfish fishing (Tables A.4-11 and A.4-12), or recreational fishing (Tables A.4-16 and A.4-17) and are classified as least resilient according to Tables A.4-20 and A.4-21. That is, vulnerable areas are defined as cities that appear in Table A.4-9 and Table A.4-20, or Table A.4-11 and Table A.4-20, or Table A.4-17 and Table A.4-19, or counties that appear in Table A.4-10 and Table A.4-21, or Table A.4-12 and Table A.4-21. Thirty-eight cities and eighteen counties are identified as vulnerable areas in the last columns of Tables A.4-22 and A.4-23.

A.4.6.1 Commercial fishery

Vulnerable areas that are cities, as identified in this analysis, are bolded in Table A.4-22. With regard to engagement in commercial fishing, twenty-nine cities are 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. Ilwaco and Moss Landing are most vulnerable with regards to engagement in commercial fishing. Ilwaco and Moss Landing have the highest levels of engagement in fishing (score of four and three, respectively) and 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 having 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 lower resiliency scores (score of one).

Table A.4-22. Commercial and recreational scores and identification of vulnerable cities.

City	Number of times the city scored in top one-third of commercial fishing engagement indicators	Number of times the city scored in top one-third of commercial groundfish dependency indicators	Number of times the port scored in top one-third of OR/WA recreational fishing engagement indicators	Number of times the city scored in top one-third (least resilient) of resiliency indicators	Vulnerable Area (vulnerable, most vulnerable)
Aberdeen	**1**	**1**		**2**	**vulnerable**
Alameda					
Albion		1			
Anacortes	3				
Arroyo Grande		1			
Astoria	**4**	**3**	**2**	**2**	**vulnerable**
Atascadero		1			
Avalon					
Avila	2	1			
Bandon	**1**	**1**		**2**	**vulnerable**
Bellingham	**4**	**3**		**2**	**vulnerable**
Berkeley	**1**			**1**	**vulnerable**
Blaine	2	2			
Bodega Bay	**3**	**1**		**2**	**vulnerable**
Brookings	3	3	4		
Cambria		1			
Cannon Beach				2	
Cathlamet	1				
Charleston	1	1	4		
Chinook	**1**	**1**		**3**	**vulnerable**
Clackamas		1			
Clatskanie					
Coos Bay	**4**	**3**		**2**	**vulnerable**
Copalis Beach				5	
Costa Mesa		1			
Crescent City	**4**	**3**		**2**	**vulnerable**
Dana Point	**1**			**1**	**vulnerable**
Depoe Bay			**3**	**2**	**vulnerable**
Edmonds		1			
El Granada		1			
Eureka	**4**	**3**		**2**	**vulnerable**
Everett		**1**		**1**	**vulnerable**

Ferndale	1				
Fields Landing					
Florence	1	1			
Fort Bragg	**4**	**3**		**2**	**vulnerable**
Friday Harbor				1	
Garibaldi	**1**	**1**	**4**	**3**	**most vulnerable**
Gearhart/Seaside					
Gig Harbor		1			
Gold Beach	**1**	**2**	**1**	**1**	**vulnerable**
Goleta		1			
Grayland					
Grays Harbor	1				
Half Moon Bay		1			
Hammond		1			
Harbor	1	1			
Hood River				2	
Hoquim					
Huntington Beach		1			
Ilwaco	**4**	**1**		**3**	**most vulnerable**
La Conner	**1**			**2**	**vulnerable**
La Push		**1**	**1**	**5**	**vulnerable**
Lake Forest		1			
Lake Forest Park		1			
Long Beach				2	
Long View					
Los Osos		1			
Los Angeles				2	
Mckinleyville		1			
Monterey	3	1			
Morro Bay	**3**	**3**		**1**	**vulnerable**
Moss Landing	**3**	**2**		**4**	**most vulnerable**
Nasselle					
Neah Bay		**2**	**1**	**5**	**most vulnerable**
Nehalem Bay				2	
Netarts Bay				5	
Newport	**4**	**3**	**5**	**1**	**vulnerable**
Newport Beach	1	1			
North Bend	1	1			
Oakland		**1**		**2**	**vulnerable**

Ocean Park					
Oceanside		**1**		**1**	**vulnerable**
Olympia					
Other Humboldt county ports	1				
Other Marin/Sonoma outer coast ports	1				
Other Mendocino county ports					
Other Monterey/Santa Cruz county ports		1			
Other No Puget Sound ports					
C Orange/LA county ports	2	1			
Other San Diego county ports	1	1			
Other San Luis Obispo county ports					
Other SF Bay/San Mateo county ports	1				
Other So Puget Sound ports					
Oth34 Ventura/Santa Barbara county ports					
Other Col R ports	2				
Other Washington Coastal Ports					
Other/unknown CA ports					
Other/unknown WA					
Oxnard	**3**	**1**		**1**	**vulnerable**
Pacific City		**2**	**1**	**2**	**vulnerable**
Point Arena	**1**	**1**		**2**	**vulnerable**
Point Reyes					
Port Angeles	**1**	**2**		**1**	**vulnerable**
Port Hueneme	1				
Port Orford	**2**	**3**		**2**	**vulnerable**
Portland	**1**			**1**	**vulnerable**
Princeton	3	1			
Pseudo port code for Columbia River	2				
Pt Townsend				1	
Raymond					
Reedsport		1			
Richmond				2	
Salem					
Salkum		1			
San Diego	2	1			
San Francisco	4	3			

San Jose					
San Luis Obispo		1			
San Pedro	**4**	**1**		**1**	**vulnerable**
Santa Barbara	4	1			
Santa Cruz	**2**	**1**		**2**	**vulnerable**
Santa Maria		1			
Sausalito					
Seaside		**1**		**1**	**vulnerable**
Seattle	3	1			
Sequim					
Shelton				2	
Siletz		**1**		**2**	**vulnerable**
South Beach		1			
South Bend		1			
Tacoma				2	
Terminal Island	3				
Tillamook	2				
Tokeland					
Toledo	1	1			
Tomales Bay					
Trinidad				3	
Ventura	3				
Waldport				3	
Warrenton	**1**	**1**		**1**	**vulnerable**
Westport	**4**	**2**	**2**	**1**	**vulnerable**
Willapa Bay	2				
Willmington		1			
Winchester Bay	**2**		**1**	**4**	**vulnerable**
Yachats				2	

Table A.4-23. Commercial and recreational scores and identification of vulnerable counties.

	Number of times the county scored in top one-third of commercial fishing engagement indicators	Number of times the county scored in top one-third of commercial groundfish dependency indicators	Number of times the county scored in top one-third (least resilient) of resiliency indicators	Vulnerable Area
County				
Alameda County	1			
Benton County				
Butte County		1		
Clackamas County		1		
Clallam County		**1**	**2**	**vulnerable**
Clark County				
Clatsop County	**3**	**2**	**2**	**vulnerable**
Columbia County			2	
Contra Costa County				
Coos County	**4**	**2**	**3**	**most vulnerable**
Cowlitz County			3	
Curry County	**2**	**2**	**2**	**vulnerable**
Del Norte County	**2**	**1**	**4**	**vulnerable**
Deschutes County		1		
Douglas County			1	
El Dorado County				
Fresno County				
Grays Harbor County	**4**	**2**	**4**	**most vulnerable**
Hood River County			4	
Humboldt County	**3**	**1**	**3**	**most vulnerable**
Island County			2	
Jackson County				
Jefferson			2	
Josephine County				
Kern County				
King County	1	1		
Kitsap County			1	
Klamath County				
Lake County				
Lane County			1	
Lewis County				
Lincoln County	**4**	**2**	**4**	**most vulnerable**
Los Angeles County	**3**	**3**	**2**	**vulnerable**
Marin County	2			
Marion County				
Mason County			2	
Mendocino County	**3**	**1**	**3**	**most vulnerable**
Monterey County	**2**	**1**	**2**	**vulnerable**
Multnomah County				
Nevada County				
Okanogan County				
Orange County	3	1		
Pacific County	**3**	**1**	**3**	**most vulnerable**
Pierce County				
Placer County				
Polk County				

Riverside County				
Sacramento County				
San Benito County				
San Bernardino County				
San Diego County	3	1		
San Francisco Bay County	2			
San Joaquin County			2	
San Juan County		**1**	**1**	**vulnerable**
San Luis Obispo County	**2**	**1**	**2**	**vulnerable**
San Mateo County	3	1		
Santa Barbara County	**2**	**1**	**1**	**vulnerable**
Santa Clara County	1			
Santa Cruz County	2			
Shasta County				
Skagit County			1	
Skamania County			3	
Snohomish County			1	
Solano County			1	
Sonoma County	2	1		
Stanislaus County				
Tehama County				
Thurston			1	
Tillamook County	**2**	**1**	**2**	**vulnerable**
Tulare County				
Tuolumne County				
Umatilla County		1		
Ventura County	2	2		
Wahkiakum County	**1**	**1**	**3**	**vulnerable**
Washington County				
Whatcom County	**3**	**1**	**2**	**vulnerable**
Yamhill County				
Yolo County				
Yuba County				

With regard 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 (two or greater) and low resiliency scores (two or greater). Morro Bay, Newport, and Oceanside all have high groundfish dependency (score of three) but lower resiliency scores (score of one). Chinook, Garibaldi, La Push, and Ilwaco all have higher groundfish dependence (score of one) and the lowest resiliency scores (three or more). Several vulnerable areas that are cities are identified as highly engaged and highly dependent (see Table A.4-22).

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 regards to commercial fishing engagement. Six counties are labeled as most vulnerable areas and include Coos, Grays Harbor, Humboldt, Lincoln, Mendocino, and Pacific counties. All have high commercial fishing engagement scores (three or more) and low resiliency scores (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 regard 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 highly engaged and highly dependent (see Table A.4-23).

A.4.6.2 Recreational fishery

Ten cities are identified as vulnerable areas with regard to recreational fishing in Oregon and Washington. These cities are bolded in Table A.4-22 under the recreational column. 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 recreational vulnerable cities include Gold Beach, La Push, Neah Bay, Newport, Pacific City, Westport, and Winchester. Newport has very high score in recreational engagement (score of five) but a lower resiliency score (score of one). La Push, Neah Bay and Winchester all have lower recreational engagement scores (scores of one) but very low resiliency scores (score of four or more).

It was not possible to identify recreationally engaged vulnerable areas in California due to the two-county and regional level recreational data that was available with regard to recreational fishing, compared to city and county level data available for the resiliency indicators. However, we were able to identify some California communities as potential vulnerable areas based on commercial engagement in and dependency on the groundfish fishery. Table A.4-16 shows that San Luis Obispo through Santa Cruz counties and San Diego through Los Angeles counties are most engaged in recreational fishing and dependent on the groundfish recreational fishery. Los Angeles, San Luis Obispo and Santa Barbara counties are all ranked as least resilient in Table A.4-23.

A.4.6.3 Summary

In summary, 38 cities and 18 counties are identified as commercial and/or recreational vulnerable areas (areas with high engagement or dependence on commercial or recreational fisheries and low resilience to change). Tables A.4-22 and A.4-23 display the results of the analysis. To qualify as a vulnerable area, a city or county must be listed in the top one-third of ranked indicator values for at least one engagement or dependency indicator and one resiliency indicator. When stricter ranking requirements are applied so that a community has to be ranked in the top one-third of an indicator twice under engagement and/or dependence and resilience, a smaller pool of cities and counties qualify. These 17 cities include: 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 include: 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 vulnerable. These cities and counties are labeled "most vulnerable". The cities include: Garibaldi, Ilwaco, Moss Landing, and Neah Bay. The counties include: Coos, Grays Harbor, Humboldt, Lincoln, Mendocino, and Pacific counties.

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APPENDIX B

SELECTED ADVISORY BODY AND STATE REPORTS PRESENTED AT THE JUNE 2006 COUNCIL MEETING

PROPOSED ACCEPTABLE BIOLOGICAL CATCH AND OPTIMUM YIELD SPECIFICATIONS AND MANAGEMENT MEASURES FOR THE 2007-2008 PACIFIC COAST GROUNDFISH FISHERY
AND
AMENDMENT 16-4: REBUILDING PLANS FOR SEVEN DEPLETED PACIFIC COAST GROUNDFISH SPECIES

DRAFT ENVIRONMENTAL IMPACT STATEMENT

JULY 2006

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GROUNDFISH MANAGEMENT TEAM REPORT ON TENTATIVE ADOPTION OF 2007-2008 GROUNDFISH FISHERY SPECIFICATIONS/MANAGEMENT MEASURES AND AMENDMENT 16-4

At its April 2006 meeting, the Council adopted final preferred alternatives for acceptable biological catches (ABCs) for all species and optimum yields (OYs) for non-overfished species. These values are listed in Table 2-1 in the Preliminary Draft Environmental Impact Statement (DEIS) (pages 3-5 in Agenda Item F.2.a, Attachment 1).

In its April 2006 statement for 2007-2008 management specifications (Agenda Item F.1.c., Supplemental GMT Report) the GMT discussed the Council's direction for this management period to "rebuild [overfished species] as quickly as possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of these stocks within the marine ecosystem." The Council provided further direction at that meeting, selecting two suites of preferred overfished species OYs from the lower end of the rebuilding OY range initially slated for analysis. These two alternatives were labeled at that meeting as the "Preferred Low OY" and "Preferred High OY" alternatives.

Under this agenda item, the Council is expected to make final decisions on OYs for overfished species. Additionally, if the Council wants to consider 2007 exempted fishing permits (EFPs), some yield of overfished species needs to be set-aside to accommodate EFP catch. The Council should also provide guidance on recreational harvest guidelines for canary and yelloweye rockfish. These actions will allow the Groundfish Management Team (GMT) and Groundfish Advisory Subpanel (GAP) to focus on recommendations for preferred management measures under Agenda Items F.5 and F.6.

Analytical documents available at this meeting look at the effects of the different OY levels on the environment, focusing on three Action Alternatives. Action Alternative 1 presents a management measures regime based on the Preferred Low OY alternative. Action Alternatives 2 and 3 present management regimes based on the Preferred High OY alternative, but emphasizing different fishing strategies. Summary descriptions of the action alternatives are provided in Agenda Item F.2.a., Supplemental Attachment 5, "Summary of the Biological and Socioeconomic Effects of the 2007-2008 Action Alternatives."

With regard to setting the OYs for overfished species, the Council needs to be aware of the differences in the biology of the different rockfish stocks and, as a result, the varying rebuilding schedules. Table 2-3 and Figure 2-2 in Chapter 2 of the Preliminary DEIS present the rebuilding parameters of the overfished stocks. Figure 2-2 displays the rebuilding yields and the resulting differences in median times to rebuild. Stocks with steep slopes, such as darkblotched, Pacific ocean perch (POP), and widow rockfish, are more productive; stocks with relatively flat lines, such as cowcod and yelloweye, are considerably less productive. Stocks with low productivity will take much longer to rebuild, even in the absence of fishing. Table 2-3, excerpted below, shows a variety of OYs and median times to rebuild, including those for states of no fishing (F=0), and for fishing at the Preferred Low OY and Preferred High OY levels.

	Action Alt. 1 OYs	Rebuilt Date	Action Alts. 2 & 3 OYs	Rebuilt Date	F=0 Rebuilt Date
Bocaccio	40 mt	2021.9	218 mt	2026	2021.1
Canary rockfish	32 mt	2060	44 mt	2063	2053
Cowcod	4 mt	2039	8 mt	2043	2035
Darkblotched rockfish	130 mt	2009.9	229 mt	2010.2	2009.5
Pacific ocean perch	44 mt	2015	100 mt	2015.6	2014.6
Widow rockfish	120 mt	2014	368 mt	2015	2013
Yelloweye rockfish	12.6 mt	2083	23 mt ‘07 20 mt ‘08	2083.5	2048

Comparison of years to rebuild (years) for F=0, status quo OY, and OY alternatives for 2007							
	Bocaccio	Canary	Cowcod	DKBL	POP	Widow	Yelloweye
Years to rebuild at F=0	15.1	48.0	29.0	3.5	8.6	7.0	42.0
Years to rebuild at status quo (i.e.: 2006 OY)	23.0	58.4	33.1	4.1	16.5	8.8	113.5
Years to rebuild at Preferred Low OY alternative	15.9	54.0	33.0	3.9	9.0	8.0	77.0
Percent difference in years to rebuild (Preferred Low OY vs. status quo)	-30.9%	-7.5%	-0.3%	-4.9%	-45.4%	-9.1%	-32.2%
Years to rebuild at Preferred High OY alternative	20.0	57.0	37.0	4.2	9.6	9.0	77.5
Percent difference in years to rebuild (Preferred High OY vs. status quo)	-13.0%	-2.4%	11.8%	2.4%	-41.8%	2.3%	-31.7%

Estimates of rebuilt dates for F=0 illustrate **how soon it is possible for each stock to recover to B_{MSY},** given life history and environmental constraints in the absence of fishing beginning in 2007. These rebuilt date estimates are based on the most recent stock assessments for these species. Depending on data and methods used, the rebuilt dates for these species could be revised in future stock assessments, even in the absence of fishing.

In our April 2006 statement on 2007-2008 harvest levels, we recommended, and we continue to recommend, that the Council **take into account the status and biology of the stocks** by:

- Looking at the depletion rates of each overfished species and the sensitivity of those species to changes in OY to structure suites of OYs that focus protection on the more sensitive species. The species with rebuilding times that are most sensitive to changes in OY are canary rockfish, yelloweye rockfish, and cowcod. We believe that the suites of Preferred Low and Preferred High OYs appropriately focus greater protection on the species more sensitive to OY changes.

- We also recommended that the OYs for overfished species include allowances for research catch, in order to ensure that future information could be gathered on the status and biology of these and other fish stocks. In setting the Preferred High OY alternative, the Council heeded our advice and included research catch amounts in the component overfished species OYs. Extractive scientific research under the Preferred Low OY alternative would come at a cost of further lost fishing opportunity. For the purpose of estimating economic effects of the Preferred Low OY alternative, the GMT assumed that there would be no Exempted Fishing Permits (EFPs) under that alternative.

In order to ensure that overfished species are managed within their rebuilding OYs, projected overfished species mortalities are modeled at the beginning of the year, and subsequent adjustments to management measures are made inseason to keep total catch within the OYs. However, there is uncertainty in both the stock assessments and pre-season projections that need to be considered when setting the rebuilding OYs. Taking this uncertainty into consideration, the GMT makes recommendations below on OYs for specific overfished species.

In its guidance on **taking into account the needs of fishing communities**, the 9th Circuit Court of Appeals stated, "The purpose of the [Magnuson-Stevens] Act is clearly to give conservation of fisheries priority over short-term economic interests. The Act sets this priority in part because the longer-term economic interests of fishing communities are aligned with the conservation goals set forth in the Act." The 9th Circuit goes on to state "The natural reading of this language, however, is that Congress intended to ensure that overfished species were rebuilt as quickly as possible, but wanted to leave some leeway to avoid disastrous short-term consequences for fishing communities."

We discussed the three action alternatives and the zero harvest alternative and their effects on fishing communities in terms of: short term economic impacts compared to status quo, short term economic impacts compared to historic economic impacts, short term economic impacts compared to the 2000 disaster declaration by the Secretary of Commerce, and short term economic impacts of each action alternatives when compared to one another. While there is currently no definition that establishes a threshold for identifying "disastrous short term consequences," there are several precedents that help put the economic impacts of the action alternatives into perspective:

- The Secretary of Commerce's 2000 commercial fishery disaster declaration for the groundfish fishery;
- The US department of Agriculture defines severe production losses in a county as a reduction countywide of at least 30 percent; and
- The Small Business Administration will make a physical disaster declaration when at least three businesses have uninsured losses of 40% or more of their estimated fair replacement value.

Under the status quo fishery, revenues are lower than when compared to revenues generated in 2000, the year of the disaster declaration. In 2000, 2001, and 2002 groundfish exvessel revenues were approximately $62 million, $52 million, and $43 million respectively. Recreational angler trips numbered an estimated 1,218,000 in 2000, 927,000 in 2001, and 843,000 in 2002.

The action alternatives result in exvessel revenue, recreational angler trips, and income impacts that continue to be lower than when the disaster declaration was made. Changes in personal income are lowest under action alternative 1 and this alternative reduces personal income by $57.6 million from status quo levels (see table 7-68g, page 505 of the Preliminary DEIS). The percent change in income impacts (compared to status quo) under action alternative 1 reduces personal income by more than 40% for many port groups. Action Alternative 2 reduces commercial groundfish fishery income by more than 20% for some port groups. Action Alternative 3 reduces commercial groundfish fishery income by less than 15% for all port groups (see Table 7-70, page 510 of the Preliminary DEIS). Recreational fisheries follow the same general pattern. Action Alternative 1 reduces recreational groundfish personal income by more than 40% for some regions. Action Alternative 2 reduces personal income by more than 40% for some regions. Action Alternative 3 reduces recreational groundfish personal income by more than 25% for several regions, and more than 30% for one region (see Table 7-71, page 511 of the Preliminary DEIS).

In addition to those short-term and large-scale effects of the 2007-2008 action alternatives that are predictable pre-season, the GMT is also concerned with the less predictable effects of the Preferred Low OY alternative, which supports Action Alternative 1. In our April statement on 2007-2008 harvest specifications, we reminded the Council of the uncertainty inherent in inseason groundfish fisheries management, stating "information available on the different fisheries varies in both its quality and abundance – both pre-season, and as we proceed through the seasons." The Preferred Low OY/Action Alternative 1 requires a variety of fisheries to be either severely constrained or closed by January 1, 2007. Any flexibility to respond to management uncertainty would require further closures and constraints upon severely constrained fisheries. It is also expected that the Preferred Low OY/Action Alternative 1 could trigger a host of inseason fishery closures to accommodate fishery information received inseason.

Chapter 3 of the Preliminary DEIS **takes into account the interaction of overfished species within the marine ecosystem**. The rebuilding rockfish stocks on the West Coast and 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 effects 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 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 also relatively modest.

Specific Overfished Species OYs

The results of the most recent round of stock assessments for overfished species were, in general, more optimistic than the prior round of assessments. The exception to this is yelloweye rockfish, which was substantially more pessimistic. As a result of the need to restrict the fisheries based on the new yelloweye assessment, the GMT recommends the OY ramp-down strategy for this species, which results in a lower OY, but would provide time to collect much-needed additional data that could better inform new management measures for greater yelloweye protection.

Cowcod may be viewed as an unproductive stock, similar to yelloweye; however the most recent round of assessments shows this stock is less depleted than previously thought. Because of the more optimistic stock assessment result, a dramatic decrease in the OY may not be necessary like the proposed decrease in the yelloweye OY. The GMT feels that the relatively unproductive nature of these stocks justifies a relatively restrictive management scheme.

Canary rockfish and bocaccio may be viewed as being more productive than yelloweye and cowcod, but less productive than Pacific ocean perch, darkblotched rockfish, and widow rockfish. The GMT recommends adopting OYs for these species that are relatively close to pre-season catch predictions because of the greater depletion and lower productivity of these stocks. While setting an OY close to predicted catch is expected to result in substantial inseason actions to stay within those OYs (because of inseason deviations from pre-season catch predictions), the GMT feels that the productivity of these stocks justifies a relatively more restrictive management scheme.

Pacific ocean perch, darkblotched rockfish, and widow rockfish may be viewed as being less depleted and more productive than the other three depleted species. If the Council wishes to accommodate the GMT's request to allow for uncertainty and management flexibility by building in a difference between the OY and predicted catch, the GMT feels that this difference or "buffer" should be greatest around these species. Doing so would have a relatively small impact on the rebuilding times for these species, but would accommodate management flexibility, reduce the need for inseason adjustments to management, and result in greater stability to the management regime. The GMT would also like to note that when a buffer is set between the expected (scorecard) catch and the adopted OY, the benefits realized in more rapid rebuilding times when actual catches are less than the OY are captured in subsequent stock assessments and assessment updates (as realized catches, rather than OYs, are entered into subsequent assessments as data).

As discussed above, the Council sets harvest levels and management measures pre-season with the expectation that the management measures will adequately constrain harvest to keep total catch within established harvest levels. As each season progresses, new information becomes available, often modifying the assumptions that were made pre-season about catch and bycatch rates. When inseason catch rate estimates vary from pre-season catch rate estimates, the Council takes inseason action to either constrain the fishery to stay within OYs, or liberalize the fishery to achieve OYs for non-overfished species while staying with overfished species OYs. Inseason revisions to management measures are necessary to maintain rebuilding schedules and to prevent overfishing, but the more inseason measures vary from those set pre-season, the less predictable fishing business management becomes for fishery participants.

Species That Are Most Sensitive to Changes in OY

Cowcod While the cowcod stock assessment is data poor, the GMT believes that continued use of closed areas as a management tool would appropriately keeps the catches of cowcod to an acceptable level. The GMT notes that all of the Action Alternatives, including the No Action Alternative, would result in projected cowcod mortalities that are less than the Preferred High OY (by 0.8-4.7 mt). The 8.0 mt Preferred High OY for cowcod is calculated under an 80% probability of rebuilding by T_{MAX}, or a rebuilt date of 2043. Projecting the status quo harvest rate forward would result in an OY of 4.6 for 2007 and 2008, with a rebuilt date of 2040.

Yelloweye Yelloweye rockfish have a life history that illustrates the classic challenge of rebuilding overfished West Coast rockfish stocks – they are slow to mature, have low productivity, and can live in excess of 100 years. Given their low productivity, any incremental change in yelloweye rockfish harvest *levels* can notably change the associated constant harvest *rates*. For example, a 2007 OY of 12 mt would result in a constant harvest rate that would extend the rebuilding period beyond the F=0 rebuilt date by 30 years (from 2048 to 2078), while a 2007 OY of 12.6 mt would result in a constant harvest rate that would extend the rebuilding period beyond the F=0 by 35 years (from 2048 to 2083).

For yelloweye rockfish, the GMT recommends a departure from the Council's practice with other overfished species of setting constant harvest rates that are intended to carry through time to the rebuilt dates. We recommend that yelloweye OYs in 2007-2010 be set at ramping down harvest *levels*, beginning with 23 mt in 2007 and continuing to 20 mt in 2008, ultimately reaching 13.5 mt in 2011. Beginning in 2011, the yelloweye rockfish rebuilding plan would revert to a constant harvest rate of F = 0.0101 through to the rebuilt date of 2083.5. By contrast, an initial 2007 OY based on this harvest rate would result in an OY of 12.6 mt and a rebuilt date of 2083. As points of reference, the 2006 yelloweye OY is 27 mt, with expected total catch currently estimated at 21.1 mt.

By any standards, the yelloweye assessment data are sparse; the assessment is tuned to recreational catch-per-unit-of-effort (CPUE) data with a decreasing period of coverage from south to north, and size and age composition information and fishery independent data are particularly lacking. Additionally, yelloweye rockfish have a low vulnerability to trawl gear (which is why the NMFS trawl survey is a poor index for this stock), and WCGOP data for fixed gear fisheries is minimal. Poor yelloweye rockfish data availability makes provision of a yelloweye research catch allowance critical to future assessment, management and rebuilding efforts. Therefore, the GMT continues to support the ramp-down approach for yelloweye. This approach would provide time for: 1) additional data to be collected through additional and/or enhanced research, such as the International Pacific Halibut Commission survey; 2) fishermen, such as fixed gear fishery participants, and processors who will be affected by the yelloweye rebuilding plan to make decisions that could affect their future businesses; and 3) the Council, its advisory bodies, and the states to identify, explore, and further develop management tools to manage to the lower rebuilding OYs that are anticipated over the next few years.

Yelloweye rockfish are sedentary in nature and tend to favor the high rocky relief, or untrawlable habitat, found off the northern West Coast. Due to their habitat preference, yelloweye rockfish are rarely encountered in trawl fisheries, especially in light of small footrope requirements on the shelf. Most yelloweye harvest occurs in tribal and non-tribal hook and line fisheries, and in recreational fisheries. However, some of the specific rocky relief areas are prime recreational halibut and lingcod fishing areas, while other areas encompass favorite commercial fishing spots. Logbook data, or data on fishing locations by these different fisheries is, for the most part, not collected, and at-sea observations are minimal. Therefore, the states would like to have a series of public meetings with affected stakeholders to develop potential area closures for yelloweye rockfish conservation, which could be in place beginning in 2009, and design and implement a logbook program for fixed gear fisheries. Additionally, further research to examine survivability and recreational gear selectivity may provide information to help design management measures for the 2009-2010 management cycle.

Given the high degree of uncertainty in the assessment, the GMT developed alternatives that target amounts less than the Preferred High OY. For example, the estimated mortalities for Action Alternatives 2 and 3 are 14.3 mt and 18.3 mt, respectively, compared to an initial ramp-down OY of 23 mt, which leaves residual amounts of 4.7-8.7 mt in 2007, and 1.7-5.7 mt in 2008.

Species That Are Moderately Sensitive to Changes in OY

Bocaccio The bocaccio stock assessment demonstrates that recruitment is highly variable and anecdotal evidence suggests there may be a strong incoming year-class. Should this strong year-class become evident, past experience indicates that young bocaccio are difficult to avoid for most fisheries and, consequently, encounter rates would be expected to increase. Additionally, the commercial trawl preseason catch projections for bocaccio have been off by a significant amount (100-200%) as compared to post-season catch estimates in recent years, and fixed gear West Coast Groundfish Observer Program (WCGOP) data, especially for the area south of 40°10'N. lat., is fairly sparse. Therefore, we recommend that the Council consider management measures that would result in preseason catch projections that are significantly less (e.g., around 15-20 mt) than the OY to cover this uncertainty. The GMT notes that Action Alternatives 2 and 3, and the No Action Alternative would result in projected bocaccio mortalities that are significantly less, by 32-107 mt, than the Council's Preferred High OY of 218 mt.

Canary Unavoidable incidental catches of canary rockfish occur in trawl, fixed gear, open access, and recreational fisheries targeting groundfish, as well as commercial and recreational fisheries targeting species other than groundfish. Canary's wide geographic distribution and catchability in all fisheries makes it difficult to manage with species-specific RCAs, like yelloweye rockfish and cowcod. Canary is one of the most constraining stocks in 2007-2008 management. The commercial trawl preseason catch projections have been off by a factor of 75-100% as compared to post-season catch estimates in recent years. WCGOP data for fixed gear is fairly sparse, and there is very little observer data for open access and recreational fisheries. Therefore, the GMT recommends the Council consider management measures that would result in preseason catch projections that are slightly less than the Preferred High OY. All of the Action Alternatives, including the No Action Alternative, would result in projected canary mortalities that are less than the Preferred High OY (by 2.7-10.9 mt).

Species With OYs Affected by the Rebuilding Paradox

Darkblotched In the recent past, the commercial trawl preseason catch projections for darkblotched rockfish have been off by as much as 250% as compared to post-season catch estimates. Darkblotched is rarely caught by fixed gear and recreational fisheries. While the GMT has significantly increased the precision in its catch estimation methodology over the past year, inseason data indicates that actual catches are still about 50% higher than what was projected preseason for 2006. Additionally, this species is nearing its rebuilt level, with particularly strong year classes from 1999 and 2000 that are now entering the fishery. Between 2000 and 2005, both the biomass and the spawning output of darkblotched roughly doubled. The biomass is expected to increase by an additional 40% from current levels by 2010, with spawning output doubling again in that period, at which point the stock is expected to be rebuilt based on the assessment point estimate.

This rapid darkblotched stock increase means that there would likely be increased encounter rates for darkblotched in 2007 and 2008 (i.e., the "rebuilding paradox" of not being able to avoid higher catches as the stock approaches target biomass levels.) Therefore, the GMT recommends the Council consider including a relatively high amount of OY to cover this rebuilding paradox and continued catch projection modeling uncertainty. The GMT notes that, while the Action Alternatives, including the No Action Alternative, all result in projected darkblotched mortalities that are less than the Preferred High OY (by 18.2-32.5 mt,) the amount of residual may not be sufficient to address the high variability in encounter rates as the stock rebuilds. As a potential consequence of variable encounter rates, darkblotched bycatch may jeopardize commercial slope fisheries such as the DTS and winter petrale fisheries. The Council has repeatedly heard testimony from industry on the importance of winter petrale and DTS fisheries in maintaining a permanent work force, and avoiding loss of markets to other supply sources which, once lost, can be difficult to regain.

Pacific ocean perch The commercial trawl preseason catch projections for Pacific ocean perch (POP) have been off by as much as 100% as compared to post-season catch estimates in recent years; however, the GMT has significantly increased the precision in its catch estimation methodology over the past year, especially for trawl. Like darkblotched, POP is rarely caught by fixed gear and recreational fisheries. However, POP is also nearing its rebuilt level, so there would likely be increased encounter rates for POP in 2007 and 2008. Therefore, the Council may wish to consider including a relatively high amount of OY to cover the rebuilding paradox and this uncertainty. Similar to darkblotched, unless there is sufficient OY available to address these items, POP will likely constrain commercial slope fisheries. However, unlike darkblotched and other overfished stocks, there is expected to be hardly any residual for POP (i.e., no residual for Action Alternatives 1 and 3, and a residual of 1.5 mt in Action Alternative 2). This is because the OYs analyzed for the Action Alternatives for POP for 2007 and 2008 (which are 44 mt and 100 mt) are significantly reduced from the 2006 OY level of 447 mt. These reduced OYs were not the result of the recent stock assessment or rebuilding plan, but were proposed from recent catch levels in the commercial slope fisheries, which are more significantly constrained by darkblotched rebuilding levels.

Widow Rockfish For widow, the commercial trawl preseason catch projections have been off by as much as 100% as compared to post-season catch estimates in recent years; however, the GMT has significantly increased the precision in its catch estimation methodology over the past year, especially for trawl, and catches of widow are small in fixed gear and recreational fisheries. However, widow is also nearing its rebuilt level, so there would likely be increased encounter rates for widow in 2007 and 2008. Therefore, the GMT recommends the Council consider management measures, which would result in preseason catch projections that are slightly less than the Preferred High OY. Action Alternatives 2 and 3, would result in projected widow rockfish mortalities that are significantly less than the Preferred High OY (by 176-224 mt); however, Action Alternative 1 with the low OY for widow has little residual (3.8 mt) remaining.

Harvest Guidelines for Canary and Yelloweye Rockfish

The Council needs to set separate harvest guidelines for canary and yelloweye rockfish for the recreational fisheries, to be divided at the Oregon/ California border. Under status quo management the Council had adopted harvest guidelines for canary and yelloweye recreational fisheries. The 2006 scorecard represents these harvest guidelines; the 2005 scorecard reflects the end-of-season fishery impacts that actually occurred. Following Council guidance at its April 2006 meeting, the GMT constructed scorecards representing different allocation scenarios (Tables 4-43 through 4-47 in Agenda Item F.2.a Attachment 2, pages 133-140). The recreational fishery harvest guideline alternatives in the table below are taken from those scorecards. These harvest guidelines represent proportional reductions from the 2005 or the 2006 scorecard in order to constrain total mortality below the Preferred Low or the High OY alternatives. One scenario depicts the harvest guidelines if all of the canary and yelloweye rockfish were allocated to the recreational fisheries.

Canary Rockfish recreational harvest guideline/ target alternatives

			High OY		Low OY			
	2006 scorecard		Using 2006 scorecard	Using 2005 scorecard	Using 2006 scorecard	Using 2005 scorecard	All Rec, w/ 2006 scorecard	All Rec, w/ 2005 scorecard
WA	8.5		1.6	1.4	1.1	1.6	2.1	4.7
OR			6.6	5.4	4.3	4.1	8.3	12.1
CA	9.3		9	2	5.9	1.7	11.4	5

Source: Tables 4-43 to 4-47 in Agenda Item F.2.a Attachment 2, pages 133-140

Yelloweye Rockfish recreational harvest guideline/ target alternatives

			High OY				Low OY			
	2006 scorecard		Using 2006 scorecard		Using 2005 Scorecard		Using 2006 Scorecard	Using 2005 Scorecard	All Rec, w/ 2006 scorecard	All Rec, w/ 2005 scorecard
			2007	2008	2007	2008	2007-8	2007-8	2007-8	2007-8
WA	6.7		3.5	3	5.4	4.4	1.6	2.4	2.6	3.9
OR			3.2	2.7	4.2	3.5	1.5	1.9	2.3	3.1
CA	3.7		3.7	3.1	0.9	0.8	1.7	0.4	2.7	0.7

Source: Tables 4-43 to 4-47 in Agenda Item F.2.a Attachment 2, pages 133-140

** Note that Table 4-61 (p. 154 in F.2.a Attachment 2) gave the California recreational 2006 harvest guidelines, rather than the no action impact estimates. The no action impact estimates should be 6.1 mt for canary rockfish and 1.5 mt for yelloweye rockfish. The no action impact estimates are correctly listed for the other states in Tables 4-59 and 4-60.

GROUNDFISH ADVISORY SUBPANEL REPORT ON TENTATIVE ADOPTION OF 2007-2008 GROUNDFISH FISHERY SPECIFICATIONS/MANAGEMENT MEASURES AND AMENDMENT 16-4

The Groundfish Advisory Subpanel (GAP) considered options for 2007-2008 optimum yields (OYs) for depleted groundfish species. There are three parts to this statement: the first contains general comments on current and future economic conditions in the groundfish fishery; the second covers OY recommendations for overfished species, including detailed justification rationale; and the third provides sector specific comments with over-arching impacts and respect to more than one species.

The GAP referenced Agenda Item F.2.a, Attachment 2; page 158, Table 7.69, for exvessel values. In addition, the GAP defines "take" in this document as the amount of catch expected to be harvested (including discard mortality). The GAP has also applied a 3:1 multiplier effect when identifying associated community impacts. The income impact multiplier for all groundfish is 2.16. The GAP believes that the community impacts are much more significant than income impacts alone and believes that the 3:1 multiplier is a more accurate depiction of overall community impacts. Recreational information comes from a National Marine Fisheries Service (NMFS) 2001 study "Technical Memorandum NMFS-F-SPO-49 October 2001."

General Economic Conditions

Members of the GAP representing all sectors of the industry continue to voice their desire to be allowed to fish over the long term. Many interpretations of the Ninth Circuit Court's ruling have been made. Taking into consideration the needs of fishing communities to avoid short-term disastrous consequences has different meanings to different stakeholders. However, one fact is undisputable: short-and long-term consequences to fishing communities are intrinsically linked. In order for there to be commercial and recreational fishing industries over the long term, short-term management measures must help preserve fishing businesses. More plainly said, if no fishing industry exists into the future because of overly extreme cuts in harvest then the Council has not taken into account the economic needs of fishing communities. If individual businesses continue to become depleted, necessary infrastructure within fishing communities that support commercial and recreational industries also become depleted. Once boats are tied to the dock, doors are closed, markets are lost, it isn't just one season's fishing foregone.

The GAP believes that some access to depleted species in order to catch healthy stocks is necessary to avoid disastrous short-term consequences to fishing communities. If communities and fishery sectors cannot survive short-term restrictions, longer-term efforts at sustainability apply only to the biology of fish – not to sustaining communities. The GAP believes the relationship between sustainable fishing communities and stable fisheries stocks is intrinsic, and preserving both for the long-term is not only worthwhile, but a necessity. With this in mind, the GAP notes the following with respect to the level of distress in the current fishery.

Generally from 1981 through 1997 the exvessel value of the commercial non-whiting groundfish fishery ranged from $80 to $100 million. In 1998, the first year of the groundfish disaster, the value of the entire non-whiting groundfish fishery was $61 million. The disaster was officially declared in 2000, and from 2002 through 2005 exvessel value of the fishery ranged from approximately $40 to $45 million. A difference of $40 to $55 million from the earlier period.

During this time of harvest cuts many fishing businesses and several seafood processors have gone out of business. Secondary and tertiary businesses associated with the fishing industry have also suffered. The additional hardship of increased fuel costs has only made it more difficult to maintain business plans.

Taking into consideration the needs of fishing communities goes beyond simple measures of changes in revenue. Socioeconomic effects should also be a major part of the discussion. For example, unemployment rates are higher for older individuals who have a more difficult time transitioning to new employment opportunities. This type of information is difficult to quantify but we know there are detrimental social consequences when businesses are suffering financially and closing their doors.

Incentives for improved science, management, and fishing practices should always be encouraged and explored. However, the one control the Council has for decision-making today on rebuilding plans is controlling fishing effort. Recreational and commercial fisheries have adapted to reduced harvests. Areas are now closed to protect overfished stocks. Essential fish habitat was established to protect spawning grounds and sensitive habitats. These reductions, closures, and other management measures are in place and there is evidence that stocks are rebuilding. Further reductions in harvest will harm the West Coast groundfish fishery and support industries without any meaningful gain in rebuilding times for most overfished species.

On the basis of the current distress in the fishery, the array of tradeoffs between present and future production, the levels of economic activities that each of these OYs affords, and affect on rebuilding times, the GAP has the following specific recommendations.

GAP Recommendations for OYs for Overfished Species

The following is a summary of the GAP recommendations:

Species	2007 OY	2008 OY
Bocaccio	218 mt	218 mt
Canary rockfish	44 mt	44 mt
Cowcod	8 mt	8 mt
Darkblotched rockfish	330 mt	330 mt
Pacific Ocean Perch	217 mt	217 mt
Widow rockfish	456 mt	456 mt
Yelloweye rockfish	Ramp down approach	Ramp down approach

BOCACCIO

Recommendation

The GAP recommends an OY of 218 mt for 2007 and 2008.

Fisheries Involved

Bocaccio is caught in the following fisheries occurring south of 40° 10'.

- Research Fisheries
- Limited Entry Trawl Non-whiting Fisheries
- Limited Entry Fixed-Gear Fisheries
- Open Access Directed Groundfish Fisheries
- Open Access Incidental Fisheries
    - California halibut
    - California gillnet
    - Coastal pelagic species wetfish
    - Pink shrimp
    - Ridgeback prawn
    - Salmon troll
- California Recreational Fisheries

Communities Impacted

There are at least 31 ports that could be impacted with a reduction in the amount of Bocaccio available. These communities are all located south of 40˚ 10' north latitude and include:

Albion, Bodega Bay, Fort Bragg, Point Arena, Point Reyes, Shelter Cover, Big Creek, Elk, Monterey, Moss Landing, Half Moon Bay, San Francisco, Santa Cruz, 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, and Wilmington.

Justification for Recommendation

- An OY of 218 mt represents an 80% probability of rebuilding. The median time to rebuild the stock under this alternative would be 2026, or five years longer than if a zero OY alternative were implemented.
- The Bocaccio biomass is increasing at an accelerated rate. Interactions with Bocaccio will continue to increase as the stock continues to rebuild.
- For 2007 and 2008 this represents an OY which is only 36% and 28% of the Council's preferred acceptable biological catch (ABC) of 602 mt and 618 mt, respectively.
- Dr. Alec McCall reports that there is strong evidence that two strong year classes are moving into the fishery.
- This fishery has already constrained or eliminated other fisheries, for example, the spot and ridgeback prawn trawl fisheries, the California halibut fishery, sea cucumber fishery, overall open access California groundfish fisheries, California limited entry trawl fishery and all of the California groundfish recreational fisheries.

Impacts of Lower OY Values

Limited Entry Trawl Non-whiting Fishery

Under a zero OY alternative, there would be no limited entry trawl non-whiting fishery south of 40˚10' N. Lat. This results in a loss of $2,600,000 exvessel value which equates to a $7,800,000 impact to affected communities.

Under the low OY alternative (40 mt), the limited entry trawl non-whiting fishery is expected to take 9.1 mt of Bocaccio (Table 2-14). In 2006, this same fishery is expected to take 47.9 mt of Bocaccio. This is an 80% reduction in catch, resulting in a $2,080,000 loss in exvessel revenues, which equates to $6,240,000 loss to affected communities.

Under the high OY alternative (218 mt), the limited entry trawl non-whiting fishery is expected to take 50.5 mt (Table 2-21). This number is more similar to the expected catch in 2006 and the higher OY allows a fishery similar to the status quo fishery, which is already severely constrained.

Limited Entry Fixed-Gear Fishery

Under a zero OY alternative there would be no limited entry fixed-gear fishery south of 40°10' N. lat. for shelf and nearshore rockfish. This results in a loss of $1,200,000 in exvessel revenue which equates to a $3,600,000 economic impact to the affected communities.

Under the low OY alternative (40 mt), the limited entry fixed gear fishery is expected to take 5.4 mt of Bocaccio (Table 2-14). This same fishery is expected to take 13.4 mt of Bocaccio in 2006. This is a 60% reduction in catch resulting in a loss of $720,000 in exvessel revenue which equates to $2,160,000 impact to affected communities.

Under the high OY alternative (218 mt), the limited entry fixed gear fishery is expected to take 13.4 mt of Bocaccio. The higher OY would allow a fishery similar to the status quo fishery, which is already severely constrained.

Open Access Directed Groundfish Fishery

Under a zero OY alternative the open access directed groundfish fishery south of 40°10' N. Lat. for shelf and nearshore rockfish would be eliminated. This results in a loss of $3,000,000 in exvessel value, which equates to a $9,000,000 economic impact to the affected communities.

Under the low OY alternative (40 mt), the open access directed groundfish fishery is expected to take 4.1 mt (Table 2-14). This is 6.5 mt less than the expected catch for 2006. This is a 37% reduction resulting in a loss of $1,110,000 exvessel values, which equates to a $3,330,000 economic impact to affected communities.

Under the high OY, alternative (218 mt), the open access directed groundfish fishery is expected to take 13.4 mt (Table 2-21). The higher OY option allows a near status quo fishery, which is already severely constrained.

California Recreational Fishery

Under a zero OY alternative all California recreational fisheries that encounter Bocaccio would be eliminated. This results in a loss of more than $1 billion to affected communities.

Under the low OY alternative (40 mt), the California recreational fishery is expected to take 16.0 mt (Table 2-14). This same fishery is expected to take 98.0 mt in 2006. This is an 84% reduction in catch and equates to an $840,000,000 economic impact to California communities.

Under the high OY alternative (218 mt), the California recreational fishery is expected to take 106.8 mt (Table 2-21). The high OY allows a status quo fishery, which is already severely constrained.

Maintaining Bocaccio catches at 2006 levels in order to prosecute fisheries on healthier stocks DOES NOT represent a profitable position for any of the fisheries which interact with Bocaccio. Using 2006 levels as a benchmark for measuring impacts is misleading in that 2006 levels are not reflective of healthy fishing communities. Total Bocaccio catches prior to the groundfish fishery disaster declaration in 2000 were significantly higher with 480 mt landed in 1997. The total catch expected in 2006 is just under 174 mt. This reflects a 64% reduction in Bocaccio catch as well as a higher percentage reduction in catches of associated species.

CANARY ROCKFISH

Recommendation

The GAP recommends a 44 mt OY for 2007 and 2008.

Fisheries Involved

Canary rockfish are caught in essentially all of the major fishery sectors including:

- Research Fisheries
- Tribal Fisheries
- Limited Entry Trawl Non-Whiting Fisheries
- Limited Entry Trawl Whiting Fisheries
- Limited Entry Fixed Gear Fisheries
- Open Access Directed Groundfish Fisheries
- Open Access Directed Incidental Groundfish Fisheries
    - California Halibut
    - Pink Shrimp
    - Salmon Troll
- Washington Recreational Fisheries
- Oregon Recreational Fisheries
- California Recreational Fisheries

Communities Involved

There are at least 46 ports that could be impacted by a reduction in the amount of canary rockfish available for harvest. These ports include: Aberdeen, Astoria, Bandon, Bellingham, Blaine, Brookings, Cathlamet, Charleston, Chinook, Crescent City, Depoe Bay, Eureka, Everett, Fields Landing, Florence, Garibaldi, Gold Beach, Ilwaco, La Push, Mill Creek, Neah Bay, Newport, Pacific City, Port Angeles, Port Orford, Port Townsend, Seattle, Tokeland, Trinidad, Westport, Winchester Bay, Albion, Avila, Bodega Bay, Fort Bragg, Point Arena, Point Reyes, Shelter Cover, Big Creek, Elk, Monterey, Morro Bay, Moss Landing, Half Moon Bay, San Francisco, and Santa Cruz.

Justification for Recommendation

- The most recent canary stock assessment reports that the biomass has been increasing since 2000. As the canary stock continues to rebuild the interaction with canary rockfish during fishing operations will continue to grow.
- Cooperative research currently being conducted indicates that some of the assumptions in the stock assessment surrounding older female fish are inaccurate and that inclusion of the new information would show the stock is actually more productive. Video Trawl research from the same project indicates a higher level of abundance than assumed in the stock assessment.
- The recommended OY is 7% less than the 2006 OY and 26% of the 2007 Council preferred ABC of 172 mt.
- Estimated catch for 2006 (44.3 mt) is higher than the high OY option (44 mt).

Impacts of Lower OY Values

Tribal Fishery

Under a zero OY alternative, the tribal fishery loses all groundfish and salmon fisheries resulting in an economic loss of $11,685,700 in exvessel revenue.

Limited Entry Trawl Non-Whiting Fishery (non-tribal)

Under a zero OY alternative, the limited entry trawl non-whiting fishery would be eliminated. This results in a loss of $6,500,000 in exvessel revenue, which equates to a $19,500,000 economic impact to affected communities.

Under the low OY alternative (32 mt), the limited entry non-whiting fishery is expected to take 3.7 mt (Table 2-14). In 2006 this same fishery is expected to take 7.8 mt. This would result in a 53% reduction in catch and results in a loss of $3,445,000 in exvessel revenue, which equates to a $10,335,000 economic impact to affected communities.

Under the high OY alternative (44 mt), the limited entry non-whiting fishery is expected to take 8.5 mt (Table 2-21). The high OY alternative allows a fishery similar to the status quo fishery, which is already severely constrained.

Limited Entry Trawl Whiting Fishery (non-tribal)

Under a zero OY alternative, the entire whiting fishery could be lost resulting in a $30 million exvessel loss, which equates to a $90 million economic impact to affected communities.

Under the low OY alternative (32 mt), a 3.0 mt hard cap would be imposed on the whiting fishery (Table 2-14). This equates to a 40% reduction from the hard cap in place for 2006. Based on this scenario, it is likely that 50% of the whiting OY would be unattainable, resulting in a $15 million exvessel revenue loss, which equates to a $45 million economic impact to affected communities.

Under the high OY alternative (44 mt), it is projected that the whiting fishery would take 5.5 mt (Table 2-21). If the 2006 hard cap of 4.7 mt is implemented there is the possibility that 15% of the fishery would be foregone if, due to the rebuilding paradox, canary rockfish are encountered at an accelerated rate and the hard cap is reached. 5.0% of the fishery equates to $4.5 million exvessel revenue loss, which equates to a $13.5 million economic impact to affected communities.

Limited Entry Fixed Gear Fishery (non-tribal)
Under a zero OY alternative, the limited entry fixed gear fishery would be eliminated. This results in a loss of $19,000,000 exvessel value and equates to $57,000,000 to affected communities.

Under the low OY alternative (32 mt), the limited entry fixed gear fishery is expected to take 0.1 mt (Table 2-14). This same fishery is expected to take 1.2 mt in 2006, resulting in a 98% reduction and a loss of $18,620,000 in exvessel revenue, which equates to a $55,860,000 economic impact to affected communities.

Under the high OY alternative (44 mt), the limited entry fixed gear fishery is expected to take .9 mt (Table 2-21), which results in a 25% reduction in catch and equates to a loss of $4,700,000 in exvessel value. This loss translates to a $14,250,000 economic impact to affected communities.

Open Access Directed Groundfish Fishery
Under a zero OY alternative, the open access directed groundfish fishery would be eliminated. This represents a loss of $8,000,000 in exvessel revenue, which equates to a $24,000,000 economic impact to affected communities.

Under the low OY alternative (32 mt), the open access directed groundfish fishery is expected to take 1.0 mt (Table 2-14). This same fishery is expected to take 3.0 mt of canary rockfish in 2006 resulting in a 66% reduction in catch and a loss of $5,280,000 in exvessel value which equates to a $15,840,000 economic impact to affected communities.

Under the high OY alternative (44 mt), the open access directed groundfish fishery is expected to take 2.1 mt (Table 2-21). The high OY alternative allows a fishery similar to the status quo fishery, which is already severely constrained.

California Recreational Fishery
Under a zero OY alternative the California recreational fisheries that encountered canary rockfish would be eliminated. This results in a loss of more than $1 billion to affected communities.

Oregon Recreational Fishery
Under a zero OY alternative, the Oregon recreational fisheries that encounter canary rockfish would be completely eliminated. This results in a loss of more than $45 million to affected communities.

Washington Recreational Fishery
Under a zero OY alternative, Washington recreational fisheries that take canary would be eliminated. This results in a loss of $5,000,000 to affected communities (includes total loss of halibut fishery, 50% loss of groundfish fishery, and 25% loss of salmon fishery due to depth restrictions – forced to stay inside of 30 fathoms).

Under the low OY alternative (12.6 mt), the Washington recreational fishery is expected to take 1.6 mt. This same fishery is expected to take 3.1 mt in 2006 which is an 80% reduction in catch which results in a loss of $4,000,000 to affected communities.

Maintaining canary catches at 2006 levels in order to prosecute fisheries on healthier stocks DOES NOT represent a profitable position for any of the fisheries which interact with canary rockfish. Using 2006 levels as a benchmark for measuring impacts is misleading in that 2006 levels are not reflective of healthy fishing communities.

Total canary rockfish catches prior to the groundfish fishery disaster declaration in 2000 were significantly higher with 1,309 mt landed in 1997. The total catch expected in 2006 is just over 44 mt. This represents a 97% reduction in catches of canary rockfish as well as a higher percentage reduction in catches of associated species.

COWCOD

Recommendation

The GAP recommends an OY of 8 mt for 2007 and 2008.

Fisheries Involved

Cowcod are caught in the following fisheries:

- Research Fisheries
- Limited Entry Trawl Non-Whiting Fisheries
- Limited Entry Fixed-Gear Fisheries
- Open Access Directed groundfish Fisheries
- California Recreational Fisheries

Communities Involved

There are at least 31 ports that could be impacted with a reduction in the amount of cowcod available. These communities are all located south of 38˚ 10' N. Lat. and include:
Albion, Bodega Bay, Fort Bragg, Point Arena, Point Reyes, Shelter Cover, Big Creek, Elk, Monterey, Moss Landing, Half Moon Bay, San Francisco, Santa Cruz, 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, and Wilmington.

Justification for Recommendation

- The ABC for cowcod more than tripled with the new assessment, from 5 mt to 17 mt. The OY for 2006 was 4.2 mt, 58% below the ABC. With a 17 mt ABC, the status quo rebuilding policy would result in an OY of 5 mt, 71% below the ABC. An OY of 8 mt would be 53% below the ABC, more aggressive rebuilding relative to the 2006 fishery.
- An 8 mt OY for cowcod represents an 80% probability of rebuilding on schedule.
- As this stock continues to be rebuilt, there will be higher incidence of interactions with this stock (rebuilding paradox).

Impacts of Lower OY Values

<u>Limited Entry Trawl Non-Whiting Fisheries</u>

A zero OY alternative would eliminate the limited entry trawl non-whiting fishery south of 40°10' N. Lat. resulting in a loss of $2,600,000 in exvessel value and $7,800,000 to the affected communities.

The low OY alternative (4 mt) results in an expected catch of 0.2 mt for the limited entry trawl non-whiting fishery (Table 2-14). This same fishery is expected to catch 2.7 mt in 2006. This results in a 93% reduction in catch and a loss of $2,418,000 in exvessel values, which equates to a $7,254,000 economic impact to affected communities.

The high OY alternative (8 mt) results in an expected catch of 2.9 mt for the limited entry trawl non-whiting fishery (Table 2-21). The high OY allows a status quo fishery, which is already severely constrained.

Limited Entry Fixed-Gear Fisheries

A zero OY alternative would eliminate the limited entry fixed gear fishery south of 40°10' N. Lat. This results in a loss of $1,200,000 in exvessel revenue and 3,600,000 to the affected communities.

Under the low OY alternative (4 mt) the limited entry fixed gear fishery is expected to take 0.1 mt of cowcod (Table 2-14). This is the same expected catch for 2006.

Under the high OY alternative (8 mt) the limited entry fixed gear fishery is expected to take 0.1 mt of cowcod (Table 2-21). The high OY alternative allows a status quo fishery, which is already severely constrained.

Open Access Directed Groundfish Fisheries

A zero OY alternative would eliminate the southern open access directed groundfish fishery. This results in a loss of $3,000,000 in exvessel value, which equates to a $9,000,000 economic impact to affected communities.

Under the low OY alternative (4 mt), the open access directed groundfish fishery is expected to take 0.1 mt (Table 4-45). This is the same catch expected for 2006.

Under the high OY alternative (8 mt), the open access directed groundfish fishery is expected to take 0.1 mt. This alternative allows for a status quo fishery, which is already severely constrained.

California Recreational Fisheries

Under a zero OY alternative, California recreational fisheries south of Point Conception would have to be eliminated. This results in a loss of approximately $500,000,000 to affected communities.

Under the low OY alternative, California recreational fisheries are expected to take 0.0 mt (Table 2-14). This same fishery is expected to catch 0.4 mt in 2006. This results in a 100% reduction in catch, which equates to a $500 million economic impact to affected communities.

Under the high OY alternative, California recreational fisheries are expected to take 0.3 mt (Table 2-21). The high OY allows a fishery similar to the status quo fishery, which is already severely constrained.

Maintaining cowcod catches at 2006 levels in order to prosecute fisheries on healthier stocks DOES NOT represent a profitable position for any of the fisheries which interact with cowcod rockfish. Using 2006 levels as a benchmark for measuring impacts is misleading in that 2006 levels are not reflective of healthy fishing communities. Total cowcod catches prior to the groundfish fishery disaster declaration in 2000 were higher with 9 mt landed in 1997. The total catch expected in 2006 is 3.4 mt, a reduction in catch of over 62%.

DARKBLOTCHED ROCKFISH

Recommendation

The GAP recommends an OY of 330 mt for 2007 and 2008.

Fisheries Involved

Darkblotched rockfish is currently taken in several West Coast fisheries including:

- Research Fisheries
- Tribal Fisheries
- Limited Entry Trawl Non-Whiting Fisheries
- Limited Entry Trawl Whiting Fisheries
- Limited Entry Fixed-gear Fisheries
- Open Access Directed Groundfish Fisheries

Communities Involved

There are at least 13 communities that could be impacted with a reduction in the amount of darkblotched rockfish available. These communities include Astoria, Bellingham, Blaine, Brookings, Charleston, Crescent City, Eureka, Ft. Bragg, Ilwaco, Neah Bay, Newport, and Westport.

Justification for Recommendation

- An OY of 330 mt is 72% of the Council's preferred ABC of 457 mt. The 330 mt OY results in a rebuilt stock by 2010.5, a 1 year increase from a zero OY alternative.
- As the darkblotched rockfish stock rebuilds, the interactions with these fish will continue to increase (rebuilding paradox).
- The current 200 mt OY was imposed as an interim OY pending the development of a rebuilding plan; it was not intended to be a rebuilding OY.
- Given higher occurrence of darkblotched, the current fishery could catch 284 mt, which is higher than the high OY option (229 mt).
- A 330 mt OY equates to rebuilding six months into the year 2010. A zero harvest OY equates to rebuilding six months into the year 2009. Both options equate to rebuilding during the *same* management cycle. It is estimated that you could set a 432 mt OY and darkblotched rockfish would still be rebuilt within the same management cycle (2010.9).

Impacts of Lower OY Values

<u>Tribal Fishery</u>

Under a zero OY alternative, the tribal bottom trawl fishery would be eliminated, resulting in a direct loss of $693,379 in exvessel revenue.

Limited Entry Trawl Non-Whiting Fishery (non-tribal)
Under a zero OY alternative, the limited entry trawl non-whiting fishery would be eliminated north of 38˚ N. Lat. This results in a loss of $14,300,000 in exvessel revenue which equates to a $42,900,000 economic impact to affected communities.
Under the low OY alternative, the limited entry trawl non-whiting fishery is expected to catch 66.7 mt (Table 2-14). This same fishery is expected to catch 248.9 mt in 2006. This is a 73% reduction in catch and equals $10,439,000 lost in exvessel revenues, which equates to a $31,317,000 economic impact to affected communities.

Under the high OY alternative, the limited entry trawl non-whiting fishery is expected to catch 181.1 mt (Table 2-21). This same fishery is expected to catch 248.9 mt in 2006. This is a 28% reduction in catch and equals a loss of $4,040,000 in exvessel revenues, which equates to a $12,012,000 economic impact on affected communities.

Limited Entry Trawl Whiting Fishery (non-tribal)
Under a zero OY alternative, the entire whiting fishery could be lost resulting in a loss of $30 million in exvessel revenue, which equates to a $90 million economic impact to the affected communities.

Under the low OY alternative (130 mt), the whiting fishery is expected to catch 8.6 mt (Table 2-14). In 2005 the whiting fishery took 16.5 mt of darkblotched rockfish. Under the 8.6 mt a 50% reduction would occur, resulting in a loss of approximately $15,000,000 in exvessel revenue which equates to a $45,000,000 economic impact to affected communities.

Under the high OY alternative (229 mt), the whiting fishery is expected to catch 16.2 mt (Table 2-21). Based on the darkblotched catch from 2005 only a slight loss would occur. However, under the rebuilding paradox, if darkblotched are encountered at an accelerated rate then the fishery could reach its darkblotched hard cap prior to the attainment of the whiting fishery causing economic loss.

Limited Entry Fixed Gear Fishery (non-tribal)
Under a zero OY alternative, the entire limited entry fixed gear fishery would be lost. This results in a loss of $12,000,000 in exvessel value and equates to a $36,000,000 economic impact to affected communities.

Under the low OY alternative (130 mt), the limited entry fixed gear fishery is expected to take 0.0 mt (Table 2-14). This same fishery is expected to take 1.3 mt in 2006. This represents a 100% decrease in catch and a loss of $12,000,000 in exvessel value that equates to a $36,000,000 economic impact to affected communities.

Under the high OY alternative (229 mt), the limited entry fixed gear fishery is expected to take 1.1 mt (Table 2-21). This results in a 16% decrease in catch or a loss of $1,920,000 in exvessel value, which equates to a $5,760,000 economic impact to affected communities.

Open Access Directed Groundfish Fishery
Under a zero OY alternative, the open access directed groundfish fishery on the slope north of 38˚ would be eliminated. This results in a loss of $1,900,000 in exvessel value which equates to a $5,700,000 economic impact to affected communities.

Under the low OY alternative, the open access directed groundfish fishery is expected to take 0.2 mt (Table 2-14). This same fishery is expected to take 0.2 mt in 2006.

Under the high OY alternative, the open access directed groundfish fishery is expected to take 0.2 mt (Table 4-43). The high OY alternative allows a status quo fishery, which is already severely constrained.

Maintaining darkblotched catches at 2006 levels in order to prosecute fisheries on healthier stocks DOES NOT represent a profitable position for any of the fisheries which interact with darkblotched rockfish. Using 2006 levels as a benchmark for measuring impacts is misleading in that 2006 levels are not reflective of healthy fishing communities. Total darkblotched catches prior to the groundfish fishery disaster declaration in 2000 were higher with 747 mt landed in 1997. The 2006 OY is 200 mt, a reduction in catch of about 73% as well as a higher percentage reduction in catches or associated species.

PACIFIC OCEAN PERCH

Recommendation

The GAP recommends an OY of 217 mt for 2007 and 2008.

Fisheries Involved

Pacific Ocean perch (POP) is currently taken in several West Coast fisheries including:

- Research Fisheries
- Tribal Fisheries
- Limited Entry Trawl Non-Whiting Fisheries
- Limited Entry Trawl Whiting Fisheries
- Limited Entry Fixed-Gear Fisheries
- Open Access Directed Groundfish Fisheries

Communities Involved

There are 11 ports that could be impacted by a reduction in the amount of Pacific Ocean Perch available. These communities include: Astoria, Bellingham, Blaine, Brookings, Charleston, Crescent City, Eureka, Ilwaco, Neah Bay, Newport, and Westport.

Justification for Recommendation

- A 217 mt OY is equal to 24% of the Council’s preferred sustainable ABC of 900 mt in 2007.
- As POP continues to rebuild, interactions with the stock will continue to increase (rebuilding paradox).
- There are significant problems associated with attempting to rebuild a stock which is occurring on the extreme southern fringe of its geographic range. This stock has been under rebuilding scenarios of one kind or another for about thirty years. The GAP encourages the Council to consider whether we are attempting to manage to incorrect levels by not considering the biomass of the stock over a larger portion of its range.
- Estimated catch in 2006 (116.7 mt) is higher than the high OY alternative (100 mt).
- The high OY alternative (100 mt) results in a rebuilt stock in 2015.6 (just over six months through the year 2015). An OY of 217.5 results in a rebuilt stock in 2016.9. Both options equate to rebuilding during the *same* management cycle.

Impacts of Lower OY Values

Tribal Fishery

Under a zero OY alternative, the tribal bottom trawl fishery would be eliminated, resulting in a direct loss of $693,379 in exvessel revenue.

Limited Entry Trawl Non-Whiting Fishery (non-tribal)

Under a zero OY alternative the limited entry trawl non-whiting fishery would be eliminated north of 40°10'. This results in a loss of $12,000,000 in exvessel value, which equates to a $36,000,000 economic impact to affected communities.

Under the low OY alternative (44 mt) the limited entry trawl non-whiting fishery is expected to take 32.4 mt (Table 2-14). This same fishery is expected to take 102.6 mt in 2006. This results in a 69% reduction in catch and a loss of $8,280,000 in exvessel revenues, which equates to a $24,840,000 economic impact to affected communities.

Under the high OY alternative (100 mt) the limited entry trawl non-whiting fishery is expected to take 85.9 mt (Table 2-21). This results in a 16% reduction in catch and, a loss of $1,920,000 in exvessel revenues which equates to a $5,760,000 economic impact to affected communities.

Limited Entry Trawl Whiting Fishery (non-tribal)

Under a zero OY alternative, the entire whiting fishery could be lost resulting in a $30,000,000 loss to exvessel revenues, which equates to a $90,000,000 economic impact to affected communities.

Under the low OY alternative (44 mt), the whiting fishery is expected to take 3.0 mt of POP (Table 2-14). In 2003 and 2004, the whiting fishery caught 4 mt and 6 mt, respectively. The whiting fishery is expected to take 5.7 mt in 2006. This could result in 33-50% less POP available to the whiting fishery resulting in a loss of $10 to 15 million in exvessel revenues. This equates to a $30 to 45 million dollar economic impact to affected communities.

Under the high OY alternative (100 mt), the whiting fishery is expected to take 5.4 mt (Table 2-21). Based on catches in recent years, this may allow for full attainment of the whiting OY. However, based on implications of the rebuilding paradox and the rate of bycatch in the limited entry bottom trawl fishery, there is the possibility of losing part of the whiting OY.

Limited Entry Fixed-Gear Fishery (non-tribal)

Under a zero OY alternative, the limited entry fixed gear fishery would be eliminated north of 40°10' N. Lat. This results in a loss of $10,000,000 in exvessel value, which equates to a $30,000,000 economic impact to affected communities.

Under the low OY alternative (44 mt), the limited entry fixed gear fishery is expected to take 0.6 mt (Table 2-14). This same fishery is expected to take 0.4 mt in 2006. This results in a 33% reduction in catch and a loss of $3,300,000 in exvessel revenues, which equates to a $9,900,000 economic impact to affected communities.

Under the high OY alternative (100 mt), the limited entry fixed gear fishery is expected to take 0.6 mt (Table 2-21). This results in a 33% reduction in catch and a loss of $3,300,000 in exvessel revenues, which equates to a $9,900,000 economic impact to affected communities.

Open Access Directed Groundfish Fishery

Under a zero OY alternative, the open access directed groundfish fishery slope fishery north of 40°10' N. Lat. would be eliminated. This results in a loss of $1,500,000 in exvessel value and associated loss of $4,500,000 to affected communities.

Under the low OY alternative (44 mt), the open access directed groundfish fishery is expected to take 0.1 mt (Table 2-14). This same fishery is expected to take 0.1 mt in 2006.

Under the high OY alternative (100 mt), the open access directed groundfish fishery is expected to take 0.1 mt (Table 2-21). The high OY value allows a status quo fishery, which is already severely constrained.

Maintaining POP catches at 2006 levels in order to prosecute fisheries on healthier stocks DOES NOT represent a profitable position for any of the fisheries which interact with POP. Using 2006 levels as a benchmark for measuring impacts is misleading in that 2006 levels are not reflective of healthy fishing communities. Total POP catches prior to the groundfish fishery disaster declaration in 2000 were higher with 751 mt caught in 1997. The total catch expected in 2006 is 116.7 mt, a reduction in catch of over 85% as well as a higher percent reduction in catches of associated species.

WIDOW ROCKFISH

Recommendation

The GAP recommends an OY of 456 mt for 2007 and 2008.

Fisheries Involved

Widow rockfish are currently taken in several West Coast fisheries including:

- Research Fisheries
- Tribal Fisheries
- Limited Entry Trawl Non-Whiting Fisheries
- Limited Entry Trawl Whiting Fisheries
- Limited Entry Fixed Gear Fisheries
- Open Access Directed Groundfish Fisheries
- Open Access Incidental Groundfish Fisheries
    - Pink shrimp
    - Salmon troll
- Oregon Recreational Fisheries
- California Recreational Fisheries

Communities Involved

There are at least 11 ports that could be impacted with a reduction in the amount of widow rockfish available. These communities include Astoria, Charleston, Crescent City, Eureka, Fort Bragg, Bodega Bay, San Francisco, Ilwaco, Newport, Seattle and Westport.

Justification for Recommendation

- A 456 mt OY is equal to 8% of the Council's preferred sustainable ABC of 5,334 mt in 2007. This OY corresponds to a rebuilding plan which results in the stock being rebuilt by 2016, 3 years longer than zero harvest.
- The most recent stock assessment revealed that widow rockfish was never overfished and is rebuilding rapidly.
- Interactions with widow rockfish will continue to increase as the stock continues to grow (rebuilding paradox).
- A 456 mt OY equates to rebuilding in 2016. The preferred high OY (368 mt) results in the stock being rebuilt in 2015. Both options equate to rebuilding during the *same* management cycle. It is estimated that an OY of approximately 440 mt would result in a rebuilt stock in 2015.9.
- The 2005 stock assessment indicates that in 2004 the widow stock was not overfished and in 2004 was above the overfished level at 31% of the unfished biomass.

Impacts of Lower OY Values

Tribal Fisheries

Under a zero OY alternative, the mid-water trawl and whiting fishery would be eliminated resulting in a $4,752,058 loss in exvessel revenue.

Limited Entry Trawl Non-Whiting Fishery

Under a zero OY alternative, the entire limited entry trawl non-whiting shelf fishery could be eliminated. This results in a loss of $6,900,000 in exvessel value, which equates to a $20,700,000 economic impact to affected communities.

Under the low OY alternative (120 mt), projected catch of widow rockfish in the limited entry non-whiting fishery would be reduced to 0.1 mt (Table 2-14). This same fishery is expected to take 0.6 mt of widow in 2006. This results in an 83% reduction in catch and a loss of $5,727,000 in exvessel revenue, which equates to a $17,181,000 economic impact to affected communities.

Under the high OY alternative (368 mt), the limited entry trawl non-whiting fishery is expected to take 1.0 mt (Table 2-21). The high OY alternative could allow a status quo fishery, which is already severely constrained.

Limited Entry Trawl Whiting Fishery

Under a zero OY alternative the entire whiting fishery would be lost resulting in a $30 million dollar loss at the exvessel level. This equates to a $90 million dollar economic impact to affected communities.

Under the low OY alternative, the whiting industry hard cap would be reduced to 64.9 mt (Table 2-14). This equates to a 66% reduction from the hard cap in place for 2006. Twenty million in lost exvessel revenues could be associated with the loss of access to the healthy whiting OY based on the reduction in widow rockfish available (66% of a $30 million dollar fishery). This equates to a $60 million dollar economic impact to the affected communities.

Under the higher OY alternatives, it is assumed that the 200 mt hard cap for the whiting fishery would remain in place. It is difficult to predict whether losses would occur under this scenario. While 200 mt is the hard cap in place for 2006, due to the circumstances of the rebuilding paradox it is unclear whether or not a 200 mt hard cap will affect the 2006 fishery. Presumably as the stock continues to rebound, harvesters in the whiting fishery will continue to encounter widow rockfish at higher rates.

Limited Entry Fixed-Gear Fishery

Under a zero OY alternative the limited entry fixed gear fishery would be eliminated. This results in a loss of $1,800,000 in exvessel value, which equates to a $5,400,000 economic impact to affected communities.

Under the low OY alternative (120 mt), the limited entry fixed gear fishery is expected to catch 0.5 mt (Table 2-14). This same fishery is projected to take 0.5 mt in 2006.

Under the high OY alternative (368 mt), the limited entry fixed gear fishery is expected to take 0.5 mt (Table 2-21).

Open Access Directed Groundfish Fishery

Under a zero OY alternative, the open access directed groundfish fishery would be eliminated. This results in a loss of $3,000,000 in exvessel value which equates to a $9,000,000 economic impact to affected communities.

Under the low OY alternative (120 mt), the open access directed groundfish fishery is expected to take 0.1 mt (Table 2-14).

Under the high OY alternative (368 mt), the open access directed groundfish fishery is expected to take 0.1 mt.

Oregon Recreational Fisheries

Under a zero OY alternative, Oregon recreational fisheries associated with widow rockfish would be eliminated resulting in a loss of $3,200,000 to affected communities.

Under the low OY alternative (120 mt), the Oregon recreational fishery is expected to take 0.5 mt. This same fishery is expected to take 1.4 mt in 2006. This equates to a 65% reduction in catch and a loss of $2,080,000 in exvessel value which equates to a $6,240,000 economic impact to affected communities.

Under the high OY alternative (368 mt), the Oregon recreational fishery is expected to take 1.4 mt.

California Recreational Fisheries

Under a zero OY alternative, California recreational fisheries associated with widow rockfish would be eliminated resulting in a loss of $1 billion to affected communities.

Under the low OY alternative (120 mt), the California recreational fishery is expected to take 1.6 mt (Table 2-14). This same fishery is expected to take 8.0 mt in 2006. This results in an 80% reduction in catch and a loss of $800 million to affected communities.

Maintaining widow rockfish catches at 2006 levels in order to prosecute fisheries on healthier stocks DOES NOT represent a profitable position for any of the fisheries which interact with widow rockfish. Using 2006 levels as a benchmark for measuring impacts is misleading in that 2006 levels are not reflective of healthy fishing communities. Total widow catches prior to the groundfish fishery disaster declaration in 2000 were higher with 6,492 mt caught in 1997. The total catch expected in 2006 is 258 mt, a reduction in catch of over 96% as well as a higher percentage reduction in catches of associated species.

YELLOWEYE ROCKFISH

Recommendation

The GAP recommends a ramp-down approach for yelloweye rockfish which results in the following OYs:

- 2007 OY, 23 mt
- 2008 OY, 20 mt
- 2009 OY, 17 mt
- 2010 OY, 15 mt

Fisheries Involved

Yelloweye rockfish are currently caught in several fisheries including:

- Research Fisheries
- Tribal Fisheries
- Limited Entry Trawl – Non Whiting Fisheries
- Limited Entry Fixed Gear Fisheries
- Open Access Directed Groundfish Fisheries
- Open Access Incidental Groundfish Fisheries
    - Pink shrimp
    - Salmon troll
- Washington Recreational Fisheries
- Oregon Recreational Fisheries
- California Recreational Fisheries

Communities Involved

There are at least 31 ports that could be impacted by lower amounts of yelloweye available. These ports include: Aberdeen, Astoria, Bandon, Bellingham, Blaine, Brookings, Cathlamet, Charleston, Chinook, Crescent City, Depoe Bay, Eureka, Everett, Fields Landing, Florence, Garibaldi, Gold Beach, Ilwaco, La Push, Mill Creek, Neah Bay, Newport, Pacific City, Port Angeles, Port Orford, Port Townsend, Seattle, Tokeland, Trinidad, Westport, and Winchester Bay.

Justification for Recommendation

- This "ramp-down" approach incorporates a reduced OY on a yearly basis; however the proposal from the GAP would set 15 mt as the lower bound on the OY. The GAP notes that under the first year of this ramp-down approach the OY would be 23 mt, 36% below the ABC of 36 mt. The 2007 OY also represents a 15% reduction from 2006. Under a ramp-down to 13.5 mt, it is estimated that rebuilding times could increase by approximately 7 months.

- The GAP believes the yelloweye stock will be rebuilding under this scenario in the shortest time possible while taking into consideration the biology of the stock and the needs of the fishing communities

Impacts of Lower OY Values

Tribal Fishery

Under a zero OY alternative, the tribal fishery loses all groundfish and salmon fisheries resulting in an economic loss of $11,685,700 in exvessel revenue.

Limited Entry Trawl – Non Whiting Fisheries

Under a zero OY alternative, the limited entry trawl non-whiting shelf fishery north of 36° N. Lat. would be eliminated. This results in a loss of $6,500,000 in exvessel revenue, which equates to a $19,500,000 economic impact to the affected communities.

Under the low OY alternative (12.6 mt), the limited entry trawl non-whiting fishery is expected to take 0.1 mt (Table 2-14). This same fishery is expected to take 0.1 mt in 2006.

Under the high OY alternative (23 mt in 2007), the limited entry trawl non-whiting fishery is expected to take 0.3 mt (Table 2-21).

Limited Entry Fixed Gear Fisheries

Under a zero OY alternative, the limited fixed gear fishery north of Point Conception would be eliminated. This results in a loss of $15,000,000 in exvessel revenue which equates to a $45,000,000 economic impact to affected communities.

Open Access Directed Groundfish Fisheries

Under a zero OY alternative, the open access directed groundfish fishery north of 40˚10' N. Lat. would be eliminated. This results in a loss of $5,400,000 in exvessel revenue, which equates to a $16,200,000 economic impact to affected communities.

Under the low OY alternative (12.6 mt), the open access directed groundfish fishery is expected to take 0.9 mt (Table 2-14). This same fishery is expected to take 3.0 mt in 2006. This results in a 70% reduction in catch and a loss of $3,780,000 in exvessel revenues, which equates to an $11,340,000 economic impact to affected communities.

Washington Recreational Fisheries

Under a zero OY alternative Washington recreational fisheries that take yelloweye would be eliminated. This results in a loss of $5,000,000 to affected communities (includes total loss of halibut fishery, 50% loss of groundfish fishery, 25% of salmon fishery due to depth restrictions – forced to stay inside of 30 fathoms).

Under the low OY alternative (12.6 mt), the Washington recreational fishery is expected to take 1.6 mt. This same fishery is expected to take 3.1 mt in 2006, an 80% reduction in catch, which results in a loss of $4,000,000 to affected communities.

Oregon Recreational Fisheries

Under a zero OY alternative, Oregon recreational fisheries that take yelloweye would be eliminated. This results in a loss of $45,000,000 to affected communities.

Under the low OY alternative (12.6 mt), the Oregon recreational fishery is expected to take 1.5 mt. This same fishery is expected to take 3.6 mt in 2006 and results in a 59% reduction in catch and a loss of $26,550,000 to affected communities.

California Recreational Fisheries

Under a zero OY alternative, California recreational fisheries that take yelloweye would be eliminated. This results in a loss of $400,000,000 to affected communities.

Under the low OY alternative (12.6 mt), the California recreational fishery is expected to take 1.2 mt (Table 4-45). This same fishery is expected to take 3.7 mt in 2006. This results in a 68% decrease in catch and a loss of $272 million to affected communities.

Sector Specific Comments

California Fixed Gear Fishery

Under the low Bocaccio OY, all recreational and commercial shelf rockfish opportunity would be forced to access shelf species at no deeper than 30 fathoms. This would eliminate access to valued shelf species such as vermillion rockfish as they tend to be in deeper water in the southern California bight. This would also increase pressure on non-assessed nearshore species. The commercial fixed gear impact for directed groundfish fisheries would be $37,500 per limited entry vessel per year. The open access fleet could lose $9,300 per vessel per year. With increasingly smaller profit margins, this amount of a reduction in profit would likely be the end of their businesses.

Northern Open Access Directed Groundfish Fishery

Reducing the catch of midwater schooling black and blue rockfish is the least effective and most expensive way to protect yelloweye stocks. Limiting benthic species that share habitat with yelloweye by moving into shallower water is a much more effective and less costly alterative. The reduction of any catch in open access affects the most impoverished small boats and ports of the northern California and Oregon coast. The ports of Humboldt, Crescent City, Gold Beach, Pacific City and Port Orford all earned vulnerable category status. Garibaldi earned a most vulnerable title. This lost revenue must all come from the profit side of these small businesses. Due to the reduction imposed on our industry over the last six years, any lost income will have a much harsher outcome to open access fishers. Their profit margins have been eroded by raising costs without coinciding price increases. The cost of living has also gone up. This is a critical period for open access fishermen. A reduction in profits would put all open access nearshore fishermen at risk of bankruptcy. In Crescent City alone, 15 fishermen would be displaced. Each of these fishermen rely on rock cod for over ½ their yearly income. Cutting catches would make it impossible to maintain their yearly cash flow.

Southern Open Access

Any reduction in catch of the open access fishery causes a great reduction in profit. Open access boats for the directed groundfish fishery south of 40°10' N. Lat. are generally small vessels run by single family, small businessmen. In some ports, these vessels comprise a large percentage of the fleet.

California Recreational Fishery

It is difficult to estimate the social and economic value of recreational fishing. The groundfish draft environmental impact statement notes that the values they calculated were drawn from the dollars anglers spent pursuing the fishery. In 2005 for example, California Recreational Fisheries

Survey data in northern California records almost 57,000 angler trips for the months of September and October. If "Action Alternative 2" were adopted by the Council, and forced an additional closure for the month of October in north-central, it would lead to a loss of almost $3 million in recreational fishing expenditures.
Another indicator of lost revenue to the state of California is the steady decline of sport fishing license sales. CDFG reports that annual resident licenses sales are down from 2.2 million in 1976 to 1.2 million in 2005. During that time the population of California grew 166%, from 21 to 35 million people, but we lost a million anglers with a drop in sales of 54%. This decline in license sales has cost CDFG over $32 million at a time when budget cuts leave current regulations unenforced because of the lack of wardens in the field.

The fishing public's uncertainty about the allowed species, changing bag limits and seasons remains the prime culprit for this lost revenue. The public has turned away from fishing because they do not understand the rules. The Council should support California Department of Fish and Game (CDFG's) efforts to simplify the regulations. The main change recreational stakeholders in the north-central region have requested: is expansion of the open depths out to 40 fathoms. We support this mainly for conservation reasons - no additional fish will be taken, despite the estimates in the analysis. The change will merely spread the effort away from minor nearshore rockfish.

The draft DEIS does not include the social value of recreational fishing. Dollar signs cannot describe the value of families fishing for food and fun.

Oregon Recreational Fishery
The charter fleet in Oregon has been reduced from 232 boats in 2001 to 94 boats sampled in 2005. About 25% of the 94 boats are NOT full-time operators – many are small 6-pack boats that are on trailers and may only operate on weekends. Management measures implemented since 2001 have greatly reduced and changed the make-up of the fleet. Many of the full-time operators have already gone out of business. The few full-time operators that are left are barely holding on. As management continues to tighten up it takes less and less restrictions to break the remaining participants.

Under low OY conditions the Oregon recreational fishery stands to lose at least $7.5 million. This equates to 35,187 private trips and 71,427 charter trips lost.

Washington Recreational Fishery
For the Washington recreational fleet, – both private and charter operations are operating under restrictions that are difficult to live with currently and further reductions and restrictions will be devastating. Businesses in all sectors, (hotel/motel, bait and tackle shots, charter offices, etc.) are showing a downturn of as much as 1/3 in revenues from this time last year. This is a cumulative effect of short halibut seasons, fathom restrictions, fuel prices, and a poor economy. Many charter operations have been operating on the margin and any further restrictions are likely to break them and place the stronger businesses into their position. A zero OY on yelloweye, short halibut seasons, reduced salmon opportunity, and bad press involving albacore could result in a fleet reduction similar to the collapse of the salmon in the early eighties. There are no immediately feasible fisheries to fall back on. On Table 7-71 Summary of Percentage Change in Recreational Income Impacts it lists the south and central Washington coasts as 0.0% change, due to the fact that these areas can no longer reduce their take of yelloweye. The assumption that

further restricting opportunity in these areas will result in no change in income is ludicrous. Businesses are substantially reduced because of this year's management measures. Loss of revenue from a zero OY on canary or yelloweye will result in a loss in excess of $5 million.

PFMC
06/13/06

Economic Impacts for zero OY and low OY alternatives

	Zero OY	Low OY
Bocaccio		
Limited Entry Trawl Non-Whiting	$ 2,600,000.00	$ 6,240,000.00
Limited Entry Trawl Whiting	$ -	$ -
Limited Entry Fixed Gear	$ 3,600,000.00	$ 216,000.00
Open Access Directed Gfish	$ 3,000,000.00	$ 1,110,000.00
Subtotal	**$ 9,200,000.00**	**$ 7,566,000.00**
Canary		
Limited Entry Trawl Non-Whiting	$ 6,500,000.00	$ 3,445,000.00
Limited Entry Trawl Whiting	$ 30,000,000.00	$ 15,000,000.00
Limited Entry Fixed Gear	$ 19,000,000.00	$ 18,620,000.00
Open Access Directed Gfish	$ 8,000,000.00	$ 5,280,000.00
Subtotal	**$ 63,500,000.00**	**$ 42,345,000.00**
Cowcod		
Limited Entry Trawl Non-Whiting	$ 2,600,000.00	$ 2,418,000.00
Limited Entry Fixed Gear	$ 1,200,000.00	$ -
Open Access Directed Gfish	$ 3,000,000.00	$ -
Subtotal	**$ 6,800,000.00**	**$ 2,418,000.00**
Darkblotched		
Limited Entry Trawl Non-Whiting	$ 14,300,000.00	$ 4,040,000.00
Limited Entry Trawl Whiting	$ 30,000,000.00	$ 15,000,000.00
Limited Entry Fixed Gear	$ 12,000,000.00	$ 12,000,000.00
Open Access Directed Gfish	$ 5,700,000.00	$ -
Subtotal	**$ 62,000,000.00**	**$ 31,040,000.00**
Pacific Ocean Perch		
Limited Entry Trawl Non-Whiting	$ 12,000,000.00	$ 8,280,000.00
Limited Entry Trawl Whiting	$ 30,000,000.00	$ 12,500,000.00
Limited Entry Fixed Gear	$ 10,000,000.00	$ 3,300,000.00
Open Access Directed Gfish	$ 1,500,000.00	$ -
Subtotal	**$ 53,500,000.00**	**$ 24,080,000.00**
Widow Rockfish		
Limited Entry Trawl Non-Whiting	$ 6,900,000.00	$ 5,727,000.00
Limited Entry Trawl Whiting	$ 30,000,000.00	$ 20,000,000.00
Limited Entry Fixed Gear	$ 1,800,000.00	$ -
Open Access Directed gfish	$ 3,000,000.00	$ -
Subtotal	**$ 41,700,000.00**	**$ 25,727,000.00**
Yelloweye		
Limited Entry Trawl Non-Whiting	$ 6,500,000.00	$ -
Limited Entry Fixed Gear	$ 15,000,000.00	$ 12,000,000.00
Open Access Directed Gfish	$ 5,400,000.00	$ 3,780,000.00
Subtotal	**$ 26,900,000.00**	**$ 15,780,000.00**
COMMERCIAL TOTAL	**$ 263,600,000.00**	**$ 148,956,000.00**
Recreational		
Bocaccio	$ 1,000,000,000.00	$ 840,000,000.00
Canary	$ 1,050,000,000.00	$ 855,250,000.00
Cowcod	$ 500,000,000.00	$ 500,000,000.00
Widow	$ 1,003,200,000.00	$ 802,080,000.00
Yelloweye	$ 50,000,000.00	$ 30,550,000.00
RECREATIONAL TOTAL	**$ 3,603,200,000.00**	**$ 3,027,880,000.00**
REC & COMM TOTAL	**$ 3,866,800,000.00**	**$ 3,176,836,000.00**

Source: Agenda Item F.2.C. Supplemental GAP Report, June 2006
Commercial values are ex-vessel

California (All)

Table 7. California (All) Total Expenditures by Resident Status, 2000 (in thousands of dollars).

CALIFORNIA (ALL)		Total	Upper Bound	Lower Bound	Total	Upper Bound	Lower Bound
Trip Expenditures	**Mode**		**Residents**			**Non-Residents**	
Private Transportation	Party/Charter	12,272	13,320	11,225	10,438	11,872	9,004
	Private/Rental	24,958	13,320	21,428	7,170	9,117	5,224
	Shore	23,634	27,494	19,774	3,776	4,929	2,624
Food	Party/Charter	13,873	15,182	12,565	5,304	6,189	4,418
	Private/Rental	21,347	24,597	18,096	1,937	2,477	1,396
	Shore	17,655	20,704	14,605	1,329	1,818	841
Lodging	Party/Charter	2,695	3,603	1,788	8,672	10,532	6,812
	Private/Rental	4,400	5,695	3,104	1,930	3,065	796
	Shore	11,906	15,183	8,629	1,970	2,959	980
Public Transportation	Party/Charter	793	1,462	124	33,938	42,330	25,546
	Private/Rental	169	306	32	4,343	7,763	924
	Shore	860	1,214	506	1,316	2,464	168
Boat Fuel	Private/Rental	31,059	36,118	25,999	1,890	2,570	1,210
Party/Charter Fees	Party/Charter	57,712	63,353	52,071	6,367	7,577	5,158
Access/Boat Launching	Party/Charter	972	1,198	746	391	573	208
	Private/Rental	3,771	4,414	3,128	257	369	146
	Shore	1,846	2,253	1,439	169	363	0
Equipment Rental	Party/Charter	2,541	3,184	1,899	4,789	6,416	3,162
	Private/Rental	1,859	2,355	1,363	576	978	174
	Shore	1,477	2,042	912	131	243	19
Bait & Ice	Party/Charter	740	954	525	316	433	199
	Private/Rental	17,386	20,110	14,662	1,020	1,341	700
	Shore	6,297	7,767	4,828	332	461	204
Total	Party/Charter	91,599	93,742	85,565	70,216	79,210	61,222
	Private/Rental	104,949	118,417	97,307	19,125	23,344	14,906
	Shore	63,675	69,816	57,534	9,024	11,007	7,042
Annual Expenditures			**Residents**			**Non-Residents**	
Rods and Reels		87,379	100,428	74,329			
Other Tackle		61,712	71,043	52,382			
Gear		14,152	16,610	11,694			
Camping Equipment		7,090	9,770	4,409			
Binoculars		1,963	2,526	1,401			
Clothing		9,280	11,958	6,601			
Magazines		3,067	3,742	2,393			
Club Dues		2,404	3,150	1,658			
License Fees		35,296	39,378	31,215			
Boat Accessories		230,663	317,031	144,296			
Boat Purchase		688,820	831,723	545,917			
Boat Maintenance		167,606	194,586	140,625			
Fishing Vehicle		638,561	918,489	358,632			
Fishing Vehicle Maintenance		155,872	195,703	116,041			
Vacation Home		11,495	23,523	0			
Vacation Home Maintenance		5,316	8,918	1,715			
All Sub-Totals		2,380,901	2,711,403	2,050,536	98,365	108,495	88,235
State Total		2,479,266	2,809,924	2,148,746			

GROUNDFISH ADVISORY SUBPANEL (GAP) REPORT ON FINAL ADOPTION OF 2007-2008 GROUNDFISH FISHERY SPECIFICATIONS/MANAGEMENT MEASURES AND AMENDMENT 16-4

The Groundfish Advisory Subpanel (GAP) recommendations on commercial fishery seasons, trip limits and rockfish conservation area (RCA) boundaries are as follows.

Limited Entry Trawl

The GAP agrees with the GMT's recommendations on limited entry trawl RCA and cumulative trip limits coastwide.

GAP members became aware of a proposal to limit the fleet to one gear on board per cumulative limits for the 2007-2008 fisheries. GAP members voiced concern over receiving the proposal on the Friday morning of the final action agenda item. The GAP understands that this proposal results from the GMT's hope they could better estimate effort shifts.

A subcommittee of the GAP explored the option briefly and has the following comments:

1. **Cost.** The costs associated with this proposal are large. The proposal would require fishermen to return to port between cumulative periods and switch their gear. Currently the vessels are allowed to have both gears on board. The costs associated with switching the gear can be significant.
2. **Flexibility**. The proposal limits the fleet's flexibility to access fish when and where they become available.
3. **Effectiveness**. Given the uncertainty of availability of target fish and the variability of bycatch species the GAP does not believe that this restriction will increase the accuracy of bycatch or target species actual catch.

The GAP realizes that this option was initially proposed prior to consideration of a trigger mechanism that allows for management action between Council meetings. The GAP believes that the trigger mechanism will be sufficient to adjust management measures as necessary. The trigger mechanism is the GAP's preferred alternative for dealing with this issue. Other options include some type of declaration system or an information sharing meeting where the GMT meets with members of the fleet to discuss their expected "game plans" for the upcoming season.

The GMT is also proposing that selective trawl gear be required south of 40˚10 in order to avoid bocaccio rockfish capture. The GAP notes that there is little or no data on the effectiveness of this gear south of 40˚10 with respect to bocaccio. Furthermore, the GAP is confident that the next bocaccio stock assessment will reflect a significantly higher, if not rebuilt, population of bocaccio. With this in mind the GAP believes that the costs associated with requiring this gear south of 40˚10 poses an unnecessary economic hardship on the fleet when the gear may become irrelevant within the next management cycle.

Limited Entry Fixed Gear

The GAP recommends status quo management measures for limited entry fixed gear north of 40º10' N. lat.

The GAP also recommends status quo management measures for limited entry fixed gear south of 40º10' N. lat. with the following exceptions:

- The 34º27' N. lat. management line is recommended for stratifying management measures for thornyheads.
- Increase the California scorpionfish cumulative trip limit to 600 lbs/2 months during periods 1, 3, and 6; increase to 800 lbs/2 months during periods 4 and 5.
- Increase the shallow nearshore rockfish cumulative trip limit to 600 lbs/2 months during periods 1 and 6; increase to 800 lbs/2 months during periods 3 and 5; and increase to 900 lbs/2 months during period 4.
- Increase the deeper nearshore rockfish cumulative trip limit north of 34º27' N. lat. to 600 lbs/2 months during period 5; increase the deeper nearshore rockfish cumulative trip limit south of 34º27' N. lat. to 600 lbs/2 months during period 6.
- Increase the lingcod cumulative trip limit to 100 lbs/ month during periods 1 and 6.

Open Access

The GAP recommends Alternative 3b management measures for open access gears north of 40º10' N. lat. with the following exceptions:

- Increase the lingcod cumulative trip limit to 400 lbs/month from May through November.

The GAP also recommends status quo management measures for open access gears south of 40º10' N. lat. with the following exceptions:

- The 34º27' N. lat. management line is recommended for stratifying management measures for thornyheads.
- Increase the California scorpionfish cumulative trip limit to 600 lbs/2 months during periods 1, 3, and 6; increase to 800 lbs/2 months during periods 4 and 5.
- Increase the shallow nearshore rockfish cumulative trip limit to 600 lbs/2 months during periods 1 and 6; increase to 800 lbs/2 months during periods 3 and 5; and increase to 900 lbs/2 months during period 4.
- Increase the deeper nearshore rockfish cumulative trip limit north of 34º27' N. lat. to 600 lbs/2 months during period 5; increase the deeper nearshore rockfish cumulative trip limit south of 34º27' N. lat. to 600 lbs/2 months during period 6.
- Increase the lingcod cumulative trip limit to 300 lbs/ month during November; increase to 100 lbs/ month during December.

The GAP recommends recreational management measures as follows.

California Recreational Management Measures

The GAP recommends option 5b California recreational seasons and open depths as follows:

RCG SEASON BY REGION

Region	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
North Region	---	---	---	---	> 30 fm Closed							
North Central	---	---	---	---	---	> 30 fm Closed						---
South Central - Monterey	---	---	---	---	> 40 fm Closed							---
South Central - Morro Bay	---	---	---	---	> 40 fm Closed							---
South Region	---	---	> 60 fm Closed									

NOTES AND KEY:

RCG = Rockfish, cabezon, greenlings

--- = Closed to boat-based fishing for RCG

The estimated impacts under option 5b are:

	Estimated Impacts (mt)								
Region	**Yelloweye**	**Canary**	**Cowcod**	**Bocaccio**	**Widow**	**Minor NS RF North**	**Minor NS RF South**	**CA Scorpionfish**	**Lingcod**
North region	0.9	0.7	N/A	N/A	0	17.3	N/A	0	51
North Central	0.6	5.5	0	0.2	2.2	N/A	165	0	152
South Central - Monterey	0	0.5	0	7.4	0.9	N/A	104	0	29
South Central - Morro Bay	0	1.3	0	2.5	0.1	N/A	92	0	24
South Region	0	0.3	0.3	57.4	5.2	N/A	61	75	26
TOTAL CALIFORNIA	1.7	8.3	0.3	67.5	8.4	17.3	422	75	282

Oregon Recreational Management Measures

Yelloweye: The GAP recommends a no-action management measure as described in agenda item F.2.b, ODFW Report June 2006. Also recommended is an ability to change to alternative more restrictive depth based management measures should the yelloweye impacts exceed a rate compatible with preseason projections. This in-season constraint ability would allow for a lowering of the impact rate.

Lingcod: The GAP recommends a change of the lingcod minimum length from 24” to 22”.

Bag limit: The GAP recommends that the bag limit be limited to no less than 5 fish with all management measures as indicated through Oregon public comment. A depth constraint or season closure is preferred to a bag of less that 5. Flat fish 25 bag limit in aggregate not to include Pacific Halibut.

<u>Washington Recreational Fisheries</u>

Statewide Measures:

- Maintain status quo bag limits as described in the No Action Alternative (Chapter 2, p. 52), which include a recreational groundfish bag limit of 15 fish per day, including rockfish and lingcod, with a sublimit of 10 rockfish, and 2 lingcod. Retention of canary and yelloweye rockfish is prohibited.

- Maintain status quo lingcod season as described in the No Action Alternative (Chapter 2, p. 52); in 2007 and 2008, the following lingcod seasons would apply:

    - Marine Areas 1-3: Open the Saturday closest to March 15 (which is March 17 in 2007 and March 15 in 2008) through the Saturday closest to October 15 (which is October 13 in 2007 and October 18 in 2008).

    - Marine Area 4: Open April 15 through October 13 in 2007 and open April 15 through October 15 in 2008.

- Reduce the minimum size for lingcod from 24 inches to 22 inches.

Area-Specific Measures:

Management Measures for Marine Areas 3 and 4 (Queets River to U.S./Canada border)

Action Alternative 3 (Chapter 2, p. 89), with two revisions: Prohibit fishing for, retention, and possession of **<u>groundfish</u>** seaward of a line approximating 20 fm from May 1 through **<u>September 30</u>**, except on days that halibut fishing is open.

Revisions:

1. Change "rockfish and lingcod" to more broadly cover "all groundfish" for ease of regulatory understanding and enforcement of the regulations
2. Move the depth restriction in July from 10 fm seaward to 20 fm

Management Measures for Marine Area 2 (Leadbetter Pt. to the Queets River)

Action Alternative 3 (Chapter 2, p. 89), with one revision: Prohibit fishing for, retention, and possession of **<u>groundfish</u>** seaward of a line approximating 30 fm from the lingcod opening day in March through April 30, and from June 16 through July 31. From May 1 through June 15 (i.e., during the average period of the South Coast halibut fishery), allow the retention of sablefish and Pacific cod seaward of the 30-fm depth restriction.

Revision:

1. Change “rockfish and lingcod” to more broadly cover “all groundfish” for ease of regulatory understanding and enforcement of the regulations, while still allowing the retention of sablefish and Pacific cod, which may be caught incidentally while targeting halibut offshore.

Management Measures for Marine Area 1 (Oregon/Washington border to Leadbetter Pt.)

No Action Alternative (Chapter 2, p. 54), which would prohibit fishing for, retention, and possession of groundfish, except sablefish and Pacific cod, when Pacific halibut are onboard the vessel.

Cowcod Conservation Area Boundary Changes

The GAP supports the Alternative 2 Cowcod Conservation Area West boundary change to allow vessels equipped with VMS to fish within the bounds of the current CCA in depths greater than 175 fm. These new open areas are important for accessing healthy slope species, such as blackgill rockfish, and will not impact cowcod, which are not found in these areas. The GAP believes only about 9 vessels will actively fish in this area. Enforcement Consultants notified GAP members that there may be increased costs to vessels fishing in this area associated with increased VMS “ping” rates. The GAP and affected industry members are willing to bear these increased costs to provide increased slope fishing opportunities.

PFMC
06/16/06

CALIFORNIA DEPARTMENT OF FISH AND GAME REPORT ON THE TENTATIVE ADOPTION OF 2007-2008 GROUNDFISH FISHERY SPECIFICATIONS/MANAGEMENT MEASURES AND AMENDMENT 16-4

Purpose

In consideration of management measures for the 2007-08 groundfish fishery, the Council has been provided with a substantial amount of economic analysis of alternative management measures. Much of this analysis is compared to the socioeconomic impacts resulting from 2005 and 2006 management. While action alternatives 1 and 2 show negative impacts compared to status quo, the analysis for action alternative 3 shows an increase in the number of recreational angler trips and personal income when compared to status quo, which is largely driven by California recreational fishery options (Agenda Item F.2.a Supplemental Attachment 5). This document is intended to provide a perspective on compounding effects of recent management decisions prior to the status quo season, that have been needed to substantially reduce impacts on overfished species. The CDFG recommends that the resulting cumulative economic impacts that lead to the 2005-06 status quo be kept in mind when considering specifications and management measure alternatives for 2007-08 relative to the status quo.

Past and Present

In 1998 the recreational fishery for rockfish, lingcod and associated species was much less regulated than it is under the Status Quo regulations (Table 2-13, Agenda Item F.2.a Attachment 1). California anglers enjoyed a 15 fish bag limit of rockfish within a 20 fish bag and a year round season. Fishing depths were unconstrained and anglers routinely fished as deep as 100 fms north of Point Conception to the Oregon border and to 120 fms south of Point Conception. This represented an effective area of 29,970 square kilometers available for fishing assuming all areas available were fished for these species (Figures 1 - 4). CDFG recognizes that not all available areas represent appropriate habitat for rockfish, lingcod and the associated species. Beginning in 1999, stricter regulations were adopted following the completion of the bocaccio stock assessment and an overfished status determination to minimize even recreational impacts on this species. Bocaccio are a shelf species found in depths greater than 20 – 40 fms and recreational anglers began losing fishing opportunities in deeper shelf waters.

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. In 2000, the rockfish bag limit was reduced from 15 to 10 fish. In fact, in 2000 due to the number of overfished species and the need to further limit impacts, the West Coast Groundfish Fishery was declared an economic disaster. These changes moved anglers further inshore for more months and away from encounters with overfished shelf species increasing pressure on nearshore stocks as Rockfish Conservation Areas (RCAs) were implemented. To recognize the regional differences on individual overfished stocks and maximize fishing opportunities, the Rockfish and Lingcod Management Areas (RMLAs) 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 Marine Protected Areas (MPAs) were adopted in state waters around the

Channel Islands and in the Cowcod Conservation Area (CCA) - also in southern California. An additional factor that contributed to the highly restricted recreational regulations in California was the reliance on the Marine Recreational Fisheries Statistical Survey (MRFSS) data for regulation development and inseason monitoring (not tasks for which the program was designed.) During this period, California's recreational regulations were routinely conservative due to the uncertainties of MRFSS data, the concerns over accuracy of the data, and the repeated need for inseason action when estimates indicated higher catches than expected.

By 2005, the maximum seasons and depths fished were eight months at ≤ 30 fms from the Oregon Border to Cape Mendocino, six months at ≤ 20 fm from Cape Mendocino to Lopez Point, five months at ≤ 40 fms from Lopez Point to north of Point Conception, and 10 months at ≤ 30 fm or ≤ 60 fm south of Point Conception (Figures 1 - 5).

All of the above changes resulted in a reduction of 62% to the area effectively open to California's recreational groundfish fishery by 2005. It also resulted in a reduction of between 17% and 58% of the season length.

Concentrating anglers into shallower waters limits their access to other rockfish species and focuses targeting on nearshore rockfish stocks. Because most of the nearshore species are managed as data-poor, this further constricts the fishery (Table2-CARecSQ).

Reasonably Foreseeable Future

Under Action Alternative 1, in 2007 and 2008 the remaining area open to the recreational groundfish fishery would be further reduced by 12% to increase protection on rebuilding species (Figures 1 - 4) and keep catches within lower harvest targets. This action would result in a 74% overall reduction in available fishing areas since 1998. The season would likely be limited to between five and eight months and maximum allowable depths of ≤ 20 or ≤ 30 fm depending on RLMA.

Fishable areas		
Year	Area (Sq Km)	% of Past 1998 Baseline
1998	29,970	100%
2005	11,472	38%
2007-08	7,890	26%

Direct/Indirect Effects

All reductions in seasons and depth limitations have had direct impacts on anglers including:

- Reductions in seasons have reduced overall opportunities,
- Reduced or eliminated opportunities for target species in deeper water (e.g. large “red” rockfish including bocaccio, yelloweye, canary, cowcod, copper or vermilion rockfish, and to some extent lingcod or associated species like chilipepper rockfish) have reduced participation.
- Direct effects of depth changes (via stricter RCA boundaries) on resources have included increased pressure on nearshore stocks when the status of many of these species is considered “data poor”.

Indirect effects experienced by anglers include:

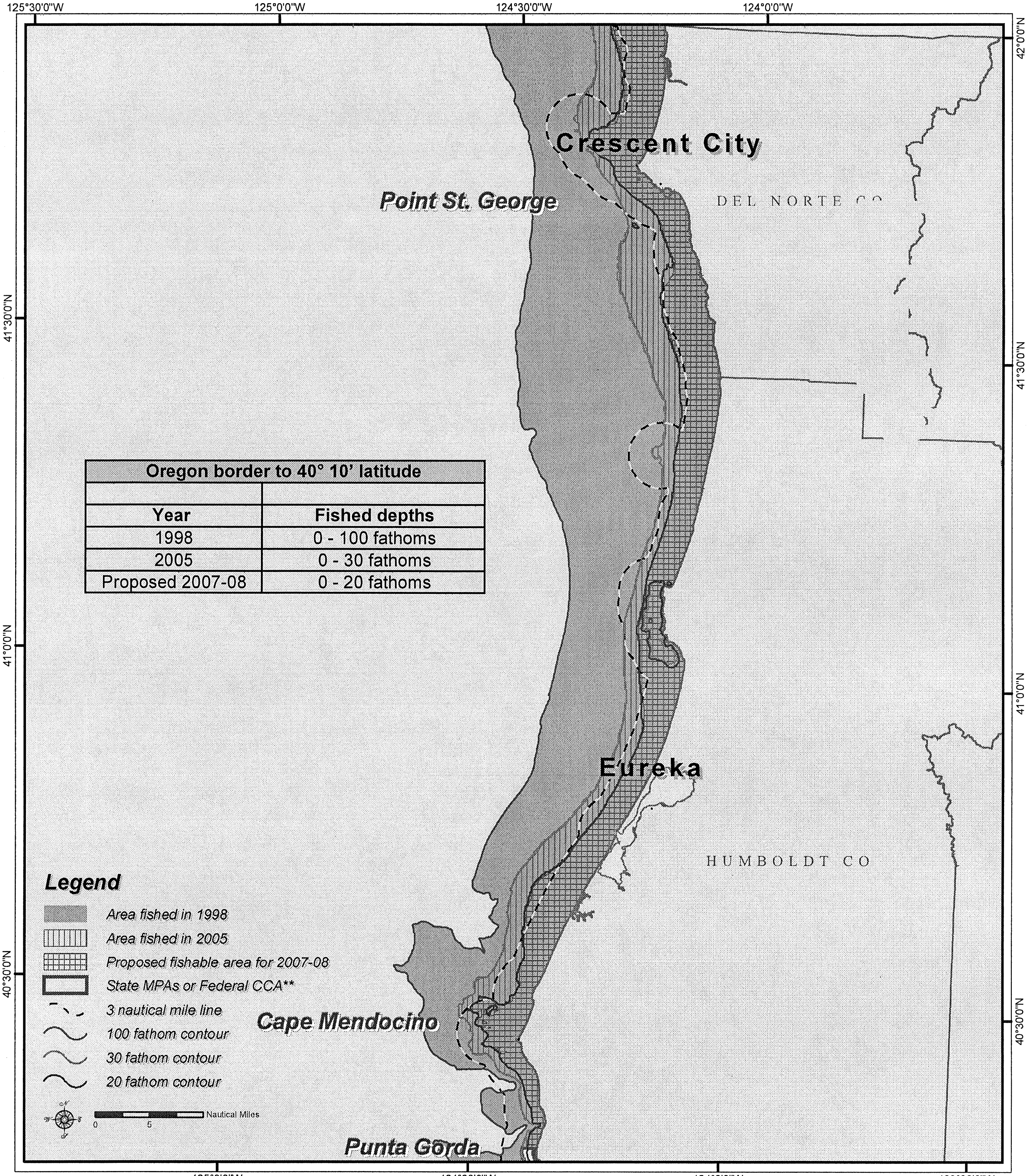
- Increased perception that “there are no fish left” or all species are over fished has also reduced participation.
- Confusion over changes in the regulations and/or resulting citations reducing participation,
- Greater difficulty in predicting fishing behavior leading to inseason closures which:
  - Create additional impacts on the sportfishing public
  - Reduce business for industry (loss of repeat customers)
  - Greater effort by enforcement staff to enforce changing regulations

Impacts on the recreational fishing industry:

- Less fishing trips with shorter seasons and less “target” species available
- Difficulty retaining qualified staff due to increased “down time” when their services are not needed
- Increased costs due to gear restrictions, greater advertising,

Impacts of Regulations on Recreationally Fished Areas for Rockfish and Associated Species

Change in fishable areas shown for 1998, 2005, and proposed 2007 - 08 based on RCA Alternative 1 (Low)



Oregon border to 40° 10' latitude	
Year	Fished depths
1998	0 - 100 fathoms
2005	0 - 30 fathoms
Proposed 2007-08	0 - 20 fathoms

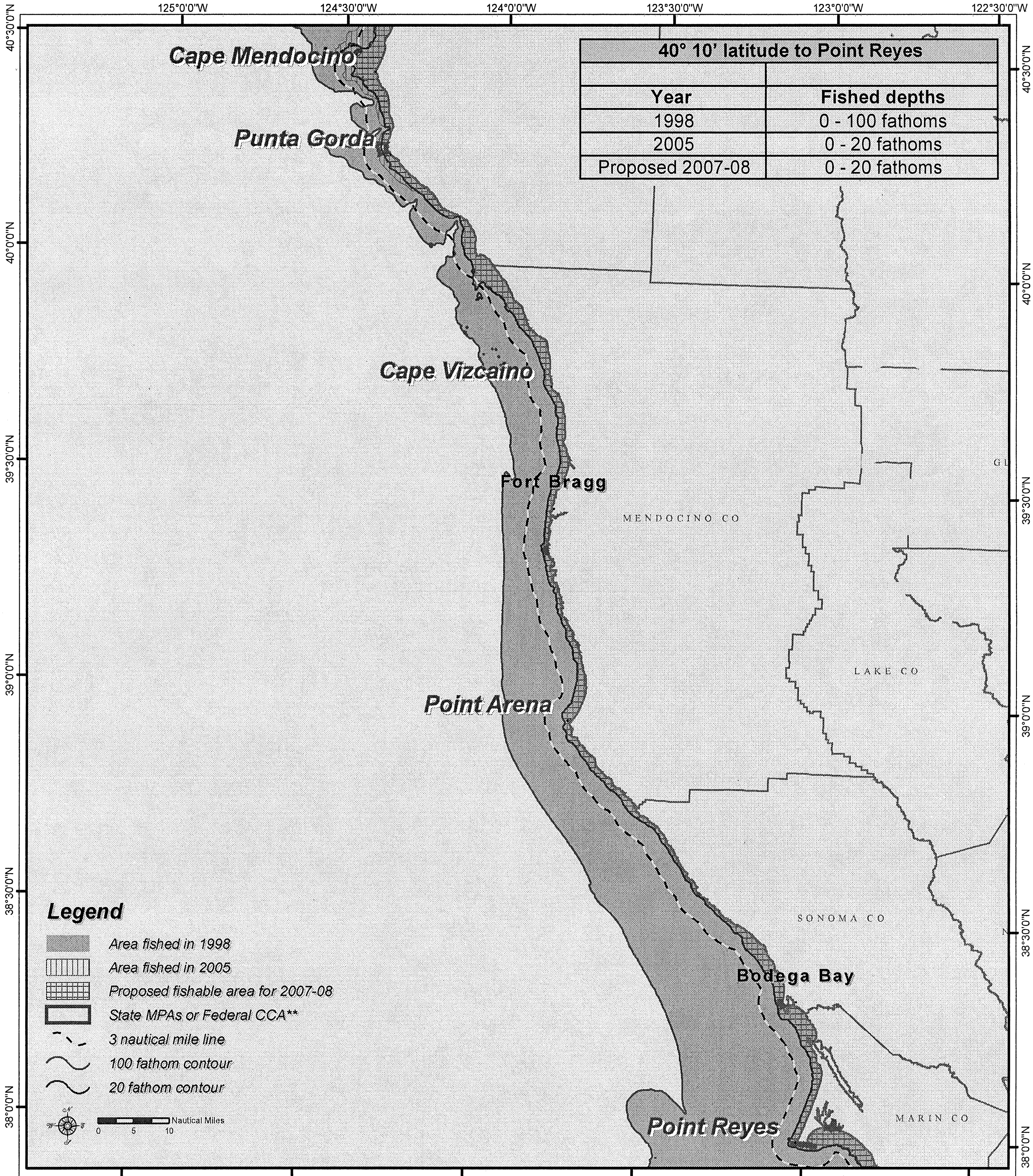
* Survey data suggest that in the past, fishing for rockfish, lingcod and associated species occurred in depths less than 100 fm north of Point Conception and less than 120 fm south of Point Conception.

** Marine Protected Areas (MPAs) or Cowcod Conservation Areas (CCAs) include areas less than 100 or 120 fathoms that were fished prior to their formal designations (such as [illegible] the 100 and 120 fathoms depth zones represented fished areas).

Prepared By California Department of Fish and Game Marine Region GIS May 10, 2006

Impacts of Regulations on Recreationally Fished Areas for Rockfish and Associated Species

Change in fishable areas shown for 1998, 2005, and proposed 2007 - 08 based on RCA Alternative 1 (Low)



40° 10' latitude to Point Reyes	
Year	**Fished depths**
1998	0 - 100 fathoms
2005	0 - 20 fathoms
Proposed 2007-08	0 - 20 fathoms

* Survey data suggest that in the past, fishing for rockfish, lingcod and associated species occurred in depths less than 100 fm north of Point Conception and less than 120 fm south of Point Conception.

** Marine Protected Areas (MPAs) or Cowcod Conservation Areas (CCAs) include areas less than 100 or 120 fathoms that were fished prior to their formal designations (such as in 1998 when the 100 and 120 fathoms depth zones represented fished areas).

Prepared By California Department of Fish and Game Marine Region GIS May 10, 2006

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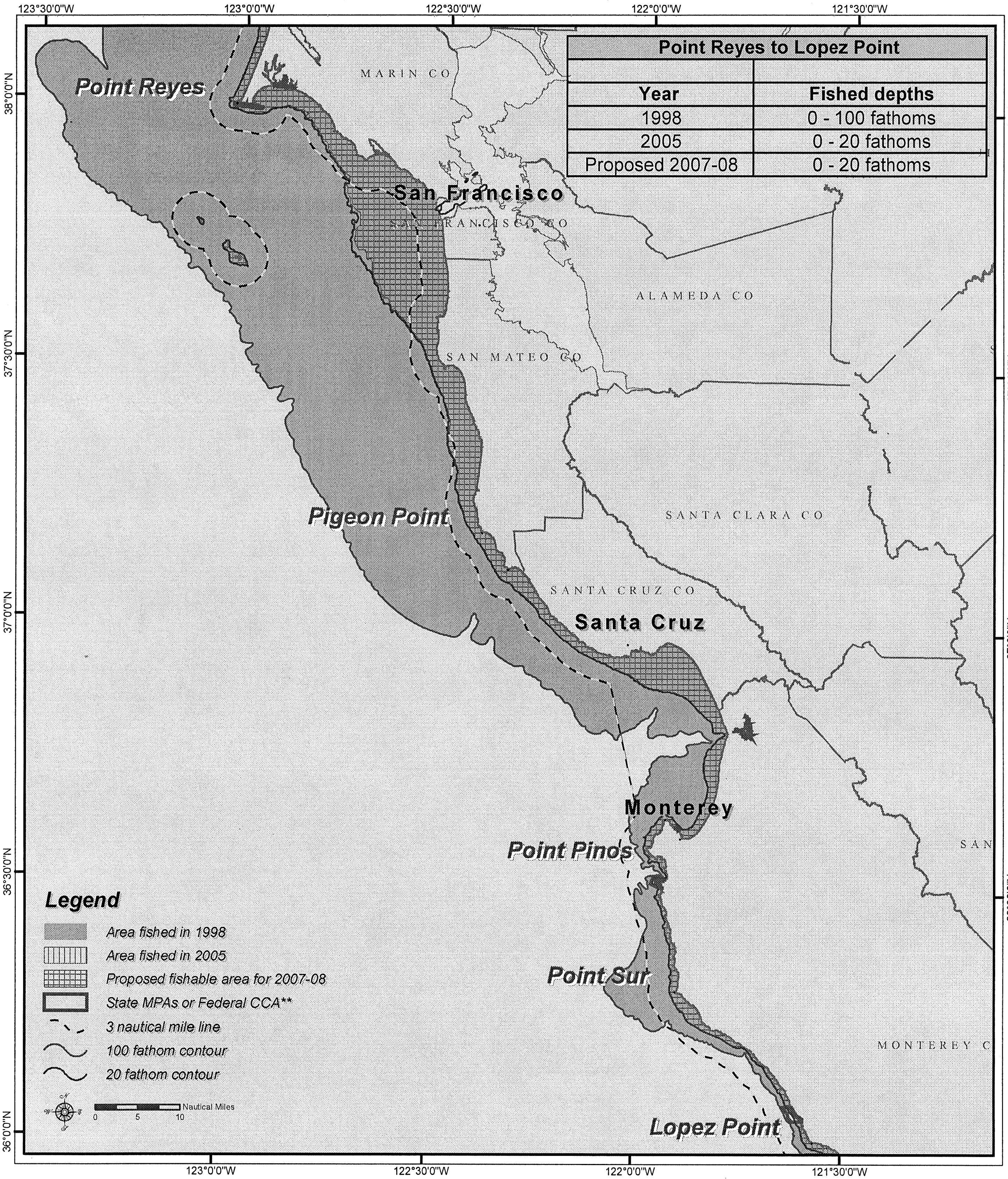
Change in fishable areas shown for 1998, 2005, and proposed 2007 - 08 based on RCA Alternative 1 (Low)



Point Reyes to Lopez Point	
Year	Fished depths
1998	0 - 100 fathoms
2005	0 - 20 fathoms
Proposed 2007-08	0 - 20 fathoms

* Survey data suggest that in the past, fishing for rockfish, lingcod and associated species occurred in depths less than 100 fm north of Point Conception and less than 120 fm south of Point Conception.

** Marine Protected Areas (MPAs) or Cowcod Conservation Areas (CCAs) include areas less than 100 or 120 fathoms that were fished prior to their former designations (such as in 1998 when the 100 and 120 fathoms depth zones represented fished areas).

Prepared By California Department of Fish and Game Marine Region GIS May 10, 2006

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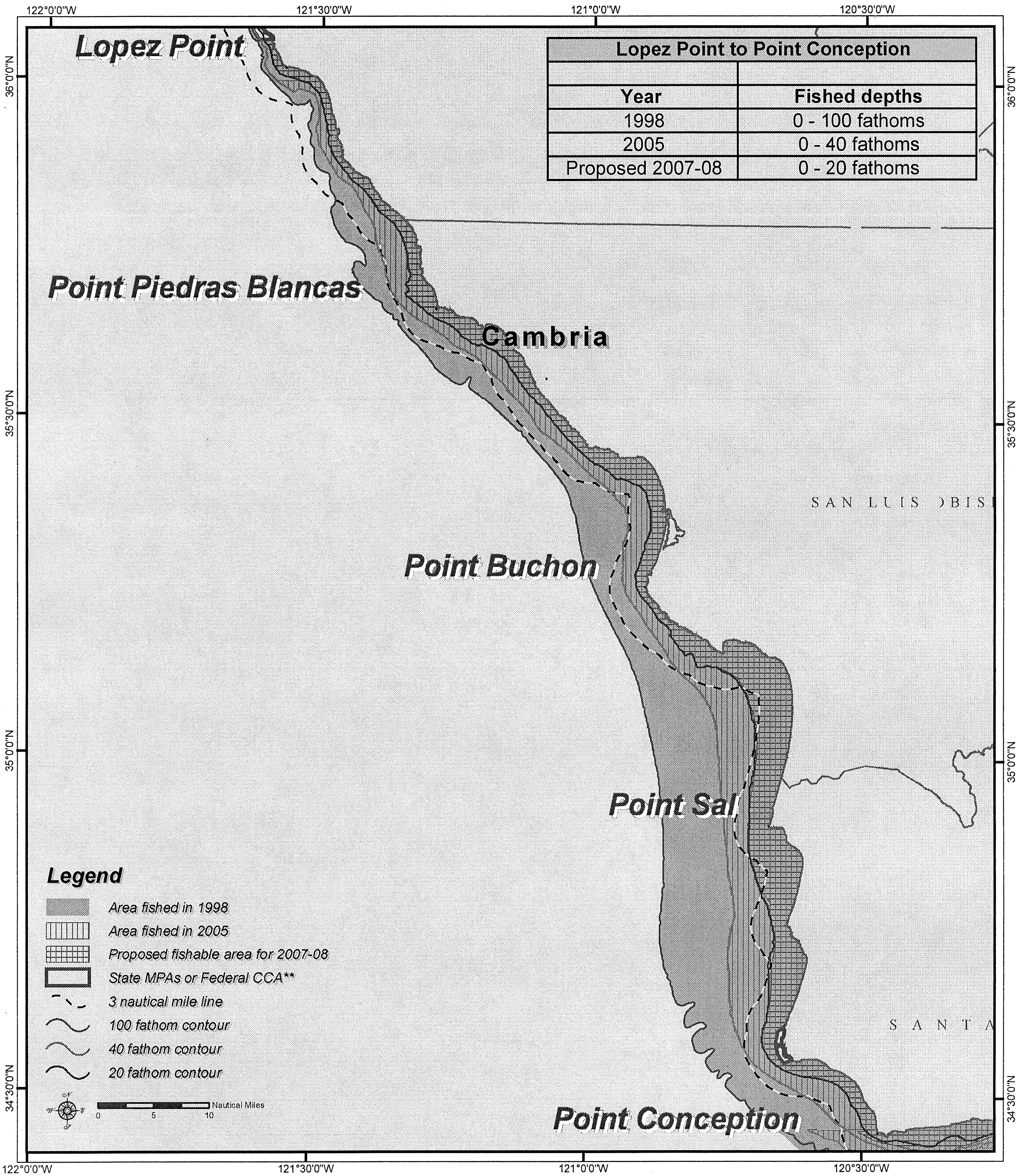

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Prepared By California Department of Fish and Game Marine Region GIS May 10, 2006

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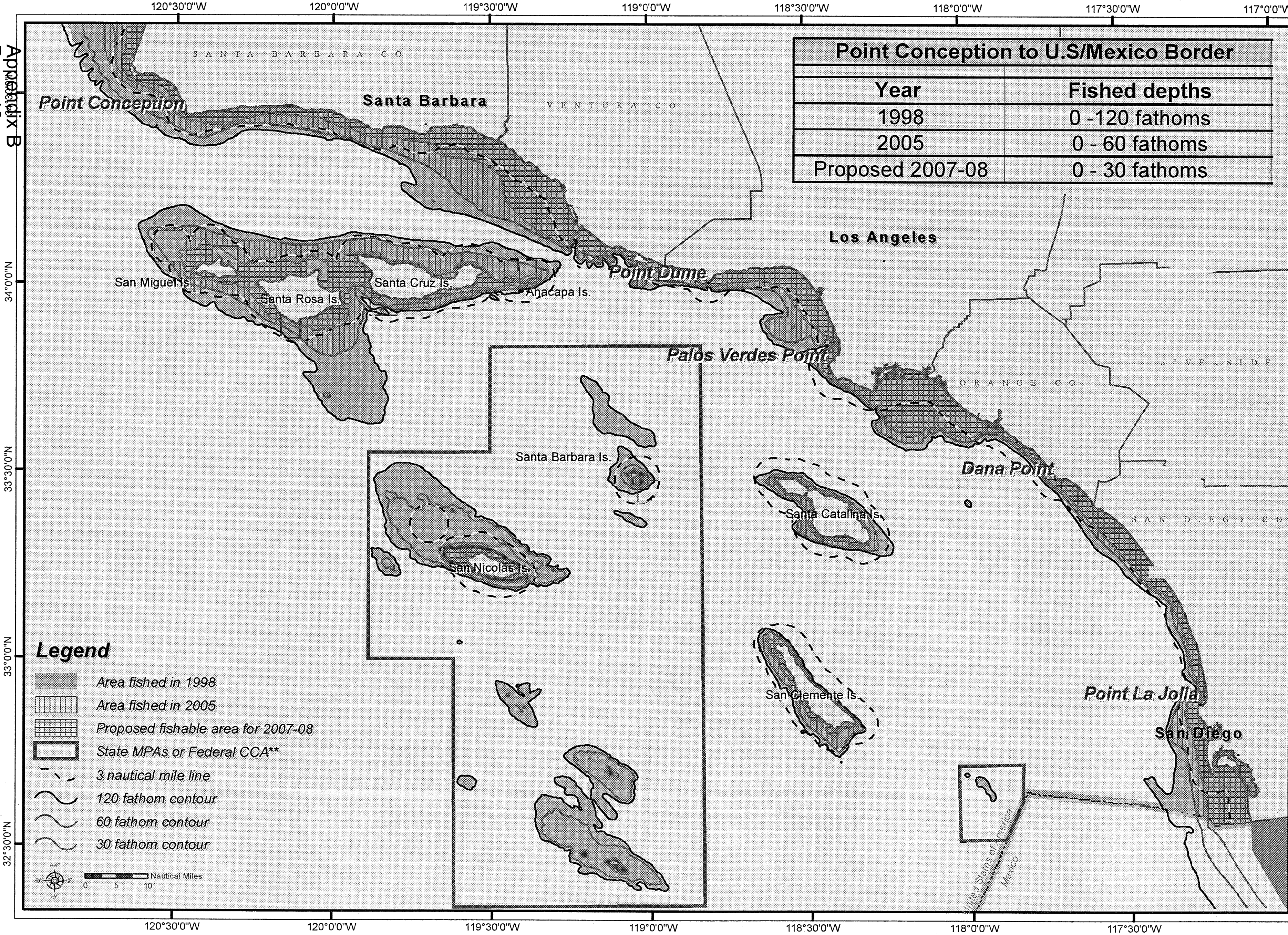

Point Conception to U.S/Mexico Border	
Year	Fished depths
1998	0 -120 fathoms
2005	0 - 60 fathoms
Proposed 2007-08	0 - 30 fathoms

* Survey data suggest that in the past, fishing for rockfish, lingcod and associated species occurred in depths less than 100 fm north of Point Conception and less than 120 fm south of Point Conception.
** Marine Protected Areas (MPAs) or Cowcod Conservation Areas (CCAs) include areas less than 100 or 120 fathoms that were fished prior to their formal designations (such as in 1998 when the 100 and 120 fathoms depth zones represented fished areas).

OREGON DEPARTMENT OF FISH AND WILDLIFE REPORT ON THE TENTATIVE ADOPTION OF THE 2007-2008 GROUNDFISH FISHERY SPECIFICATIONS/MANAGEMENT MEASURES AND AMAENDMENT 16-4

The Oregon Department of Fish and Wildlife (ODFW) met with members of the Sport Advisory Council (SAC) on June 6, 2006 to discuss the proposed management measures for the 2007-2008 Oregon recreational groundfish fisheries. SAC is an advisory body, providing management advice to ODFW, specific to the sport groundfish and halibut fisheries, and is comprised of representatives of the charter and private sectors of the sport fishery, as well as a representative of the port commissions. Membership is distributed coastwide in an effort to have representation of each of the coastal areas.

At this meeting, ODFW staff summarized the Council preferred harvest levels for species that constrain the Oregon sport groundfish fishery (primarily canary, yelloweye, and black rockfishes) and the range of management measures that are proposed for this fishery. The comments received from the series of public meetings that were held in May 2006 were also detailed, and the same questions posed to the public in those meetings were asked of SAC. A schematic of the management measure alternatives is provided for reference in figure 1. The following summary represents the consensus opinions of SAC:

1) Do you prefer a year round season in preference to a shorter season with less offshore closures and a larger marine bag limit?
   a) The majority of SAC members confirmed the desire for a year round season even if it meant reduced offshore opportunity. A minority preferred a shorter season. SAC confirmed they did not desire a marine bag limit of less than 5 fish.
2) Do you support a separate flatfish bag (excluding Pacific halibut) of 25 fish?
   a) SAC unanimously supported a separate 25 fish flatfish bag limit that excludes Pacific halibut.
3) What do you recommend for the lingcod daily bag limit and minimum length?
   a) The majority of SAC members supported a daily bag limit of 2 fish with a 22-inch minimum size requirement. It was thought a lingcod daily bag limit of 3 fish would increase time on the water and associated take of limiting species (i.e. canary, yelloweye and black rockfishes). A minimum size limit of 22-inches was projected to both increase the total harvest of lingcod and allow anglers to attain the lingcod daily bag limit quicker, reducing the time on the water and subsequent take of limiting species.
4) In the event that the low OY alternative for yelloweye rockfish is adopted by the Council, would (1) a longer groundfish season (6 months) with a reduced halibut quota (reduced by 30%) or (2) a shorter groundfish season (July through Labor Day) and no reduction to the halibut quota be preferable?
   a) SAC discussed the economic importance of the Pacific halibut fishery to the coast especially during the spring months. Pacific halibut opportunity provides income to pay expenses that have accrued during the winter months such as insurance, moorages, rent, and basic requirements of running a business. Additionally, the local ports depend on the Pacific halibut spring fishery for income from moorage and lodging fees. SAC recommended not reducing the halibut opportunity if at all possible. SAC also discussed the importance of the groundfish fishery during months without Pacific halibut or salmon opportunity. Loss of income generated by the groundfish fishery in the non-summer

months would effectively bankrupt many of the active charter vessels in Oregon. SAC was adamant that both alternatives 1a and 1b (figure 1) are very detrimental to the fishery and coastal economy.

5) The issue of expanding the Stonewall Bank closure area was reviewed with SAC. Staff is recommending that the closure area be increase in size. Not only halibut fishing will be closed in the area, but groundfish will also be closed. Some SAC members expressed concern over anglers with a legally caught halibut not being able to troll for salmon over the expanded (and present) closed area. A recommendation of allowing a halibut on the vessel while trolling in the area for salmon, but with an additional gear requirement requiring trolling with either a downrigger or diver was discussed. It was thought this would make illegal targeting of halibut difficult, help enforcement, and minimize the incidental take of yelloweye rockfish.

There have been several public comment letters regarding the 2007-2008 harvest specification and management measures that have been received by ODFW for distribution to the Council.

Those letters are attached.

Figure 1. Season structure along with expected yelloweye rockfish and canary rockfish impacts for various 2007-08 Oregon recreational fishery action alternatives, compared to the no action alternative.

<table>
<tr><th rowspan="2">Alternative</th><th colspan="13">Month</th><th>Marine</th><th>Ling</th><th>Ling</th><th>Yelloweye</th><th>Canary</th></tr>
<tr><th>J</th><th>F</th><th>M</th><th>A</th><th>M</th><th>J</th><th>J</th><th>A</th><th>LDay</th><th>S</th><th>O</th><th>N</th><th>D</th><th>Bag</th><th>Bag</th><th>Size</th><th>Impact (mt)</th><th>Impact (mt)</th></tr>
<tr><td>1a</td><td colspan="6">CLOSED</td><td colspan="3">GF open <20 fm</td><td colspan="4">CLOSED</td><td>10*</td><td>3</td><td>20</td><td>1.6</td><td>1.6</td></tr>
<tr><td>1b</td><td colspan="3">CLOSED</td><td colspan="7">GF open <20 fm & Halibut fishery reduced by 30%</td><td colspan="3">CLOSED</td><td>6*</td><td>3</td><td>20</td><td>1.5</td><td>2.3</td></tr>
<tr><td>2</td><td colspan="13">GF open <20 fm</td><td>5*</td><td>2</td><td>22</td><td>1.9</td><td>2.6</td></tr>
<tr><td>3a</td><td colspan="5">GF open <40 fm</td><td colspan="3">GF open <25 fm</td><td colspan="5">GF open <40 fm</td><td>5**</td><td>2</td><td>22</td><td>2.5</td><td>3.7</td></tr>
<tr><td>3b</td><td colspan="13">GF open <40 fm</td><td>5**</td><td>2</td><td>22</td><td>2.9</td><td>4.0</td></tr>
<tr><td>No Action</td><td colspan="5">GF open all depth</td><td colspan="5">GF open <40 fm</td><td colspan="3">GF open all depth</td><td>6*</td><td>2</td><td>24</td><td>3.6</td><td>5.3</td></tr>
</table>

* Status quo marine bag species.

**Marine bag limit excludes flatfish which have a separate 25 fish daily bag limit.

COMFORT INN AT GARIBALDI

Comfort INN

BY CHOICE HOTELS

6/8/06

As a manager of a hotel, in Garibaldi, I am very concerned that any change in the fishing structure would be devastating to our business, and community.

My hotel, as well as the community heavily depends on the recreational fishing industry to keep doors open, and our employee's working.

Please no action

Sincerely

Kevin M-Van

General Manager

502 Garibaldi Avenue
Garibaldi, OR 97118
Phone 503.322.3338
Fax 503.322.0328
For reservations worldwide: 800.4CHOICE choicehotels.com

GARIBALDI CHARTERS

PO Box 556, Garibaldi, OR 97118 **1-800-900-HOOK!**

Pacific Fisheries Management Council
Chairman David Hansen
Council Members

June 6, 2006

Dear Sirs,

We have reviewed the options for the Oregon recreational fishery presented to us by the ODFW. We would like you to understand what these options mean to our business. In 2005, 37% of our gross was earned from Jan to June and another 10% was earned in Sept and Oct. No small business, charter fishing or any of the other businesses connected to fishing can sustain the type of closure suggested in Option 1a. Since most of that 37% of gross is made from the May-June Halibut fishery, Option 1b is almost as bad. With all of the cutbacks we have had for the last three years, the spring Halibut fishery is all that has been keeping us alive.

Option 2 and Option 3a will put so much pressure on the rock fish that we will could be shut down as early as the first of July which will also put the charter fleet out of business. Even 3b is not a good choice as almost half of our trips from May to June were beyond forty fathoms for either Halibut or Ling Cod. We have only caught six yellow eye so far this year. The Captains are very good at staying away from any Yelloweye areas, and there are no Yelloweye at our 800' all-depth Halibut grounds.

We understand that the GMT came up with a step down program that might help reduce some of the adverse impacts of these drastic actions. Please consider using it. Present time assessments, done on the actual reef habitat where most yellow eye reside, rather than trawl fish data, needs to be done immediately. When the best available science uses old data, statistical theory and has no way to measure age or recruitment, there will never be a recovery! We believe you have come very close to the bottom line for most charter fishing businesses this year. The "No Action Option" is the only acceptable one left. Our family has been charter fishing for over 30 years. All of our children are in the fishing business-two are charter boat Captain's, one works for the ODFW and the youngest helps manage our charter office. Please do not let politics and questionable data ruin our family business, and our community's future!

Sincerely,

Mick & Linda Buell
Owners, Garibaldi Charters.

Independent Fish Filleter
Kelly Barnett
8365 Warren Street
Bay City, OR 97107
(503)377-0259
kellybarnett12@hotmail
"have knife…will travel"

Pacific Fishery Management Council
Donald Hansen, Chairman

Mr. Hansen and Fellow Councilors,

As an independent business owner and lifelong lover of the Oregon Coast and Pacific Ocean I applaud your commitment, work and dedication to the issues that affect the present and future of my home and livelihood.

In regards to current proposals for the 2007 and 2008 sports ground fishing regulations and management issues before the council I would like to offer the following opinions and observations.

First of all, most of the problems that I see and am experiencing are related to stock assessments and ABC's/OY's for canary, black and yelloweye rockfishes as well as a perceived ignorance of the social and economic impacts these assessments and council decisions based on these assessments have had on me and my community. These "best available science" studies are inherently flawed as there is no good science or studies as a starting point to draw conclusions from. We must work together to redefine what "best available science" means and how it is used in council decisions and deliberations, we must also work together on a simpler and cheaper approach to data collection that includes more anecdotal evidence and emphasizes acoustic studies over more expensive video technologies.

Ever decreasing bag limits and seasonal depth restrictions have crippled my ability to make a living in my chosen career, following in my father's footsteps as a fish filleter for both sports and commercial fishing enterprises. When I began my business the Oregon bag limit was 15 rockfish it is currently 6 marine fish, the effect this drastic and sudden lowering of sports as well as commercial catch limits has driven nearly all of the seafood workers and managers I know out of the fishing community or into a lowered standard of living. This is only the tip of the social and economic impacts that are occurring; I implore you to consider these hardships before you cut back and restrict my fishing community anymore.

In specific I am referring to the proposals for 2007-08 Oregon Recreational Fisheries proposal from ODFW, of which I have included a copy. Of the options listed the only one I feel that will not fatally wound my fishing community is the "No Action" alternative. We who have survived in the industry have tried our best to be creative and industrious to adapt to the recent "catastrophe" that has befallen us and continue on as a community. Any further restrictions to bag or depth limits would be disastrous to my business as well as my fishing community, I am afraid it cannot take another blow without dying. So please do not ignore the impacts decisions based on flawed conclusions will make to the social and economic dynamics of my fishing community.

Thank You for Your Dedication,

June 7, 2006

PFMC
Chairman- David Hanson
Council Members

To whom it may concern:

I am writing in response to your proposed season structure impacts for the 2007-08 recreational fishery action alternatives, compared to the no action alternative.

As the former owner of Garibaldi Charters and now a employee for the company I have a vested interest in the sport fishing industry in Garibaldi. The only acceptable alternative is the NO ACTION PLAN. Your 1a and 1b plans would by our records cause us to lose 50% of our business. Your plan 2, 3a and 3b are also unacceptable. If 1a and 1b were to be put into effect not only would the charter business be closed, but it would also effect the shops, gas stations, restaurants, grocery store, banks and every other business in Garibaldi. With the gas prices going up, the price of a day of fishing and lodging going up and our fishing seasons less and less our quota's being cut, how much longer do you think anyone can stay in the fishing industry and make a living. Well, let me tell you something, they can't and it's a shame. For the past 15 years we hung in there because we wanted to fish so people could have the experience but we can't much longer, and the sad part about it is that the ocean is full of fish.

Please weigh your options carefully and we can only hope your decision will be the right one as the Charter Companies really don't have too much to say about their future in this matter.

REMEMBER THE NO ACTION PLAN IS THE ONLY ACCEPTABLE ONE.

Thank You

Sharon Davis

Sharon Davis
Davis Fisheries

Classy Touch Imports & Gifts
236 Garibaldi Avenue P.O. Box 605
Garibaldi Oregon 97118

June 8,2006

Pacific Marine Council

Attention: Dave Hansen and Council Members

Dear Sirs:

It has been brought to my attention that there has been a proposal made to change the fishing guide lines for the year 2007-08, which will impact our fishing community greatly.

As a member of the Chamber of Commerce and a Business owner in Garibaldi, I feel we all depend on the fishing season heavily to support our town. They buy their gas here, stay in our motels, eat at our restaurants and shop at our local retail shops.

I feel adopting measure 1A or 1B would surely put the Charter Boats out of business. Which means I would have to eventually close my doors too.

I would hope you would accept my vote to take no new action.

Sincerely,

Gerry Bales

Gerry Bales
Classy Touch Gifts and Art Gallery

Pacific Fisheries Management Council
Chairman David Hanson
Council Members

Dear Sirs,

I have been in the fishing industry since 1968 and owned KERRI LIN CHARTERS since 1975. There have been many changes in regulations, limits and prices during this time. We try to help the local economy by having customers use local motels, food services, and gift shops. We are trying to survive.

The 2007-08 ODFW options was shown to me yesterday. There is only one option to help us stay in business: NO ACTION.

I concentrate on the fish inside 40 fathoms from May to early Sept. Other charters go "out deep" for the halibut and cod. We should be allowed to do that for a longer period of time. When we are forced inside, the quota goes quickly.

Let us fish. Don't confuse the public with constant changes. Help Garibaldi businesses.

Thank you,
Jon F. Brown
06/08/06

Bayshore
INN

Jim & Alberta Stamm, Managers

P.O. Box 584
227 Garibaldi Avenue
Garibaldi, Oregon 97118

(503) [illegible]
Fax (503) [illegible]
[illegible]

6-8-2006
PFMC
Chairman & Council Members,

Dear Sirs,

We have been informed that you are considering greatly reducing the number of fishing days for the 2007-2008 fishing season. My husband and I have managed the Bayshore Inn in Garibaldi for many years. In the spring, the bulk of our customers come from recommendations of the local charter offices. Many private boat owners stay with us, too. Any reduction in fishing could be devastating to our business.

We understand that some of the options you are considering could actually put charter offices completely out of business. This would seriously affect our whole community as the fishing and related businesses, and the lumber mill are our only employers. Instead of being one of Oregon's true fishing villages, we could become one of Oregon's newer ghost towns. Please consider the economic restrictions these type of regulations would have for all of Oregon's coastal towns. Our fishermen are always amazed by the abundance of fish around here, so it is hard to understand why you would have to shut down a whole industry because you think one species may be endangered.

Sincerely,

James A. Stamm
Alberta R Stamm

Loyce B. Bass
P.O. Box 408
Garibaldi, OR 97118

Dave Hansen and Council Members
Pacific Marine Fisheries Council

June 8th, 2006

Dear Mr. Hansen and Council Members:

It is with dismay I have learned of possible additional limitations of the charter fishing season in my beloved Garibaldi and other Pacific Coastal areas.

Please consider my concerns in your decision:

- The negative effect on the livelihood of charter businesses in our already economically struggling area
- The negative effect on the spin off business locally, i.e.: motels, restaurants, retail businesses
- Limitations on the opportunity for visiting and local fishermen's family members to experience the lively port area, including educational opportunities of the importance of the bay and estuary
- The negative effect to the Port of Garibaldi, as fewer charter businesses survive to utilize the charter slips

My family and I have been coming to this area since 1982, enjoying the fishing village atmosphere enhanced by the charter boats and the tourist business they attract.

It is my request that no changes be made in the current season and allowable catch.

Please allow the charter industry to survive, as it barely doing at this time. Garibaldi and other coastal communities need the life infused by the fishing industry.

Thank you for your kind consideration of my input into your decision.

Very truly yours,

Loyce B. Bass

Loyce B. Bass

June 8, 2006

Atten: Pacific Fishery Management Council
Don Hansen, Chair and Council Members
Reg: 2007-2008 Ground Fish Regulations

After attending the public meetings held by ODF&W and learning about what the PFMC is considering I felt it necessary to advise you of our situation.

We are a family business operating two six pack charter boats fishing out of Gold Beach and Port Orford. Due to the past and certainly current salmon regulations over 90% of our business is halibut and bottom fish.

We operate year round and depend on this as our livelihood for my wife and myself and our two sons as well as one employee. Any further restrictions i.e. shortened seasons, reduced bag limits or depth restrictions above what we deal with now would severely impact our business in a negative way to the point of putting us out of business.

We understand the conservation issues and practice release techniques developed by the ODF&W using release baskets and fishing shallower water whenever possible.

Our customers, due to the population base, travel a minimum of three hours to fish with us and as a result spend time coming and going in the community which also adds to the economic value of them fishing with us. We are the only charter business out of these two ports that work on a full time basis and this oportunity for cusomters to fish and ourselves make a living in a tourism based economy would be lost in the event further restrictions were put in place.

We ask the PFMC carefully reviews this when they set the regulations as we are not the only ones that will be put out of business as there are others exactly like us up and down the coast.

I thank you for your time and consideration.

Sincerely,

Mark Lottis

Mark Lottis, Partner
Five Star Charters
Gold Beach

June 7, 2006

Atten: Pacific Fishery Management Council
Don Hansen, Chair and Council Members
Reg: 2007-2008 Ground Fish Regulations

This letter is to convey our Association's position on further restrictions on ground fish i.e. season limits and/or bag limits.

We represent over fifty individuals and local businesses that depend heavily on the recreation and economic value that this brings to the Gold Beach area.

Our fishing grounds are already highly restricted naturally as of result of weather conditions that prevent over fishing. We need a full year round season just to get in a reasonable amount of fishing days. If any further restrictions are put on rock fish and lingcod we will for all practical purposes not have any opportunities at all for this fishery.

Please take this into consideration when making the 2007-2008 regulations.

Sincerely,

Don Foss

Don Foss, Secretary
Curry Sportfishing Association

Port of Newport

600 S. E. BAY BOULEVARD NEWPORT, OREGON 97365 (541) 265-7758 FAX (541) 265-4235

Memo

To: Pacific Fisheries Management Council (PFMC)

From: Don Mann, General Manager

Copy: ODFW Commission
Port of Newport Commission

Date: June 12, 2006

Re: Proposed Management Measures for the 2007-08 Oregon Recreational Groundfish Fishery

---

Please consider the following comments and information prior to any final decisions that will affect or change the present groundfish fishery off the Oregon Coast.

It is our recommendation that the no action alternative be taken based on the following:

- In consideration of *Action Alternative 1a*, it should be noted that 48% of all 2005 angler trips out of Newport were for groundfish. This proposed alternative would represent a 20% loss of all angler trips. This represents approximately 20% loss of launch revenue, recreational moorage fees – both long and short term, charter lease fees, as well as visitors to our RV Park. These numbers equate to a 15% loss of revenue to our total annual budget, nearly $344,000 ... just one port on the Oregon Coast.

- Action *Alternative 1b* could have an even larger affect due to the fact that the Department is proposing to reduce the recreational halibut catch and further reduce time on the water. It has taken nearly 10 years to rebuild and bring back the halibut stocks to the point that Oregon recreational fishers rely and look forward to the halibut openers as a relief to the salmon restrictions that keep mounting.

- It is difficult, with such little time to prepare, to place an exact dollar amount on the economic impact that the proposed management measures could have locally, especially given the fact that we are right in the middle of one of the worst salmon disasters to hit the coast since the listing of the coho.

I don't have the answers or another alternative that would further reduce the impacts on the yelloweye rockfish and canary rockfish, but I do know that any further restrictions to bottom fish bag limits or reduced fish days is not a good idea.

The Port of Newport recommends status quo.

L:\CORRESP\odfw groundfish mgmt.doc

WASHINGTON DEPARTMENT FISH AND WILDLIFE
JUSTIFICATION FOR APPLYING THE RAMP-DOWN OY APPROACH
TO REBUILDING YELLOWEYE ROCKFISH

As noted in the Draft Environmental Impact Statement (EIS) and the Groundfish Management Team report on Agenda Item F.2, the yelloweye is data poor and highly uncertain. All of the yelloweye assessments have been tuned to a recreational catch-per-unit-of-effort (CPUE) index and lack fishery independent trend information. Standardized fishery independent sampling is designed so that changes in sampled indices reflect changes in the population being measured rather than the method of sampling. Fishery CPUE can be prone to those changes being partially reflective of changes in behavior of the fishery (area, gear, target strategies, etc.) rather than changes in the population. As noted by the Center for Independent Experts reviewer of a previous yelloweye assessment, "CPUE data are of fundamental importance in this assessment because this is the only data type which provides direct evidence of biomass trends. However, there is always doubt as to whether any fishery-derived CPUE series is proportional to abundance." The current assessment authors state, "As in the previous assessments, the sparseness of the size and age composition data and the lack of a relevant fishery-independent survey has limited the model's ability to properly assess the status of the resource."

The baseline model assumed a single coast-wide stock and complete mixing. Given the apparently sedentary nature of this species this may be unrealistic. However, even though the approach may be desirable, current data are too sparse to support area-specific models. This is especially problematic in trying to construct the historical population required to model the population off Washington within the Stock Synthesis 2 software employed in the assessment. Although data are too sparse for a specific model off the Washington coast, previous assessment authors have commented on data that may point to a less depleted yelloweye resource in this area (trawl survey abundance, lower historical exploitation, larger average size). "The WA result is for a much lesser degree of stock decline." (Methot, et al. 2002 Yelloweye Assessment). However, until further data are collected, we will be unable to address this uncertainty. As stated in the assessment, "…due to catch restrictions since 2002, catch-per-unit-effort (CPUE) data no longer reflect the real changes in population abundance, and discard estimates are highly uncertain."

Uncertainty in the data and assessment versus the certainty of the major impacts upon industry need to be a consideration in how we proceed with respect to yelloweye rockfish.

One source of information for stocks off Washington might be to collaborate with Department of Fish and Oceans, Canada to draw upon information on the yelloweye stock and management response immediately to the north in British Columbia. Yelloweye catch quotas for the British Columbia fishery for the current year are 83 mt for the commercial fishery off the west coast of Vancouver Island, and 284 mt coastwide. Recreational catches would be in addition. To provide some perspective, this means, that after rebuilding our yelloweye stock over a 70 to 80 year period, the MSY catch level for the entire US coast will still be less than half the total of the current annual commercial catch off the west coast of Vancouver island (less than the length of the Oregon coast).

Efforts to Collect Additional Data

The Washington Department of Fish and Wildlife (WDFW) is working on several initiatives to collect additional biological data and fishery information, including:

- In 2006, WDFW is partnering with the International Pacific Halibut Commission to enhance their longline halibut survey by setting additional stations in "untrawlable" areas off Washington's north coast. WDFW hopes to continue this effort in 2007 and would also like to expand the enhanced survey with additional stations off Oregon.

- WDFW is working with scientists from Alaska and British Columbia to assemble and review data on yelloweye growth and natural mortality; these data could potentially be used to address the assumption for natural mortality (M) in the next stock assessment.

- Collection of biological and species distribution information from federal and state at-sea observer programs.

- In May, WDFW began a voluntary recreational private angler camera project to collect species identification and length data from recreational fishers.

- In May, WDFW began a voluntary logbook program for charter and private recreational boats; these data could help identify the fishing locations of these fisheries and bycatch information on canary and yelloweye rockfish.

- Also in May, WDFW began a voluntary logbook program for limited entry fixed gear participants to collect much-needed fishery location data.

In addition to these efforts, WDFW is continuing to develop a yelloweye occurrence and habitat GIS database, implement a strong public education program, and work with stakeholders from commercial and recreational fishers to refine yelloweye rockfish conservation areas (YRCAs).

Impacts to Washington Recreational Fisheries

Under the $T_{F=0}$ yelloweye OY, the estimated loss to recreational fisheries is about 1,150,000 angler trips (as noted in Chapter 7 of the draft EIS, section 7.2.10.1.1, p. 49). Washington recreational bottomfish and halibut angler trips are estimated to decline by 30% under the yelloweye OY of 12 mt (Chapter 7, section 7.2.10.1.1, p. 50). These projected reductions in angler trips would cause undue hardship on Washington's coastal communities that are already depressed.

For reference, the status of Washington's coastal communities was described in the 2000 U.S. census. In 2000, the population of Neah Bay was 794, which is a 13.3% decline from 1990. There is a 24% unemployment rate in Neah Bay. The per capita income was $11,338 with a median household income of $21,635; these data indicate that 29.9% of the Neah Bay population is below the poverty level. A lot of the employment in Neah Bay is seasonal in nature, with fisheries employing about 300 people per year.

Also according to the 2000 U.S. census, the population of La Push was 371. There is an unemployment rate of 27.4% in La Push. The per capita income was $9,589 with a median household income of $21,750, which indicates that 34.5% of the population is below the poverty level. In 2000, the population of Westport was 2,137. There was a per capita income of

$17,362, and a median household income of $32,037, which indicates that 14.3% of the population is below the poverty level.

In 2006, Washington's recreational fisheries were further constrained by the implementation of depth restrictions off our North Coast and central areas, where yelloweye are caught. These include a 20-fm depth restriction applied to the fisheries operating out of Neah Bay and La Push from late May through the end of September, and a 30-fm depth restriction from mid-March through mid-June to the recreational fishery out of Westport. Given the location of the continental shelf off Neah Bay, the 20-fm depth restriction is about 0.5 to one mile offshore. These depth restrictions, especially in the North Coast area, have severely impacted recreational bottomfish fisheries targeting healthy lingcod and black rockfish stocks, and have resulted in additional economic loss to the coastal communities.

With regard to Action Alternatives 1 and 2, the results of these alternatives would virtually eliminate the Washington North Coast recreational halibut fishery in Neah Bay and La Push. There are 38,985 angler trips taken out of Neah Bay annually, 26% of which (10,166) are halibut trips. There are an additional 7,984 angler trips originating out of La Push, 17% of which (1,389) are halibut trips. Both Neah Bay and La Push are considered to be vulnerable recreational fishing communities and they both have very low resiliency (as noted in Chapter 7 of the draft EIS, section 7.1.5.2.2 on p. 30). Action Alternative 1 would result in a decrease of 33% in recreational charter trips, and a decrease of 27% of private boat trips in the North Coast, and Alternative 2 would reduce charter trips by 42%, and private boat trips by 32% (Chapter 7, section 7.2.11, p. 53). These reductions are the result of fishery closures and increased depth restrictions, but do not include any projected reductions resulting from the proposed area closures for yelloweye conservation; therefore, the estimated reductions are likely low.

Impacts to Washington Commercial Fisheries

Under the TF=0 yelloweye OY, the estimated loss to commercial fisheries is over $100 million in ex-vessel revenues, which would result from complete closures of the tribal groundfish fisheries and closures of Washington longline and pot fisheries (as noted in Chapter 7 of the draft EIS, section 7.2.10.1.1, p. 49). Commercial ex-vessel revenues could decline by as much as 40% under the yelloweye OY of 12 mt (Chapter 7, section 7.2.10.1.1, p. 50). To ensure this low OY was not exceeded, the non-trawl rockfish conservation area would have to expand from the shoreline to 150 fms offshore, precluding access to prime sablefish and dogfish areas that are the backbone of Washington's longline fishery. The economic impacts resulting from these measures, again, would cause undue hardship on Washington's coastal communities that are already depressed. Areas labeled "most vulnerable" with regard to commercial fishing in Washington include Neah Bay and Ilwaco; other commercial vulnerable areas with low resiliency include La Push, Westport and Bellingham.

For the reasons described above, the Washington Department of Fish and Wildlife believes the ramp-down strategy is justified for setting the OY for yelloweye rockfish.

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON TENTATIVE ADOPTION OF 2007-2008 GROUNDFISH FISHERY SPECIFICATIONS/MANAGEMENT MEASURES AND AMENDMENT 16-4

Mr. John DeVore met with the Scientific and Statistical Committee (SSC), and provided an overview of important issues contained in the reference documents under this agenda item. Most of the analytical methods and technical issues associated with the impacts analyses presented in these documents have previously been reviewed by the SSC. Therefore, SSC discussion of the documents focused on a few topics under consideration for 2007 which were either newly developed, required further clarification, or have become of higher importance than in past years.

The SSC notes that among the management proposals in Draft Amendment 16-4 (Agenda Item F.2a, Attachment 3), there is an option on page 27 where "…the Council may establish a research reserve for any stock, that is within the ABC but above and separate from the OY for that stock." If adopted, this would represent a significant change from the way that mortality associated with research activities has been previously accounted for in groundfish management. Potential advantages to this approach are that the fishery would not be subject to early closure due to unexpectedly high research catches, and research could continue unhindered under most situations, thus providing crucial information that is not otherwise available when stocks are under rebuilding constraints. Total catch accounting means that the catch series used for assessment and rebuilding analyses includes research catches.

The evaluation of action alternatives for cowcod (Agenda Item F.2a, Attachment 3, pages 72-73) raises the issue that modifying the current Cowcod Conservation Area (CCA) boundaries could undermine the ability to replicate the recent submersible survey within the CCA. The SSC notes that the methodology used in conjunction with the previous survey to extrapolate the findings over other habitats outside the CCA would not be appropriate for future surveys, and therefore CCA management consistency would not be an issue with respect to future survey work. Of greater importance is that fishing mortality is no longer distributed across all areas, and hence future surveys should be conducted both inside and outside the CCAs, so that the abundance extrapolations may be stratified accordingly. While there may be good reasons to consider not changing the CCA boundaries, possible impacts to future survey work is not one of them.

The economic impact analyses take into consideration current economic effects, but not how these effects may change through time. For example, it is not clear how an economic sacrifice today may be mitigated by increased revenue due to higher abundances at a future date, or how loss of current fishing opportunities may result in loss of port infrastructure that reduces future fishing opportunities. A dynamic benefit-cost analysis would help inform the Council on these trade-offs. However, such an analysis would need to project forward for all fisheries and sectors impacted by overfished species, which would be a complex undertaking.

PFMC
06/13/06

Notes from SSC to John DeVore:

Clarifications and recommendations for reference documents

- *The analyses that report time to rebuild in fractional years imply greater precision than is appropriate. Round rebuilding times to nearest whole year.*
- *Care should be taken to not make value judgments in the analyses. For example, the risk associated with canary rebuilding is not much different among alternatives, and therefore the expected duration of rebuilding should be highlighted among alternatives, rather than risk of not rebuilding.*
- *It would be useful to present the difference in rebuilding times in both absolute years and as percent change. For example, a hypothetical one year increase is negligible if the rebuilding time is 70y, but it is a 50% increase if the rebuilding time is 2Y.*
- *Table 1 in Supplemental Report 5 should be appended to include community impacts.*
- *In Draft Amendment 16-4, it should be clarified that the year that a stock is expected to be rebuilt is not an absolute. Statements such as "the year in which the stock would be rebuilt…(page 39)" should be revised to convey less certainty.*
- *It would be desirable to clarify the notion of a stock. In particular, for a situation such as lingcod where it has a continuous latitudinal distribution but clear geographic differences in progress toward rebuilding, it may be appropriate to have an established mechanism or process to identify a "unit to conserve" that is smaller than the overall stock.*

APPENDIX C

PUBLIC COMMENT

PROPOSED ACCEPTABLE BIOLOGICAL CATCH AND OPTIMUM YIELD SPECIFICATIONS AND MANAGEMENT MEASURES FOR THE 2007-2008 PACIFIC COAST GROUNDFISH FISHERY

AND

AMENDMENT 16-4: REBUILDING PLANS FOR SEVEN DEPLETED PACIFIC COAST GROUNDFISH SPECIES

DRAFT ENVIRONMENTAL IMPACT STATEMENT

JULY 2006

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Portland, OR 97202 www.oceana.org

November 23, 2005

Delivered via: email (pfmc.comments@noaa.gov) and Facsimile: (503) 820-2299

Dr. Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

RE: 2007-2008 Pacific Coast Groundfish Fisheries Specifications and Management Measures EIS

Dear Dr. McIsaac:

The National Marine Fisheries Service and Pacific Fishery Management Council have announced their intent to prepare an Environmental Impact Statement (EIS) or Environmental Assessment (EA) that would establish the 2007-2008 commercial and recreational harvest levels and management measures for the Pacific Coast groundfish fisheries.[1] In accordance with the National Environmental Policy Act, Oceana offers the following scoping comments on the proposed action and on the significant environmental issues which surround authorization of the Pacific Coast groundfish fisheries.

As you are aware, the Pacific Region continues to authorize the groundfish fisheries without having prepared a Fishery Management Plan-level Programmatic EIS. Such an EIS is long overdue, and its preparation must be considered alongside the 2007-2008 specifications NEPA documentation.

Environmental Issues

Over 80 species of groundfish are managed under the Pacific Coast Groundfish Fishery Management Plan, including eight overfished stocks. Pacific groundfish support diverse commercial and recreational fisheries that operate under different management measures and levels of observation and, which have varying levels of impacts on the California Current Large Marine Ecosystem. Establishing commercial and recreational harvest levels for 2007-2008 is a major federal action significantly affecting the quality of the human environment that must be considered in an EIS. That EIS must consider fully the direct, indirect and cumulative impacts on the marine environment. The analysis must consider the environmental effects of groundfish fisheries including:

- Effects on habitat;
- Bycatch rates and discard amounts of commercial and non-commercial marine life;
- Effects on populations of overfished and non-overfished species; and
- Effects on endangered species and marine mammals.

Ecosystem-based management

The major focus of the proposed action is to determine acceptable biological catches and optimum yields for groundfish species and complexes. The current system for determining catch levels is based on the objective of maintaining fish stocks at levels producing maximum sustainable yield (MSY). We believe

[1] 70 Federal Register 61595 (October 25, 2005)

it is time for the Pacific Fishery Management Council to shift from the single-species MSY approach to an ecosystem-based approach in which catch amounts are based on Ecologically Sustainable Yield (ESY).[2] ESY and ESY fishing rates incorporate the principles of ecosystem-based management by considering the impacts of harvesting species in the context of the marine ecosystem, rather than on single-species stocks in isolation of each other.

Ecosystem-based management is being increasingly recognized as a management system that will lead to better decisions that protect the marine environment while balancing multiple uses of the oceans. We see an imperative need for a more comprehensive management approach that considers all links among the living and nonliving resources of our oceans, rather than viewing single species and issues in isolation. While we recognize that the Pacific Fishery Management Council is taking steps towards an ecosystem-based approach, including measures such as habitat protection and a preliminary decision to prohibit fishing for krill, more work is needed to integrate the principles of ecosystem-based management into the Pacific Region. To progress forward with ecosystem-based management, catch levels for the 2007-2008 Pacific Coast groundfish should explicitly account for ecosystem needs.

Oceana appreciates the complexities of managing the commercial and recreational Pacific Coast groundfish fisheries. As the 2007-2008 specifications and management measures EIS progresses, we look forward to further discussion of pressing conservation issues associated with the groundfish fisheries, the California Current Large Marine Ecosystem, and the integration of ecosystem-based management.

Sincerely,

Jim Ayers

Jim Ayers
Vice President, Pacific

[2] See: Fowler, C.W. 1999. Nature's Monte Carlo Experiments in Sustainability. NOAA Tech. Memo. NMFS-F/SPO-40. Zabel et al. 2003. Ecologically Sustainable Yield. American Scientist 91:150-157.

F.1.d.

NRDC
THE EARTH'S BEST DEFENSE

The Ocean Conservancy

OCEANA

March 30, 2006

Chairman Don Hansen
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Re: Yelloweye Rockfish Specifications

Dear Chair Hansen and PFMC Members:

We are writing to comment on the 2007-08 specifications proposed for yelloweye rockfish in response to the fact that yelloweye are "lagging behind the current Council-adopted schedule"[1] for rebuilding. In particular, we take issue with the Groundfish Management Team's (GMT's) proposal to increase the OY above that identified by the Scientific and Statistical Committee (SSC) as consistent with current Council rebuilding parameters for yelloweye. This letter explains our reasons for supporting a lower OY and suggests steps the Council can take to improve our information on yelloweye and take the needs of fishing communities into account.

The Council must rebuild yelloweye as quickly as possible

First, the OY proposed by the GMT conflicts with the recent decision by the Ninth Circuit Court of Appeals invalidating an analogous decision regarding the 2002 OY for darkblotched rockfish.[2] As the SSC has recognized, the Magnuson-Stevens Act and the recent Ninth Circuit opinion require that OYs be set at a level that will make "the rebuilding period as short as possible."[3] Instead, the GMT's recommendation is *double* the level that would result from applying the current yelloweye rebuilding parameters to the revised estimate of maximum time to rebuild. The GMT's proposal is not tenable under this unambiguous precedent.

Second, doubling the OY relative to the level called for in the current rebuilding plan is inconsistent with the recommendation of your scientific advisors on the SSC. The SSC notes that if the Council follows its current rebuilding policy with a new, lengthened T_{max}

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[1] SSC Report on Yelloweye Stock Assessment, March 2006, Agenda Item F.3.b.
[2] Natural Resources Defense Council v. National Marine Fisheries Council, 421 F.3d 872, 881 (9th Cir. 2005).
[3] id

of 2096, the 2007 OY using the coast-wide model would be 12.6 metric tons, not 25 mt as recommended by the GMT.[4]

Third, we are concerned that the GMT proposal would create a strong risk of serial depletion of yelloweye. Stock assessment data clearly reveal significant differences in the status of yelloweye among the states. State-based or regional OYs would be a logical way to avoid putting more pressure on yelloweye than the population in certain regions can withstand. If the Council and NMFS cannot take that approach yet because the Washington model still needs improvement, it should take into account the extra risk of local depletions that a coast-wide OY could produce, especially at the higher level proposed by the GMT, if effort is heavier in some areas than others.

Fourth, uncertainty levels are very high for this species. The record is longer and the information better for yelloweye in California than for Oregon, and better for Oregon than for Washington. The depletion level of yelloweye is also greater for California than for Oregon, and greater for Oregon than for Washington. In other words, the more we know about yelloweye in a particular region, the worse off the population in that region appears to be. Likewise, as more data sources have been added to the stock assessment, the picture given by the assessment has worsened. We point this out not to suggest that correlations are causal relationships, but to note that lack of information has consistently been associated with too rosy a picture of yelloweye. That could change, but there are clearly good reasons to be cautious in the face of the uncertainty surrounding yelloweye.

In their consideration of similar "phased" fishing mortality reductions, the New England Groundfish Science Peer Review Panel confirmed the need for a risk-averse approach to rebuilding. That panel concluded that "if such a [rebuilding] strategy stages the F reductions so that the initial drop is small, then the prevailing risk to the stock will likely be higher than a strategy where all the 'pain' is taken at the start of the rebuilding period."[5] We hope the Pacific Council does not plan to start following the lead of the New England Council, whose refusal to end overfishing has put both the cod and the region's fishermen in jeopardy.

Solutions

The Council and NMFS should develop a systematic approach for identifying the shortest time period possible for rebuilding overfished species, consistent with the court's recent decision. The time to do that is now, before the next round of revisions to existing rebuilding plans.

The Council and NMFS should identify and pursue tangible steps that can be taken next year or earlier to reduce yelloweye effort and catch, similar to those taken to reduce cowcod effort quickly in 2003. Like cowcod, adult yelloweye have high site fidelity and can benefit substantially from marine protected areas or closed areas in yelloweye

[4] Furthermore, as the SSC notes, the PFMC's approach to determining rebuilding periods by using the maximum, not the minimum, possible time period has been deemed inappropriate by a Ninth Circuit Court of Appeals decision.

[5] Report on the Groundfish Science Peer Review Meeting, 20 (AR Doc. 2612, D-03-472).

hotspots. Such measures are already in place; we urge the Council to expand their use with help from information on hot spots derived from observer and/or fishing data and other relevant sources.

Regional management appears to be a must for this species; because depletion levels vary significantly by state, a single coast-wide OY can pose significant risks if greater effort occurs in areas where yelloweye are most vulnerable. Completion of the Washington sub-population model and other steps needed to lay the foundation for regional management should be a high priority. Likewise, we hope the Council and NMFS pursue recommendations made by the SSC as far back as 2002 for a joint assessment with Canada.

Finally, the sparseness of data is a significant problem in this fishery. Available data should be augmented through increased observer coverage on the commercial halibut fleet and funding for fishery-independent surveys done with submersibles, ROVs or other underwater vehicles equipped with quantification tools.

Taking the needs of fishing communities into account

The GMT seeks to justify delaying adoption of a 12.6 metric ton OY by arguing that several years are needed to develop tools to achieve the lower OY with lower fishing impacts. Bycatch problems for yelloweye and other species have been known for years now. The question that logically arises is: why not take those steps on a faster schedule? California has used landings data to identify canary hotspots: why not compile spatial data to identify additional hot spots that could be closed to deliver a big bang for the buck in reducing yelloweye bycatch? Can observer data be mined to help fine tune spatial management tools? The more quickly such action is taken to rebuild populations like yelloweye, the faster fishing communities will reap the benefits of healthier stocks.

A modeling run conducted by the GMT suggests that the rebuilding periods resulting from two distinct strategies for rebuilding yelloweye over many decades (beginning with an OY of 12.6 mt vs. 25 mt) differ by only six months. But that analysis does not adequately take into account the importance of big old fish, the sporadic nature of recruitment, or the likelihood of serial depletion in some parts of the yelloweye range under the higher OY. We believe the GMT's OY could result in significantly longer rebuilding periods and more persistent restrictions on fishing due to any of these factors.

A recent study of the economic implications of rebuilding depleted fish populations found that the catch of overfished Pacific groundfish is worth three times as much (net present value) once they are rebuilt as in their current depleted state. The results were similar for depleted species from around the country, and the report's estimates of benefits are highly conservative. These findings underscore the economic benefits of staying the course of rebuilding and of tools like protected areas that can help avoid overfishing in the first place.[6]

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[6] Sumaila, Ussif Rashid and Elizabeth Suatoni, 2005. Fish Economics; the Benefits of Rebuilding U.S. Ocean Fish Populations, Fisheries Economics Research Unit

We appreciate the opportunity to comment on this important subject. We look forward to working with the Council to develop an approach that will rebuild yelloweye as quickly as possible and improve our understanding in the future.

Sincerely

Karen B Garrison

Karen Garrison
Co-Director of Ocean Initiative, NRDC

David Newman
Legal Fellow, NRDC

Meghan Jeans
Pacific Fish Conservation Manager, The Ocean Conservancy

Jim Ayers
Vice President, Oceana

Cc: Frank Lockhart, NMFS
Dr. Don McIsaac, PFMC Executive Director
GMT
SSC

FILE
RGG. AN, MGT

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April 5, 2006

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PFMC

Mr. D. Robert Lohn
NOAA Fisheries Regional Administrator
7600 Sand Point Way NE
BIN C15700, Bldg. 1
Seattle, WA 98115-0700

RE: Salmon bycatch in Pacific groundfish fisheries

Dear Mr. Lohn:

In light of the current decisions facing the Pacific Fishery Management Council and NOAA Fisheries, we request that the agency immediately review, analyze, and present a comprehensive report of salmon bycatch in the Pacific groundfish fisheries, in particular the whiting fishery and bottom trawl fisheries, to the Pacific Fishery Management Council and the public. While we are aware of the recent *Reinitiation of Section 7 Consultation Regarding the Pacific Fisheries Management Council's Groundfish Fishery Management Plan*, we believe that in order to make rational decisions, the Council needs detailed information about interception of all Pacific salmon stocks by the Pacific groundfish fisheries, on a salmon stock-by-stock basis. We recommend this information include the estimated interception of Klamath River Chinook salmon.

Further, we recommend a separate section of the report include a description of the methodology of salmon bycatch accounting presently used, and a discussion of any deficiencies in data, data collection, or data dissemination that frustrate responsible management. Should the agency be unable to complete this section of the report in time for consideration during the currently ongoing Council meeting, the agency must provide this information to the Council and the public well in advance of the Council's next meeting.

Sincerely,

Jim Ayers
Vice President

cc: Chairman Donald Hansen, PFMC
Dr. Donald McIsaac, PFMC

FILE
RGG. AN. MGT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

April 12, 2006

Reply To
Attn Of: ETPA-088

RECEIVED
APR 14 2006
PFMC

Ref: 06-011-NOA

Dr. Donald McIsaac
Pacific Fishery Management Council
7700 N.E. Ambassador Pl., Suite 200
Portland, OR 97220

Dear Dr. McIsaac:

We have reviewed the Federal Register Notice of Intent (NOI) to prepare an environmental impact statement (EIS) to expand the scope of the original 2007 - 2008 Pacific Coast groundfish fishery specifications and management measures on the human, biological and physical environment. The scope of the EIS would be expanded to include an analysis of the impacts of revising the rebuilding plans for the seven overfished Pacific Coast groundfish species. Our review of the NOI was conducted in accordance with our responsibilities under National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Thank you for the opportunity to provide comments at this stage of the EIS development process.

Section 309 specifically directs the U.S. Environmental Protection Agency (EPA) to review and comment in writing on the environmental impacts associated with all major federal actions. Under our Section 309 authority, policies and procedures, our review of the draft EIS prepared for the proposed project will consider the expected environmental impacts, and the adequacy of the EIS in meeting procedural and public disclosure requirements of NEPA.

We understand that the EIS will include two actions. The first would be to establish 2007-2008 biennial harvest specifications and management measures for fisheries covered by the Pacific Coast Groundfish Fishery Management Plan (FMP). The second action would consider revising rebuilding plans for the seven depleted groundfish species which may require amending the groundfish FMP. In addition, we understand that the Ninth Circuit Court ruling interpreted the requirements of the Magnuson-Stevens Act that the rebuilding plans must be as short as possible and that the short-term needs of fishing communities may be taken in account in setting rebuilding periods.

As you are aware addressing these actions will require a fine balance between fish species and fishing community needs. Assuring that the proper balance is achieved will require the most recent, comprehensive and accurate data available for both fish species and fishing communities. We encourage the Management Council and National Maine Fisheries Service to use all available quality data appropriate for performing your fish species and fishing community assessments, including observer data where appropriate.

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In addition to the rebuilding plans for the seven depleted groundfish species, we are interested in the assessments for those species whose stocks are approaching overfished levels such as the Pacific Whiting. With the potential for some of these stocks to be depleted, we recommend that appropriate margins of safety be incorporated into the management measures for these species to assure that healthy stocks are maintained.

We appreciate the opportunity to participate early in the planning process for this project and are available to discuss issues or answer questions that arise while you develop the draft EIS. Should you have any questions regarding our comments please contact me at (206) 553-6382 or by electronic mail at letourneau.mike@epa.gov.

Sincerely,

Michael W. Letourneau
Environmental Scientist

cc: J. Devore, PFMC

NRDC
THE EARTH'S BEST DEFENSE

April 13, 2006

BY FAX (503-820-2299) AND MAIL

Dr. Donald McIsaac
Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Re: 2007-08 EIS Scoping Comments

Dear Dr. McIsaac:

On behalf of the Natural Resources Defense Council, we are writing to provide scoping comments on the environmental impact statement ("EIS") on the 2007-08 Pacific Coast groundfish fishery specifications and management measures ("2007 specifications"). A notice of intent to prepare the EIS was published in the Federal Register March 14, 2006. These comments supplement those we sent on yelloweye rockfish phasing on March 30, 2006.

It is essential that the EIS evaluate fully all potential environmental issues relating to the 2007 specifications and present a full range of alternatives for all important choices faced by the National Marine Fisheries Service ("NMFS") in crafting the specifications. Among other crucial issues, the EIS must present a full analysis of the following issues:

- The current status of the different species managed in the Pacific groundfish fishery, especially those species known or suspected to be overfished.
- A detailed discussion of the management of overfished species over the past several years, including but not limited to data on actual mortality levels for those years and a discussion of whether actual mortality levels have exceeded the optimum yields (OYs) set by NMFS in past years and whether overfishing has been occurring. If actual mortality levels have (or may have) exceeded OYs set by NMFS, the EIS must present an analysis of the environmental consequences.
- A detailed discussion of the ability of current management methods to constrain actual mortality to the levels established by NMFS in its annual specifications, and a detailed analysis of alternative management measures that could offer more reliable control over the actual level of fishing harvest.

- A full discussion of bycatch issues, including but not limited to: (a) identification and analysis of the amount, type and sources of bycatch occurring in the fishery, especially for each overfished species; (b) a full analysis of the effects of bycatch on the fishery, especially on overfished species; (c) an analysis of the sources of uncertainty in bycatch estimates and potential tools for taking that uncertainty into account (for example, in the North Pacific bycatch is projected to be higher on vessels not carrying an observer); (d) a full analysis of the effect of current management techniques and methods (including allocations) on the amount and type of bycatch occurring in the fishery; and (e) an analysis, for each overfished species, that examines each potentially available bycatch reduction technique and determines whether that bycatch reduction technique is practicable for use in managing that species and if not, what steps should be taken to make it practicable.
- A consideration of management objectives that may be outdated, such as full utilization of the groundfish resource, and alternatives that are better suited to the realities of scarcity and vulnerable species.
- A full discussion of efforts by NMFS and the Pacific Fishery Management Council to foster and encourage a year-round Pacific groundfish trawl fishery; the environmental consequences of this year-round fishery; alternatives to a year-round fishery.
- A full discussion of the environmental consequences—including increases in the level of bycatch—of managing the fishery using small trip limits.
- A comprehensive discussion of rebuilding issues, including analysis of a varied range of rebuilding periods that would potentially meet the requirements to rebuild in the shortest period of time possible and a full discussion for each overfished species of the biological consequences of different catch levels and rebuilding periods. This analysis should include a discussion of major sources of uncertainty in the rebuilding analysis for each overfished population, including uncertainty about total mortality, and the effect of such uncertainty on rebuilding analyses.
- A full discussion of the environmental impacts of different fishing gears and techniques, including impacts on habitat of overfished groundfish and other species.
- A thorough analysis of the effects of authorizing 2007-08 catch levels on the unassessed target and non-targeted species.
- A full discussion of NMFS's ability to enforce the harvest limits it selects for the 2007 and 2008 fishing seasons given its current fishery management techniques.
- A full discussion of the value of area closures for protecting groundfish species and their habitat, especially overfished species, and full consideration of a range of closure alternatives.
- A comprehensive discussion of cumulative impacts.
- A full discussion of the impact on Pacific groundfish of other fisheries, such as state-managed fisheries and non-groundfish fisheries prosecuted in federal waters, and vice versa, e.g. the likely amount and impact on salmon populations of bycatch of Klamath River salmon in the Pacific whiting fishery.

- A full discussion of observer coverage issues, including a full analysis of the adequacy of coverage levels for assessing bycatch and for administering and/or enforcing management measures and catch limits.

This list of issues is not comprehensive. The EIS must discuss fully all issues relating to potential environmental impacts of the 2007-08 specifications and must present a full range of alternatives on all relevant issues.

Sincerely,

Karen Garrison
Co-Director, NRDC Ocean Initiative

Cc: Robert Lohn, NMFS Regional Administrator
Frank Lockhart, NMFS Groundfish Director

NRDC
THE EARTH'S BEST DEFENSE

May 24, 2006

BY FAX (503-820-2299), EMAIL (pfmc.comments@noaa.gov), AND U.S. MAIL

John DeVore
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Re: Draft Amendment 16-4 and 2007-2008 specifications and management measures for the Pacific groundfish fishery

Dear Mr. DeVore:

We are writing on behalf of the Natural Resources Defense Council (NRDC) and NRDC's more than 550,000 members to comment on the draft plans for Amendment 16-4 and the 2007-2008 specifications and management measures (specifications) for the Pacific groundfish fishery. Please include these comments in the June 2006 briefing book.

Overview

We have reviewed the Council's draft proposals from the April briefing book for new rebuilding plans and for the 2007-2008 specifications. We are encouraged by the apparent improvements in the biological condition of a number of the overfished species, and hopeful that the Council will develop a rebuilding approach that applies the shortest time period possible. However, such an approach is not yet clearly in evidence. We are concerned that the Council may use the more optimistic stock assessment results to increase short-term catch levels instead of reducing rebuilding time periods. We also remain concerned that some species (e.g. canary and bocaccio) are still at extremely low levels—in the range of 10% of historic biomass. Although some of the rebuilding alternatives being considered appear to include satisfactorily short rebuilding periods in light of the recent Ninth Circuit decision, NRDC v. NMFS, 421 F.3d 872 (9th Cir. 2005), the fact remains that many of the alternatives do not. Additionally, the proposed plans continue to be based on some of the same fundamentally flawed methodologies as the existing plans, as well as some new ones.

Rebuilding Alternatives

Based on the information available in the April 2006 Briefing Book, many of the proposed rebuilding plan and Optimum Yield (OY) alternatives repeat the problems of the existing plans. Despite ample language to the contrary, the new rebuilding plan alternatives currently under consideration provide no assurances that rebuilding periods will be "as short as possible" or mortality levels as low as possible. Indeed, many of the proposals continue to delay rebuilding beyond what the law requires, and do so by increasing mortality levels.

Rebuilding methodology

The Council acknowledges that NRDC v. NMFS "requires a reconsideration" of the existing rebuilding framework. PFMC, April Briefing Book, Agenda Item F.1.a, Attachment 2, at 5 (April 2006). The existing framework allows the Council to select any target rebuilding date (Ttarget) between the minimum time needed to rebuild in the absence of all fishing (Tmin), and Tmin plus one mean generation time (Tmax), even if that Ttarget is decades longer than Tmin. The Ninth Circuit held that the Magnuson Stevens Act's requirement to rebuild in a time period that is "as short as possible" "cannot be reconciled with a rebuilding period that is from 20 to 33 years longer than the biologically shortest possible rebuilding period...even granting the Agency some leeway in extending rebuilding periods" beyond Tmin. NRDC v. NMFS, 421 F.3d 872, 882 (9th Cir. 2005). Tmax, which is decades longer than Tmin for all of the overfished species, is an impermissibly long time period for rebuilding, and thus inherently illegal.

Nonetheless, many of the rebuilding alternatives being considered in the draft Amendment 16-4 either are pegged to and derived from Tmax, or would set Ttarget decades beyond Tmin, or both. For example, canary rockfish currently has a Ttarget of 2074, which is 17 years longer than the current Tmin. Under the new proposal and according to new stock assessment data, the new Tmin is moved from 2057 to 2048, but the three rebuilding alternatives being considered would establish new Ttargets that are 10, 15, and 23 years longer than the new Tmin, respectively. The longest of these alternatives actually sets Ttarget at Tmax, and so clearly would be illegal if adopted. These alternatives, and the methodology used to develop them, exemplify the potential gap between the Council's statements that the new rebuilding plans will comply with the Ninth Circuit's opinion and the reality of what is being proposed.

While the clear illegality of Tmax sets a definable outer bound for an illegally long rebuilding period, still at issue in the draft of Amendment 16-4 is how much "leeway in extending rebuilding periods" beyond Tmin the Council is allowed and how it must make that decision. The Ninth Circuit explained that the "leeway" was intended "to avoid disastrous short-term consequences for fishing communities." NRDC v. NMFS, 421 F.3d at 880. The Court provided the following example of disastrous consequences:

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

Id. (emphasis added). Thus, the court's example of "disastrous short-term consequences for fishing communities" is a total moratorium on all fishing due to an absolute ban on any bycatch of overfished species. NRDC is not suggesting that a complete moratorium on groundfishing is a feasible or desirable outcome.

The Council seems to be interpreting very broadly what economic "leeway" it is permitted to take in extending the lengths of rebuilding plans beyond Tmin. It is currently engaged in a detailed economic analysis that will consider and attempt to quantify the specific cost of different rebuilding periods on individual fishing communities. The analysis looks at two things: (1) what targeted species are caught from which ports, identifying whether the impacts of restricting bycatch on co-occurring overfished species would be High, Medium, or Low/No; and (2) the relationship between exvessel revenue and overfished species mortality. The Council is quantifying the specific economic effects of various mortality levels for overfished species (based on various rebuilding alternatives) but has yet to explain how the two are connected. There is no definable threshold (or even a discussion of the need for one) of what amount of economic impact – either by exvessel, by community, or both – would constitute "disastrous short-term consequences." Absent a threshold and any explanation of how the rebuilding alternatives relate to the economic analysis, the various rebuilding alternatives (and their associated mortality levels) cannot be assessed to determine whether they exceed the amount of economic "leeway" allowed by the Ninth Circuit's decision.

What is clear, however, is that the short-term economic needs of an individual fishing community do not constitute the broad type of "disastrous short-term economic consequences" described by the Court. Taking into account the short-term needs of fishing communities by providing some economic leeway in rebuilding times and mortality levels does not mean that the needs of a particular fishing community that is highly dependent on one or more overfished species can trump the requirement to rebuild as quickly as possible. The economic analysis must factor in the long and short-term economic needs of the entire fishery, and even then, cannot prioritize those needs over the clear priority given to conservation in the Magnuson-Stevens Act. We do not have enough information at this stage to know how the Council intends to use the new analysis. However, a potential use for the results of the analysis - to balance, or arguably prioritize, the needs of the fishing communities over the need to rebuild as soon as possible - conflicts with the Council's own interpretation of the Ninth Circuit's opinion currently contained in draft Amendment 16-4:

> "These actions must also conform to a recent court ruling in the Ninth Circuit Court of Appeals, which held that, among other things, *the purpose of the MSA is to give conservation of fisheries priority over short-term economic interests.* The Court interpreted the rebuilding requirements of the MSA as: 1) the rebuilding periods must be as short as possible; 2) short-term needs of fishing communities may be taken into account in setting rebuilding periods, even when the biology of the species dictates exceeding the 10-year statutory cap. As an example, the Court noted that in order to avoid disastrous short-term consequences, NMFS may set limited quotas that allow for some fishing of plentiful species, despite the inevitability of bycatch."

PFMC, April Briefing Book, Agenda Item F.1.a, Attachment 2, at 1 (April 2006) (emphasis added).

A fundamental question is how low bycatch levels of overfished species can be set without triggering disastrous short-term consequences. The Council has yet to directly address this question, although many of the rebuilding periods and associated mortality rates currently contained in the draft Amendment 16-4 alternatives are longer than what the current rebuilding plans allow and, at any rate, decades longer than Tmin. On that basis alone, many of the alternatives repeat, and some even exacerbate, the problems that exist in the current plans.

The Council may not extend a rebuilding period or Ttarget based on new optimistic stock assessment data. Nor may it use more optimistic data to increase mortality levels while leaving Ttarget alone. "As short as possible," providing some leeway, does not allow for longer periods unless the stock declines unexpectedly in the middle of a rebuilding period and maintaining the same Ttarget would lead to "disastrous short-term consequences." The economic leeway provided under a plan in one year cannot be expanded based on better data without making Ttarget shorter. The leeway remains the same because the "disastrous short-term consequences" that are avoided one year can presumably be avoided the next at the same low catch level.

The Council is developing a new framework for determining rebuilding periods and the annual specifications that flow from rebuilding plans. It cannot replace the existing defective framework with a less formulaic, and thus equally problematic structure. Until the Council adopts rebuilding plans that comply with the law, the Council must adopt mortality levels and accompanying management measures that lead to the shortest rebuilding period, including some leeway to avoid catastrophic economic consequences.

Additional suggestions

We have other suggestions regarding the rebuilding approach described in the draft Amendment 16-4. We urge the Council to include in any new rebuilding approach special consideration for stocks that are at levels approaching 10% of historic biomass or less. NMFS' Technical Guidance for NS1 notes that at levels as low as ½ the minimum stock size threshold—about 12% of historic levels for Pacific groundfish—it "may be necessary to set the fishing mortality rate to as close to zero as possible (i.e. to that associated with unavoidable levels of bycatch)" for a number of years.[1] The Council's own 40:10 policy calls for zero mortality at those low biomass levels. We recommend "as close to zero as possible" as a sensible starting point for setting OYs for species in that category.

We also have concerns about the implications of not fully taking uncertainty into account in stock assessments or rebuilding analyses. Shorter recovery times (i.e., revised times to recovery when F=0) in species such as darkblotched are largely driven by new, steeper stock recruitment curves. We caution against categorical acceptance of these more optimistic predictions due to uncertainties in the estimates of these stock recruitment curves. In some

[1] V.R. Restrepo et al, Technical Guidance on the Use of Precautionary Approaches to Implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Magnuson Act, NOAA Tech Mem NMFS-F/SPO-31, 1998, p. 38

cases, such as in the new assessment and rebuilding analysis of darkblotched rockfish, future recruitments are assumed to be almost entirely independent of the stock size. This apparent disconnect between stock size and recruitment seems likely to have significant error associated with it, and is likely to change with improved data. Thus, assuming a constant stock-recruit curve with no error is problematic. Uncertainty in steepness and Bo translate directly into uncertainty in Tmin, in addition to contributing uncertainty to the probability of recovery under different management scenarios. We recommend that that these uncertainties be incorporated into the rebuilding analyses to produce a more realistic range of predictions.

We plan to make additional comments once the new analysis of alternative OYs is available, and will address other topics, such as FMP goals and objectives and standards for evaluating rebuilding success, at that time. Thank you for your consideration of these comments.

Sincerely,

Karen Garrison David Newman